**Vocabulary Decoding and Contextual Inferencing Processes
of Young Learners during Reading -
A Think-Aloud Case Study**

Annette Elisabeth Schweitzer

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Abstract

This study investigates the role of strategic and non-strategic knowledge sources that young EFL learners retrieve for decoding vocabulary and inferring contextual meaning whilst reading. The inquiry is based on the theoretical frameworks of incidental vocabulary acquisition and interactive reading comprehension processes. The study uses the Think-Aloud Method (TAM) to probe the introspective and retrospective verbalisations of 9 to 10 year old German-speaking students during reading. The main study data were collected over a 3-week period at the German School Shanghai and consists of the learners' Think-Aloud Protocols (TAP).

The findings of the study support the view of reading as an interactive process. In order to understand written texts, the learner's cognitive and metacognitive processes in his or her short-term memory trigger the retrieval of appropriate schematic knowledge from the long-term memory for decoding vocabulary and inferring contextual meaning. The results of the study suggest that the learners retrieved a variety of knowledge sources whilst reading. These included linguistic knowledge, external knowledge and strategic knowledge. The range of strategic and non-strategic knowledge sources retrieved by the learners in this study appear to be similar to the knowledge sources retrieved by both adult and young L2 learners in previous empirical studies.

The quantity and quality of verbal data collected for this study seem to suggest that the learners were capable of introspective and retrospective verbalisation. This study supports the findings of other think-aloud studies which have demonstrated the effectiveness of TAM for investigating the vocabulary learning and reading processes of young learners. Nevertheless, it appears that the use of well-planned training sessions for the researcher to model the thinking aloud process is important for the success of the method. The study also demonstrates that the use of appropriately leveled reading material is essential for effective data collection and analysis.

List of Abbreviations

DSS – Deutsche Schule Shanghai

EFL – English as a Foreign Language

GCE – General Certificate of Education

L1 – First Language

L2 – Second Language

ORT – Oxford Reading Tree Reading Series

TAM – Think-Aloud Method

TAP – Think-Aloud Protocols

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Chapter 1

Introduction

1.1   Context of the Present Study

I started my teaching career in 1993 as a GCE O-Level and A-Level English Language and History teacher in Singapore. In 2006, my family and I moved to China. I was offered a position as head of the Primary English as a Foreign Language (EFL) department at the German School Shanghai (DSS), where I am presently teaching. My students are children of expatriated German-speaking families working in Shanghai. Their first language (L1) is German, although many children grow up speaking more than two languages. English is the first official second language (L2) in the German education system and is taught from kindergarten to high school at DSS.

When I joined DSS, there was no formal language and literacy-learning curriculum in use. My main administrative task was to develop a primary EFL curriculum with clearly defined attainment targets and assessment criteria that were grounded in proper language and literacy learning theories and instructional pedagogy. The challenges that these tasks posed were overwhelming. It took very little time for me to realise that my previous teaching experience and curriculum development and syllabus-writing skills were relevant to my new responsibilities in a rather limited sense.

My first challenge was to switch from being a mainstream secondary English language teacher to a primary EFL teacher. Unlike the older learners I was accustomed to teaching, my new students were between 6 and 10 years of age. These young students were EFL learners as opposed to L1 learners, and they were just beginning to acquire emergent L1 literacy skills. I felt the urgent need to understand the language learning processes of my new students so that I could develop better teaching methods and instructional materials that would help them attain their learning targets. I was particularly interested in how they

learned vocabulary and understood written texts. To gain more knowledge on these topics, I began researching young learner language and literacy learning theories. The more I read, the more answers I found. The more answers I found, the more questions I seemed to ask and the more I needed to enquire and learn. In fact, this process of investigating and learning has not stopped.

Many of the journal articles and studies I consulted in my early months of teaching are reviewed in this thesis. The questions I found myself repeatedly asking in the first few months of teaching regarding the background knowledge and mental strategies my students used for reading and vocabulary learning are closely related to the research questions in my study. One could say that what started as a practical and necessary intervention to a routine teaching situation for me grew rapidly into a full-fledged research interest.

1.2   Theoretical Framework of the Primary EFL Programme

In August 2007, I introduced a primary EFL programme from Year 1 to Year 4. The programme described instructional pedagogy and defined attainment targets for each skill across the year groups. The aim of the programme was to develop the aural communication and literacy skills of the students in the primary years that would pave the way for more advanced language and literacy development in the secondary years. The programme was developed along the lines of Task-Based Language Learning and Teaching and Communicative Language Teaching. The curriculum, which is still in use today, focuses on the four skills of Speaking, Listening, Reading and Writing.

Using Meara's (2001) and Pressley's (2000) vocabulary learning framework, the new curriculum focused on increasing learners' vocabulary knowledge rapidly through reading. There was a strong emphasis on literacy skills to enable the learners to access a wide range of instructional materials. Stories became the main reading texts the Primary English Department used for vocabulary and literacy instruction. Elley (1989) argues that "one potential benefit of story reading (that does lend itself to empirical study) is the extent of children's gains

in vocabulary, from single or multiple readings of particular stories" (p. 176). Elley's study demonstrated that his learners' gains in word knowledge through book flooding were relatively large. This motivated me to build an English children's fiction library to support the new programme. I reserve a more detailed discussion of Elley's work in Chapter 4.

I began by stocking the new department library with graded fiction and non-fiction reading materials from the Oxford Reading Tree (ORT) series. After consulting with the principals of other international schools in Shanghai, I learned that one benefit of using a graded reading series of storybooks is that graded readers provide a language-teaching context for contextualised vocabulary and literacy learning (Read, 2007; Schmitt, 2008) which recycles vocabulary and narrative structures. Meara (2001) argues that the use of graded readers has the advantage of giving teachers the opportunity to deal with a large volume of the highest-frequency words, in the shortest amount of time possible (Meara, 2001). The English teachers were able to develop word lists consisting of high-frequency words and phrases taken from the ORT books for explicit vocabulary teaching.

Although explicit vocabulary teaching tends to focus on word recognition and lexical knowledge, the present study bears in mind that word-form recognition alone is insufficient for language learning (Pressley, 2000). An objective of explicit vocabulary teaching was to increase the learners' knowledge of other aspects of vocabulary knowledge in order for new vocabulary to be more effectively acquired (Koda, 1996). My earliest research on vocabulary learning indicated that there are advantages of incidental vocabulary learning (Gass, 1999). According to Gass, effective vocabulary learning is "a by-product of other cognitive exercises involving comprehension" (p. 319). Therefore I suggested that in addition to explicit vocabulary teaching, the teachers could use implicit teaching methods such as extensive reading to facilitate incidental vocabulary learning. I discuss the differences between explicit and implicit vocabulary learning in Chapter 2, section 2.3.

In order to evaluate my decision to focus on a strong literacy and vocabulary learning programme, I researched the relationship between vocabulary knowledge, vocabulary learning and reading comprehension in greater depth. The literature I consulted led me to question how young learners mentally decode vocabulary meaning and work out contextual meanings whilst reading. This became the main topic of my study.

1.3   Outcomes of the Literacy Programme

Within the first year of implementing the new literacy programme, the primary English teachers noticed an increase in the learners' overall interest in reading in general. The sheer exposure to a large number of books seemed to help the learners develop a habit of regular reading at school and at home. The teachers also observed a rapid increase in vocabulary knowledge at the beginning which seems to be consistent with research findings that attribute gains in learners' incidental vocabulary knowledge to extensive reading of stories (Cohen, 1986; Elley, 1980; Feitelson, Kita and Goldstein, 1986). The teachers also reported improvements in general reading comprehension that were measurable with quizzes and reading comprehension tasks at the start of the programme. Although these results suggest that our learners appeared to benefit from extensive exposure to stories, several other interesting observations were noted.

Firstly, the teachers observed that gains in reading comprehension and vocabulary knowledge did not seem to be consistent on a long term basis. For some learners, progress in reading comprehension and vocabulary knowledge appeared to be interjected by varying periods of stagnation whereby the learners were not able to read stories in the higher stages of the ORT series. This seemed to influence the learners' acquisition of new vocabulary which in turn rendered the reading of more advanced stories difficult and so on and so forth in a kind of viscous circle Coady (1997) refers to as 'beginner's paradox'. That is, the absence of one skill seemed to disable the development of a second skill that is needed for the first skill to be learnt.

The teachers noticed that by being repeated exposed to the higher frequency words in the same reading stage, the children's word recognition skills and reading fluency seemed to be increasing. However, Schmitt (2008) argues that "knowledge of lexical items is only of value if they can be recognized or produced in a timely manner that enables real-time language use" (p. 346). Although I agree with Nagy and Anderson (1984) that vast exposure to large quantities of natural text may lead to positive gains in vocabulary learning, I see that it is not the priority of a regular eight or nine year old learner to go about intentionally reading large quantities of text for the intended purpose of steadily increasing their knowledge of all the components of vocabulary meaning. I postulated that for some learners', their inability to progress to higher reading stages may be attributed to gaps in their depth of vocabulary knowledge acquisition. Therefore, I felt that it was necessary to introduce more strategic methods of teaching vocabulary and reading comprehension in the classroom.

Whilst consulting the many empirical studies on vocabulary learning and reading comprehension that focus on measuring learners' vocabulary knowledge and reading comprehension results, I noticed that there is a growing interest in studying the cognitive and metacognitive strategies that learners retrieve for decoding vocabulary and inferring contextual meaning during reading. This led me to posit that an effective way of combining vocabulary teaching and reading comprehension would be to raise the learners' awareness of the importance of retrieving suitable background knowledge and applying appropriate mental strategies to understand the vocabulary and contextual meanings in written texts. In order to help my learners achieve these learning objectives, I needed to understand which were the most important knowledge sources and mental strategies that learners tend to activate during reading. The literature reviews in Chapters 2, 3 and 4 of this thesis provided the background for my inquiry.

1.4   Overview of the Thesis

My research questions were born out of necessity. I believed that a better understanding of the knowledge sources which were most relevant to my

learners' vocabulary and literacy learning processes would enable me to help them attain their learning targets. However, a pedagogical investigation deserves a separate study. Where I do make references in this thesis to pedagogy, it is only to briefly comment on the implications of the study in the last chapter of my thesis. My study concentrates on investigating the knowledge sources and mental strategies my learners retrieve for decoding unfamiliar vocabulary and inferring contextual meanings during reading.

This thesis is organized into ten chapters. Following the introduction in this chapter, there are three chapters reviewing the background literature that provide the theoretical framework for my study. In Chapter 2, I discuss several key concepts of vocabulary knowledge including 'components of word knowledge', 'lexical storage and processing' and 'vocabulary acquisition'. Chapter 3 deals with reading as an interactive and psycholinguistic activity. My discussion focuses on the role of the learner's linguistic knowledge, external knowledge and mental strategies for decoding vocabulary and inferring contextual meanings in written texts. I pay special attention to the knowledge sources classified in previous empirical studies and explain their importance for my study. In Chapter 4, I discuss the differences between the vocabulary learning and reading comprehension processes of adults and children and focus on the reading strategies which have been classified in previous studies involving young learners. I also discuss the role of stories for young learner vocabulary and literacy learning.

In Chapter 5, I discuss the background and development of the Think-Aloud Method and explore its advantages and disadvantages as a research method. I also present arguments for and against the use of TAM for young learner studies. At the end of this chapter, I describe the procedures of my pilot study and discuss the lessons learned from it. I go on to discuss my main research questions and data-collection procedures of my main study in Chapter 6. In Chapter 7, I describe my data transcription procedures as well as the coding and classification of strategic and non-strategic knowledge sources in my data. I describe my data analysis methods in Chapter 8. My analyses included simple

raw counts of the knowledge sources in my data. To investigate the relationship between the role of strategy application and reading comprehension success in my study, I conducted a mean of success analysis on my learners' attempts to decode vocabulary and infer contextual meaning in the data. To analyse the relationship between learners' vocabulary knowledge and reading comprehension in my study, I applied a two-way chi-square test to assess the influence of my learners' vocabulary knowledge on the proportion of successful, partially successful and unsuccessful attempts to decode vocabulary and infer contextual meaning in the data.

In Chapter 9, I discuss the results of my study in terms of my three research questions. I concentrate on the importance of my learners' cognitive and metacognitive strategies and the role of linguistic knowledge and external knowledge for decoding vocabulary and inferring contextual meaning during reading. I also discuss the effectiveness of my research methods for my study. I evaluate the validity and reactivity of my study and discuss ethical issues pertaining to the involvement of young learners in my study.

Chapter 10 contains my concluding remarks. I discuss the strengths and limitations of my study and discuss the pedagogical implications of my study. I also make recommendations for areas of further research that I find relevant and interesting.

Chapter 2

LITERATURE REVIEW I
VOCABULARY STUDIES

INTRODUCTION

In this chapter, I review Richards' (1976) and Nation's (1990, 2001) definitions of word knowledge and argue that depth of vocabulary knowledge is one of the most important components for vocabulary learning (Schmitt, 1998). Two other important topics in this chapter are how vocabulary is cognitively processed and the different ways by which it is acquired. Schmitt claims that different components of vocabulary knowledge are processed and learnt differently. For instance, components of word knowledge that are learnt earlier tend to be acquired incidentally while components of word knowledge that are learnt later may not be as readily acquired through general exposure. Rather, they tend to be more efficiently learnt through more explicit learning methods (Schmitt, 1998: 31).

By discussing the differences between explicit and incidental vocabulary learning (Waring and Nation, 2004; Wesche and Paribakht, 1999; Hulstijn, 1992; Huckin and Coady, 1999, Hill and Laufer, 2003; Gass, 1999), I address the interconnectivity between vocabulary knowledge, vocabulary acquisition and reading comprehension (Nation, 1993b). Nation argues that vocabulary knowledge and knowledge of the world help to develop learners' reading comprehension abilities which are essential for further improving vocabulary knowledge and so on and so forth. That is, vocabulary knowledge enables reading comprehension, reading comprehension enables the increase of vocabulary knowledge, and increased vocabulary knowledge helps to facilitate further gains in reading comprehension.

2.1   VOCABULARY KNOWLEDGE

2.1.1   *Vocabulary Size*

The number of word forms a learner recognizes makes up his/her breadth of vocabulary knowledge. However, it appears that a learner's actual vocabulary knowledge is greater than his or her understanding of the semantic meaning and syntactic behaviour of a word. For example, a learner's knowledge of the word 'spring' would probably include his/her understanding of the various contextual, derivational and associative meanings of the word. When discussing the relationship between vocabulary knowledge and reading comprehension, it is important to consider the distinction between breadth of vocabulary knowledge and other aspects of word knowledge which tends to be associated with the reading context.

Though breadth of vocabulary knowledge may facilitate reading fluency, word form familiarity does not play a very significant role for understanding the fuller and deeper contextual meanings of the vocabulary in a text (Schmitt, 1998; Nation, 1993b; Waring and Nation 2004). Anderson and Freebody (1981) discuss a case in point. They state, "it is not clear that, if (two foreign language learners) were left alone in a room for three hours, they could decide that they really knew the meaning of 'dog'" (p. 90). Anderson and Freebody argue that to ascertain each learner's actual vocabulary knowledge of the word 'dog', they would have to define the word in terms of its contextual surrounding and deeper word meanings. Although measurement of learners' vocabulary sizes continues to be an important aspect of vocabulary studies, there is an increasing interest in studying learners' vocabulary knowledge in terms of increases in their depth of vocabulary knowledge.

Schmitt (1998) states that a learner's vocabulary knowledge is incremental; whereby the increase is related to the acquisition of deep word meanings such as word associations and collocations rather than word form knowledge (p. 27). Meara (2001) argues that growth in a learner's vocabulary knowledge is not just

a quantitative issue because size would not explain the diversity and richness of a language acquired by foreign language learners, which may develop to resemble the language of native speakers. Meara states that the increase in a learner's vocabulary knowledge depends on his/her acquisition of deep word knowledge. These arguments are consistent with Nation's (2001) argument that knowing a word means knowing the different members of its family. Nation states that word families are psycholinguistic realities of a learner's vocabulary knowledge. Rather than describe a learner's vocabulary knowledge in terms of "knowing a word", it would be more accurate to describe it in terms of "knowing a word family" (Nation, 2001: 47).

The concept of vocabulary knowledge as knowledge of a "word family" influences a learner's real vocabulary size. For example, the results of an early study by Dale and O'Rourke (1981) show that by the end of grade 12, learners may understand up to 30,000 words. In two other studies investigating the number of word families known to university students, Hazenberg (1994) and Hazenberg and Hulstijn (1996) found that their learners knew only 10,000 to 11,000 words. Looking at the pure numbers alone, it would seem as though learners' vocabulary sizes tend to shrink as they became older and more educated. An empirical study conducted more recently by Biemiller (2005) shows that university students know about 10,000 words, which seems to verify Hazenber's and Hazenberg and Hulstijn's findings. Nevertheless, Biemiller states that his study focused on learners' knowledge of word families rather than individual word items. This may explain the differences in learners' vocabulary sizes found in O'Rourke's study and the other later studies.

Although Nagy and Scott (2001) state that a learner's actual vocabulary size is drastically reduced when his/her knowledge of derivative forms is included as part of a word family and counted as a single item, they argue that it is more accurate and realistic to describe a learner's vocabulary knowledge in terms of his/her knowledge of word families rather than individual word items. Nation (2001: 47) claims that a learner's knowledge of word member meanings indicates his/her language proficiency level and reflects his/her maturity. For

example, in the early stages of vocabulary learning, a learner may understand several members of the word family "rich" such as "richly" or "richness". In due time, the same learner will expand this word family to include members such as "enrich" or "enrichment". As Schmitt (1998) argues, incremental vocabulary knowledge does not come about from the learning of more word forms. Rather, it is the result of learning the deeper and more complex meanings of known words.

2.1.2   Components of Word Knowledge

Much of what we know about "Word Knowledge" goes back to the vocabulary knowledge framework of Richards (1976). Richards identified 7 aspects of word knowledge which could be broadly described in terms of the distinction between 'knowledge of word form' and 'knowledge of word meaning'. According to Richards, knowledge of word form refers to two aspects. The first aspect is, knowing the root meaning of a word. For instance, there are at least four meanings of the word 'spring'. It could mean 'one of the seasons of the year', 'the metal implement for holding things together' or 'the hole in the ground that produces water'. It could also refer to 'the act of jumping up'. Some writers would describe some of these either as homonyms, that is, different words with the same form; or polysemy, which is one word with multiple forms. The distinction between homonymy and polysemy is not important here, and I treat such cases as homonyms. The second aspect is, having an understanding of the syntactic behaviour associated with a word. That is, a learner with this type of word form knowledge will be able to explain that the first three examples of the word 'spring' are nouns, and that the fourth example is a verb. What makes Richards' definitions interesting is that he was the first researcher to describe vocabulary knowledge in terms of the different components of word knowledge.

One of the earliest and most useful working definitions for 'word meaning' is Bloomfield's (1933) definition. Bloomfield defines the meaning of a word as its 'intuitive validity' and its 'basic stability' to stand on its own in different contexts (p. 178). Going back to the difference between homonym and polysemy, a learner with word form knowledge may not understand the deeper semantic

connections that are shared between words. Such connections may not even be obvious to some native speakers. For instance, if a learner understands the word 'spring' to mean one of the seasons in the year, and then learns that the same word form has another meaning referring to the act of jumping up, he/she may perceive the two forms of 'spring' as separate root words with different grammatical classes that coincidentally share the same sound. Based on word form knowledge alone, there is no guarantee that the learner has grasped a deeper understanding of the associative meanings, which the two forms of the word 'spring' share. One might even wonder how many native speakers understand that the noun form 'spring', referring to the season, is associated with the sense of nature awakening or life shooting forth, making it a close associate of the verb form 'spring'.

Richards (1976) states that a learner's understanding of word meaning includes the learner's awareness of the probability of encountering a word in different contexts. Since contextual probability determines whether a word is more likely to occur in formal or informal contexts, knowledge of word probability assists the learner in processing individual vocabulary effectively. Richards argues that an even deeper understanding of word meaning involves the learner's familiarity with the limitations imposed on the use of the word according to its context. For example, the word 'manoeuvre' cannot be used to replace the word 'move' in all contexts because its use is most commonly associated with military or political operations. Therefore, knowledge of a word's limitations assists the learner in understanding and using the target language appropriately.

Nation's (1990, 2001) definitions of word meanings, which were developed from Richards' definitions, provide more descriptive subcategories to capture the subtleties and contextual references contained in the vocabulary system of a language. Nation gives two definitions of word form that are similar to Richards' semantic and syntactic categories. He refers to them as the meaning of a word and its grammatical characteristics. In addition, Nation developed six categories of word meaning, which takes into account the learner's awareness of the intuitive value and stability of a word, as well as its interdependence with other

words in the language. In Table 1 below, I summarise the definitions used by both researchers and show how the different word components correspond with each other.

Table 1 - Definitions of word meaning

Richards, 1976	Nation, 1990; 2001
Knowing the different meanings of a word according to its context	Knowing the spoken form of a word
	Knowing the written form of a word
Knowing the restrictions imposed on the use of a word according to its function and situation	Understanding the register and stylistic appropriateness of a word
Knowing how a word is associated with other words in the language	Understanding the associations of a word
Knowing the probability of encountering a word in oral or written forms	Knowing the frequency of a word
Knowing the derivations of a words	-
-	Knowing the collocations of a word

From Table 1, we see that Nation did not have a corresponding category for Richards' category of derivational meaning. This may make Nation's list appear incomplete compared to Richards' list. However, 11 years later, Nation (2001) introduced the concept of 'word families', which takes into account meanings connected with the derivational forms of a word. In fact, Nation's concept of 'word families' is more detailed and fluid than Richards' definition of derivations because it gave rise to research on the incremental nature of vocabulary knowledge such as Schmitt's (1998). Nation's definition of word frequency is broader than Richards' definition of probability of encountering a word because Nation relates word frequency to the predictability of the word's occurrence. Nation (1990, 2001) reports several frequency-based studies showing that both oral and written language consists of a small group of highly frequent words that recur. He argues that when learners understand the difference between high and low frequency words, they will be able to predict the occurrence of these words and use them more appropriately and effectively.

In contrast to Richard's definition of word function, Nation describes the functionality of a word in terms of its register and stylistic suitability. Nation's definition also includes word collocations as a category of word meaning. The importance of word collocation increased significantly between 1976 and 1990, when the corpus revolution took place and there was an increase in interest to

discuss the associative meanings between words and describing how a word interacts with other words, such as in idiomatic expressions, to form deeper meanings. Schmitt and Meara (1997: 19) explain that "the strong level of collocation in idioms causes them to have a meaning different than if the words were analysed separately." Schmitt and Meara (1997) claims that Richards' and Nation's frameworks are novel because they view vocabulary knowledge in terms of acquisition and use. Schmitt (1997: 5) uses Richards' and Nation's approach in defining vocabulary knowledge in terms of the learner's communicative knowledge and awareness of the different components of word knowledge to explain how a learner moves from receptive knowledge to productive mastery. For example, Richards considers probability knowledge for both written and oral forms. Similarly, Nation's equivalent definition of Richards' contextual word meaning is sub-divided into the spoken and written modes of communication, suggesting that word knowledge includes the learner's productive abilities.

Although Richards' and Nation's categories do not deal with the learning of the different components of word knowledge, they are important because they sparked off an interest in research on learners' depth of vocabulary knowledge and the underlying mental processes associated with vocabulary acquisition (Schmitt and Meara, 1997). Schmitt (1997) holds that up until the 1990s, research was at a stage where vocabulary knowledge and the acquisition stages which words move through were still a puzzle. Schmitt states that this is not due to the lack of effort, for "there was a virtual explosion of vocabulary studies… (However,) nearly all of the vocabulary research to date has focused on the size and growth of lexicons, being concerned with how many words are gained (or attrited) over time" (Schmitt, 1997: 1). Research in more recent times (Paribakht and Wesche, 1993; Meara, 1996; Henriksen, 1999; Nation, 2001; 2010; Laufer and Golstein, 2004; Biemiller, 2005), which concentrates on studying depth of vocabulary knowledge as I go on to discuss in the next section, seems to have grown in importance as a result of Nation's fuller description of word knowledge categories.

2.1.3   Depth of Vocabulary Knowledge

Biemiller (2005) refers to a learner's deep word knowledge as rich vocabulary knowledge. As a follow up to Nation's (1990) work on word families and derivative meanings, Biemiller breaks down vocabulary knowledge into word form without its derivatives; and word meaning connected with the derivatives of a word. Biemiller's approach is similar to Nation's (2010) argument that the learner's ability to recognize the written form of a word alone is insufficient for him/her to claim that he/she knows a word. In fact, Nation provides an even broader perspective on the relationship between form recognition and knowledge of deep word meaning. He argues that, for a learner's knowledge of written syntactic forms to be considered deep knowledge, it must have some wider role in meaning acquisition, such as in helping him/her to build up on the word's associative and derivational meanings. For example, recognizing the spelling of grammatical inflections is not associated with deep knowledge. However, if this rule-based knowledge leads to an understanding of the functions of other word classes or helps the learner to understand derivative meanings of other words, then word form knowledge has a wider and deeper application.

Although both Richards and Nation claim that knowledge of word forms constitute breadth only, several researchers argue that there may be depth in word form knowledge (Celce-Murcia and Larsen-Freeman, 1999; Halliday, 1985; Shiotsu and Weir, 2007). Henriksen (1999) and Paribakht and Wesche (1993, 1997) argue that a deeper and more complete knowledge of the lexico-grammatical system of the language can help a learner to acquire more complex vocabulary knowledge. In Schmitt's (1997) longitudinal study of L2 word form acquisition amongst adult learners, the learners who demonstrated knowledge of deep word meanings had at least basic knowledge of grammatical meaning, which was assumed to have been present before the study. Schmitt states, "it doesn't seem reasonable that a learner would have a rich associative and collocational network built up without a knowledge of word forms" (Schmitt, 1997: 5). This is consistent with Malvern et al's (2008) statement that the acquisition of syntactic categories is not necessarily superficial. They argue that

syntactic knowledge could be considered a component of deep vocabulary knowledge and may be an indispensible aspect of a learner's incremental depth of vocabulary knowledge.

Harrison (2015: 34) claims that learners do not generally learn lexical and grammatical forms separately. Rather, as their vocabulary knowledge develops, they tend to learn grammatical forms alongside a limited number of lexical forms with various components of deep word knowledge associated with those words. Schmitt (1997) found that a learner's knowledge of grammatical forms is hierarchical and reflects various depth of his vocabulary knowledge. The results of his study show that nouns and verbs are the best-mastered word classes, while knowledge of adjectives and adverbs appears at later stages. Schmitt concluded that the different levels of difficulty that different word classes present suggest the depths of meaning attached to those forms.

Although it is important and interesting to investigate learners' depth of vocabulary knowledge, Meara (1996) claims that ongoing research on learners' vocabulary size is equally important because information regarding a learner's vocabulary size is necessary for studying the learner's acquisition of deep word meanings and texts. He states that, "all other things being equal, learners with big vocabularies are more proficient in a wide range of language skills than learners with smaller vocabularies" (p. 37). That is to say, quantity in itself seems to bring depth with it. Therefore, it is unrealistic for a learner to acquire substantial depth of vocabulary knowledge without having at least a decent vocabulary size to build on.

In this section, I explored the various components of word knowledge and argued that knowledge of vocabulary form and knowledge of vocabulary meaning are both essential components of a learner's vocabulary knowledge, although a learner's vocabulary knowledge increases with knowledge of deep word meanings rather than knowledge of more word forms. In the next section, I discuss how words exist in the learner's mind and how they are organized and stored.

2.2   VOCABULARY IN THE MIND

2.2.1   Lexical Forms

The traditional way of studying vocabulary knowledge used to focus on the single word, which raised questions about the status of inflections and derivations (Schmitt and Carter, 2000). Aitchison (1987a) claims that word inflections are usually recorded mentally as add-ons to the root word with very little effort. However, she argues that derivations tend to exist as whole words consisting of both their stems and affixes in the mind. She argues that word prefixes and derivational suffixes tend to be recorded as more complex forms in the learner's mind rather than as individual items with add-ons. This is because, in contrast with inflections, whose forms are rule-governed, prefixes and derivations are formed rather randomly. For example, Aitchison states that it is difficult to explain why the noun form of 'expel' is 'expulsion' instead of 'expeltion'. Aitchison argues that the mind memorises these derivative forms as individual cases and perceives them as polymorphemic wholes.

Other researchers (Nattinger and Decarrico, 1992; Lewis, 1993; Schmitt, 2000) who are also interested in discussing the concept of lexical forms beyond the single word suggest that in fact, lexical forms are more likely to exist as strings of words, lexical chunks or lexical phrases rather than single entries in the learner's mind. Schmitt argues that if learners are able to treat many individual words in a language as wholes, as Aitchison suggests, the same perception should be possible for strings of words as they are for single words. Schmitt and Carter (2000) claim that the traditional notion of words existing individually is unrealistic because vocabulary consists of larger units than their individual orthographic representations. Collocations and fixed expressions are examples of how single words embody more than their own individual meanings. Through their study of large corpora, Schmitt and Carter conclude that vocabulary exists as "sequences of words that are learnt and stored as individual wholes" (Schmitt and Carter, 2000: 1). Their findings have important implications for a discussion of vocabulary acquisition because the learner's mental lexical storage system is

primarily responsible for his/her ability to record, organize, process and store words.

2.2.2   Lexical Processing

The objective of lexical processing is many-fold. Firstly, it is to achieve some degree of understanding of new vocabulary so that it can be organized, learnt and transferred out into the long-term memory. Secondly, it is to retrieve learnt vocabulary in order for the mind to match up new and old information. Schmitt and Carter (2000) claim that these mental processes take place in real time. Aitchison (1987) and Van Patten (1996) suggest that the main purpose of lexical processing is for understanding deep word meanings. Van Patten claims that there is a tendency for learners to process and remember semantically meaningful units such as derivative forms and collocations before they process non-meaningful units such as inflections and verb agreements. Both Aitchison and Van Patten suggest that lexical processing may not necessarily lead to any attention to word forms. Should the learner's attention be turned toward non-meaningful units during lexical processing, it is usually done at minimal or no cost to the effort required to process lexis for content and communicative information. Van Patten also adds that the challenges associated with the processing of deep word meaning often require the learner to apply cognitive strategies to attain lexical understanding. He asserts that even when strategies are applied for processing word forms, the learner's attention is still primarily focused on the processing of deep word meanings.

Let us now focus on how the short-term memory handles the processing of incoming lexical information. Before the cognitive processes in the short-term memory are activated for processing vocabulary, they have to be triggered. The most common trigger is when the learner encounters new lexis and 'notices' that there is a gap in his/her existing vocabulary knowledge in the long-term memory. Corder (1973, cited in Skehan, 1998: 51) states that noticing is the result of the mind's existing knowledge systems and processing capacities. It is the impulse for the short and long-term memory to start going to work. When a

learner encounters new word knowledge components such as inflections and derivatives, the short-term memory deals with these new entries until they are learnt.

Schmidt (1990) argues that not all new lexical forms receive equal noticing or attention; and not everything that has been noticed will be reacted to. He claims that lexical processing in the short-term memory involves a process of careful selection for the extraction of word meaning. According to Schmitt (1997), Schmitt and Schmitt (1995) and Decarrico (1999), the processing of deep word meaning is associated with an incremental process that begins with word form acquisition and ends with a more thorough knowledge of the various aspects of the word. Decarrico asserts that depth of vocabulary acquisition is a process that builds up with time and intensity. It also correlates with the learner's cognitive maturity (Nation, 2001). Rather than occurring randomly, it is achieved through recurring encounters with a word at successive levels of difficulty over a period when the learner notices and acquires new components of word meaning.

Though the short-term memory deals with the important task of processing vocabulary, it is well known for its limited capacity. Because of the relative lack of space in the learner's short-term memory, it is only responsible for providing temporary residence to new vocabulary items whilst they are being processed (Anderson, 1995). The short-term memory moves newly learnt vocabulary meaning into the long-term memory as soon as it is processed and learnt. This transfer of learnt vocabulary out of the short-term memory is essential because it frees up the limited space in the short-term memory for processing and learning more new vocabulary (Atkinson and Schriffin, 1968).

2.2.3   *Lexical Storage*

Atkinson and Schriffin (1968) argue that as the learner's current knowledge undergoes upgrading, lexical forms move between different processing facilities in the learner's mind. They state that vocabulary storage is associated with the learner's long-term memory function. While the learner's long-term memory

function is responsible mainly for lexical storage after vocabulary has been learnt, the short-term memory is the temporary reception and holding facility for incoming lexical data. It serves as the gateway to the long-term memory after vocabulary has been processed and learnt (Anderson, 1995).

The long-term memory contains single words, all their inflections and derivatives as well as the lexical phrases each word is associated with. According to Schmitt and Carter's (2000) theory, vocabulary is rarely stored as single word entries in the learner's mind. Rather, vocabulary is usually stored as lexical chunks or lexical phrases (discussed in Sub-section 2.2.1). Atkinson and Schriffin (1968) claim that the long-term memory is a relatively abundant resource. Since the long-term memory is home to all the learnt vocabulary, it has the space to store an infinite amount of data and is responsible for the retention of existing vocabulary knowledge as it expands and deepens over time. This theory explains why learners with deep vocabulary knowledge tend to have large vocabulary sizes as well (discussed in Sub-section 2.1.3).

Through repetitions or rehearsals, the learner's short-term memory becomes familiar with the new information. Each time the short-term memory learns a new word or new component of vocabulary knowledge, it transfers the data into the long-term memory where it is stored (Pawley and Syder, 1983). Atkinson and Schriffin (1968) state that lexical records from the learner's long-term memory help the short-term memory to attend to new input that is encountered. Pawley and Syder (1983, cited by Schmitt and Carter, 2000) suggest that vocabulary knowledge is not a fixed component in the learner's mind. As discussed in Section 2.1.3, a learner's vocabulary knowledge is incremental and undergoes modifications over a period of time, as the learner's vocabulary knowledge increases and deepens (Schmitt, 1998).

In the next section, I describe several different vocabulary acquisition processes.

2.3 VOCABULARY ACQUISITION

2.3.1 *Vocabulary Acquisition Framework*

There are several traditional approaches to discussing vocabulary acquisition. One approach is to look at the result of acquisition. McCarthy (1984) for instance, tends to focus on the end result of learning. He suggests that the best way of looking at vocabulary learning is to describe it in terms of two outcomes - remembering or knowing a word and being able to use the word in a wide variety of contexts. Another approach is to discuss how vocabulary is acquired. Ellis (1984) suggests that it is interesting to focus on the learning process and discusses vocabulary in terms of the different methods for learning word forms and word meanings. His study demonstrates that word forms tend to be learnt through direct learning methods such as memory work, looking up the dictionary, taking down notes in margins and notebooks or repeating the words several times to commit it to memory. On the other hand, word meanings tend to be acquired through more indirect methods such as general language exposure.

Yet another approach is to discuss vocabulary acquisition in terms of cognition. This approach is taken by Meara (1996) and Chapelle (1998). Meara claims that it is important to discuss vocabulary learning in terms of the way vocabulary is processed, organized, stored and retrieved in the learner's mind. Chapelle suggests that by studying learners' lexicon organization and processes of lexical access, we would be able to gain a deeper understanding of how vocabulary knowledge is actually acquired. Some of these arguments are based on the assumption that vocabulary is processed in levels. The notion of vocabulary processing levels has its origins in Craik and Lockhart's (1972) model of Depth or Levels of Processing Hypothesis. The hypothesis states that vocabulary has a better chance of being remembered when the learner pays more attention to it, and when there have been more opportunities given to the learner to deal with it at a cognitive level. According to Craik and Lockhart's Depth of Processing Hypothesis, the learner undergoes 3 processing levels for learning a word. On the first encounter with a new word, the learner attends to its form and semantic

meaning. Next, the learner rehearses using the word after it has occurred. Finally, the learner internalises the deeper meanings of the word and stores it.

Other researchers (Sternberg, 1987; Coady et al., 1993 and Beglar, 2010), who are also interested in the cognitive aspects of vocabulary acquisition, suggest that vocabulary learning is associated with a cognitive process that regulates comprehension of the contextual meanings of the words in question. They argue that new words are learnt when learners activate cognitive processes that govern the use of contextual cues, the retrieval of prior knowledge and application of analytical strategies for constructing vocabulary meaning. This approach is interesting because it considers how factors, which are external to the actual vocabulary learning mechanisms in the learners' mind, influence vocabulary acquisition. Qian (2002, cited in Shen, 2008: 136) and Sokmen (1997) suggest other external motivations for vocabulary learning. They state that the learning of deep word meaning is influenced by the individual needs of the learner. Qian posits that the more interesting, necessary or important a word is for the learner, the more likely it will be for the learner to activate the cognitive and metacognitive processes for acquiring its deeper meanings. Sokmen argues that the more a learner manipulates and thinks about a word, the more likely and faster it will be for the word to be transferred into the long-term memory.

Hulstijn and Laufer (2001), who have discussed cognitive aspects of vocabulary acquisition extensively, suggest that the progression from form recognition to meaning acquisition is regulated by 3 types of cognitive and metacognitive processes: need, search and evaluation. According to the authors, the learner has to encounter a real need to know the meaning of a word for the acquisition process to begin. A real need is usually encountered when a learner is required to complete a particular task, "whereby the task requirements can be either imposed or self-imposed" (Hulstijn and Laufer, 2001: 14). This requirement triggers off a search process to find out the meaning of the word. The search process may include a variety of learning methods, such as contextual guessing, consulting a dictionary, or asking the teacher. Lastly, the learner evaluates the

meaning of the word by "comparing it with a word or with other words, (comparing) a specific meaning of a word with its other meanings, or combining the word with others in order to assess whether a word does or does not fit its context" (Hulstijn and Laufer, 2001: 14).

Hulstijn and Laufer's theory, which is known as the Involvement Load Hypothesis, assumes that the learner's involvement in the vocabulary learning tasks influences the learning outcomes. According to this theory, different amounts of learner involvement and evaluations are necessary for the learning of different types of vocabulary. Low learner involvement and moderate evaluation may be sufficient for acquiring easy words or word forms, but higher involvement and stronger evaluation would be required for learning more difficult words or deep word meanings. These arguments show that it is interesting to study vocabulary acquisition within a cognitive framework. According to the cognitive approach, vocabulary is generally learnt through two methods that are differentiated by the type of conscious operations the learner applies to search for vocabulary meaning and learn it. They are explicit and implicit learning.

2.3.2   Explicit Vocabulary Learning

There are various ways of describing explicit vocabulary learning. Yet most definitions seem to concur that vocabulary is explicitly learnt when it is the result of focused attention on the object of learning itself. For example, Schmitt (2000) elucidates the role of the learner's attention in explicit vocabulary learning. He states that the more conscious attention the learner allocates to the actual vocabulary items to be learnt, the more explicit the vocabulary-learning process becomes. Ellis' (1994a; 1994b) definition of explicit vocabulary learning states that it is a conscious operation where the learner concentrates on building and testing hypotheses to understand words. Berry (1994), however, describes explicit vocabulary learning in terms of conscious mental strategy application. He views explicit vocabulary learning as the learner's recourse to deliberate strategies for learning unfamiliar words. The main difference between Ellis' and

Berry's definitions of explicit vocabulary learning is that Berry claims explicit learning is associated with the learning of both vocabulary forms and deep vocabulary meanings whereas Ellis argues that explicit learning is mainly linked to the learning of word forms and lexical structures but not necessarily with deep vocabulary meaning. Ellis's definition suggests that explicit vocabulary learning may be suited to the learning of some components of word knowledge but not all.

Ellis is not alone in suggesting that explicit vocabulary learning methods tend to be more suitable for the learning of lexical and syntactic forms. Schmitt and Carter (2000: 4) also argue that explicit learning is associated with 'item learning' and 'system learning' rather than the learning of deep word meanings. Item learning refers to the process of learning individual units such as 'compose' and 'table', where the 2 words are processed, understood and stored separately from each other. They suggest that lexical phrases also tend to be acquired through system learning. For example, the sentence 'how much do these apples cost' contains the lexical phrase 'how much do'. A learner may notice variations such as 'How much do these oranges cost' and acquire the system for 'how much do + _'. They claim that "lexical phrases do not always have to be used in production as invariable wholes" (Schmitt and Carter, 2000: 3). For instance, the learner may notice later on, that the same lexical phrase can be combined with adjectives so that 'how much do these beautiful bananas cost' is another variation of it. When the varieties in the system for the lexical phrase has been committed to memory, it is applied to produce novel combinations such as 'how much do you want for these lemons' or 'how much do they think these awful flowers are worth'. Schmitt and Carter suggest that for system learning, the learner learns a rule, for example 'walked = walk+ed'. Once the system is learnt, other words can be analysed into their constituent parts and learnt. For instance, 'jump = jump+ed' and 'cheated = cheat+ed'.

Schmitt and Carter (2003) state that during explicit vocabulary learning, there are 3 phases that flow in and out of each other as new vocabulary is processed and added to the learner's storage system. This model can be traced back to the

work of Peters (1983), who states that during the first phase, the learner acquires individual words as unanalysed wholes. During the second phase, the learner realizes that there is some consistency within the language. For derivational meanings, the learner may notice 'predictable = predict+able'. Through recurrent exposure, the learner goes on to notice that this pattern applies to other verb forms such as 'fathomable = fathom+able'. At this point, one may say that the learner is beginning to notice a system within the language. During the third phase of explicit vocabulary learning, the learner notices other variations to the learnt system. For instance, 'unpredictable = add prefix un + predictable' and 'unfathomable = un+fathomable'. The learner commits the word together with all its variations and combinations to memory and proceeds to search for similar variations in other words to commit to memory as well. Although Peters' work concerns L1 vocabulary learning, which is different from L2 vocabulary learning, it is a useful reference for understanding explicit vocabulary learning processes in general.

Some researchers argue that though item learning lends itself well to explicit learning, system learning may not always be as effectively accomplished through explicit learning methods (Berry, 2013). Take for example the case of irregular past tense verb forms. Berry argues that it would be unrealistic for learners to focus explicitly on learning all the irregular past tense verbs in a language such as English, which has a large number of irregular verbs. He estimates that there are about 150 irregular verbs in normal use, with the number increasing steadily if prefixed forms and other inflected parts such as third person singular present indicative, participle and gerund forms are taken into consideration. One could imagine that deliberate and explicit learning of the past tense system for irregular verbs in English together with all their associative meanings would be unrealistic for any learner. Rather, Berry suggests that many components of word knowledge such as irregular forms and deeper word meanings are more effectively learnt through incidental methods, which I go on to discuss.

2.3.3   Incidental Vocabulary Acquisition

Krashen (1989) defines incidental vocabulary learning as a process by which a learner internalises the features of a language without the measured or intentional efforts of the learner to gather vocabulary knowledge of the target language. They claim that during incidental vocabulary learning, the learner is usually engaged in other activities or tasks, so that any vocabulary knowledge that is learnt is acquired implicitly. In fact, Smith (1993) claims that the outcomes of incidental learning depend on the effort directed by the learner to focus on an activity outside the target learning items. The idea of incidental vocabulary learning is related to the work of Winter and Reber (1994) who believe that learners can, under some circumstances, absorb knowledge or information from the environment without being consciously aware of the learning process. That is not to say that incidental vocabulary acquisition is devoid of conscious effort. In fact, the difference between incidental and explicit vocabulary learning is not a matter of consciousness because even during incidental learning, learners may very well notice new information for learning after it has taken place. According to Schmidt (1997), incidental learning

> "does not involve selective attention to features of input that feed into the learning process, involves unconscious induction resulting in the establishment of abstract rules and representations, is the sole basis for spontaneous performance and is unaffected by instruction" (p.172).

Ellis (1994a) suggests that the proper distinction between incidental and explicit vocabulary learning can be understood in relation to the definition of focal and peripheral attention. Ellis argues that during incidental vocabulary learning, the learner does not intentionally set out to learn any specific words. Rather, his attention to the words that are eventually learnt is peripheral. Several studies using the premise of the Depth of Processing Hypothesis and the Involvement Load Hypothesis (discussed in sub-section 2.3.1) have been carried out to study L2 learner's attention, levels of processing and awareness during vocabulary learning (Watanabe, 1997; Hulstijn and Laufer, 2001 and Robinson, 2003). These

studies take into account the processes of involvement, elaboration and evaluation in their investigations. They demonstrate that if learners were more involved in processing vocabulary for meaning rather than form, the focus of the learning processes would be on comprehension rather than vocabulary learning itself. The researchers conclude that incidentally learnt vocabulary is the result of meanings being learned in spite of the fact that the learner's attention was focused elsewhere.

Schmitt (2008) claims that "virtually anything that leads to more exposure, attention, manipulation, or time spent on lexical items adds to their learning" (p. 339). Vocabulary learning is sometimes discussed with reference to the distinction between the concepts of 'acquisition' and 'learning'. Krashen (1989) distinguishes the term 'acquisition' from 'learning' in terms of how explicitly or implicitly vocabulary is learnt, whereby the term 'acquisition' is reserved for more implicitly learnt vocabulary. According to Krashen, a learning environment that supports vocabulary acquisition engages learners in a variety of activities and tasks that encourage implicit vocabulary acquisition.

Though some definitions of incidental vocabulary acquisition may imply an informal or ambiguous learning process, incidental vocabulary acquisition is not a random process. Gass (1999) states that incidental vocabulary acquisition is the primary means of L2 vocabulary learning for most people and argues that "at least some, if not a large part, of one's second language vocabulary is acquired incidentally" (p. 319). A process that is so cardinal to the majority of L2 vocabulary learning is likely to be interesting and complex. I go on to discuss two different views of incidental vocabulary acquisition.

2.3.3.1 The Strong View

Skehan (1998) defines the strong view of incidental acquisition as vocabulary knowledge acquired through pure word exposure and free from any intentional or direct learning. Although the strong view is a recognized approach to studying vocabulary acquisition, several studies question its suitability for all learning

contexts (Saragi et al., 1978; Pitt et al., 1989; Ferris, 1988 and Day, Omura and Hiramatsu, 1991). Hill and Laufer (2003) estimate that L2 learners would need to read over a daunting 8 million words of text or almost 420 novels in order to increase their vocabulary size by 2000 words purely through incidental learning. Based on these findings, the authors recommend that it is best for L2 learners not to rely fully on incidental vocabulary acquisition as the primary source of vocabulary learning. Moreover, Hulstijn and Laufer (2001) and Robinson (2003) caution that learners who understand the overall message in a text may not necessary pay attention to the precise meanings of individual words. For academic vocabulary, this could be a potential problem for attaining a full understanding of the material. They also argue that words which are easily understood by their context will not generate sufficient involvement for them to be learnt and remembered. Skehan (1998) states that for technical texts, where a high percentage of unknown vocabulary is likely to occur, the strong approach to incidental vocabulary acquisition is often an unreliable method for vocabulary learning.

Nation (2001) and Nation and Gu (2007) suggest that incidental vocabulary learning should be a balance of learning new word form knowledge and acquiring enhanced word knowledge. This makes it difficult to justify the strong view, and these days, not many researchers would subscribe to the strong view of incidental vocabulary acquisition. Studies by Bensoussan & Laufer (1984), Haynes (1993), Kelly (1990) and Schatz and Baldwin (1986) show that the strong approach results in fewer gains in vocabulary knowledge. These studies suggest that there are limitations to contextual inferencing and lexical guessing. For example, L2 learners are often unable to guess the meaning of unknown words from context. Due to their inadequate control of the skills in the target language, they have much more trouble than their L1 counterparts in acquiring words through contextual guessing. Laufer (1997), who refers to this kind of phenomenon as 'deceptive transparency' meaning 'without direction' (p. 25), argues that sometimes learners' guesses are incorrect because of the lack of the right kind of contextual cues. For instance, some words in the target language may appear to be orthographically similar to that of the first language, but are

completely different in meanings. Words in the target language may also have culturally different meanings from the same words in the learners' L1, which may make the strong approach difficult in many L2 learning situations.

Although there are arguments against the strong view of incidental vocabulary acquisition for L2 vocabulary learning, Hulstijn and Laufer (2001) and Robinson (2003) suggest that there is no real reason to doubt that some form of incidental learning may be beneficial to the learning of L2 vocabulary. The question is the extent of its use. Paribakht and Wesche's (1997) study, which compares the results of incidental vocabulary acquisition through reading with incidental vocabulary acquisition combined with vocabulary instruction, shows that L2 learners benefitted from both schemes. Nevertheless, it was found that learners who received the reading plus vocabulary instruction treatment showed superior quantitative and qualitative vocabulary knowledge gains over time. In fact, Laufer (1997) suggests that L2 learners have better chances of overcoming external obstacles in acquiring vocabulary knowledge with a blend of explicit and implicit learning methods, which I go on to discuss.

2.3.3.2 The Weak View

Studies on incidental vocabulary acquisition that are based on the weak view regard the benefits of both explicit and implicit learning methods. Many researchers argue that the weak approach to incidental vocabulary acquisition has more benefits than the strong approach. Nation (2001), for example, argues that L2 vocabulary is best acquired by combining an explicit learning component with an incidental-learning component that is based around maximizing word exposure. Schmidt (1993) argues that on a cognitive level, at least some degree of conscious attention is necessary even for vocabulary acquisition, even when it is dealt with incidentally. In the same vein, Robinson (2003) argues that there are obvious benefits of explicit vocabulary learning that cannot be discounted even during incidental learning. First of all, Robinson claims that explicit vocabulary learning is an effective and quick way of learning isolated words which are not embedded in deep contextual meaning. Secondly, Robinson argues

that when the specific goal is to learn vocabulary, an explicit focus usually leads to greater and faster gains. Schmitt (2008) argues in favour of the weak view because it suggests that the learner must engage with known vocabulary forms of a target language repeatedly in order to acquire the richness of the language. He states that it is not solely about the introduction to new words; rather it is about the incremental acquisition of the deeper and more complex components of word knowledge.

Hulstijn (2001) also claims that the weak view of incidental vocabulary acquisition is more realistic for most vocabulary learning situations, and argues that actual learning would not completely feasible without some conscious induction during the learning process. In fact, he suggests that incidental vocabulary acquisition usually begins with the learner's conscious attention to word forms and word meanings. Wesche and Paribakht (1999) argue that learners generally benefit from explicit vocabulary instruction in conjunction with extensive reading because pragmatically, it is difficult for learners to limit themselves to only one learning method of vocabulary learning. Therefore, rather than query the significance of conscious attention during vocabulary learning, a more relevant question to pose is how much conscious attention is associated with the learning of different components of word knowledge. Researchers who subscribe to the weak view generally believe that word forms and their related subcategories of words, especially syntactic subcategories require more conscious attention to learn and are therefore more suited to intentional and explicit methods. On the other hand, deep words meanings are less likely to be learnt consciously. Therefore explicit and incidental learning methods involving exposure to the target words in various contexts would more likely to lead to successful acquisition.

Many empirical studies in incidental vocabulary acquisition involving university students have shown positive gains for the weak approach that incorporates both implicit and explicit learning methods. Zimmermann's (1994) study shows that three hours of direct vocabulary instruction coupled with a moderate self-selected reading regiment was effective for sub-technical vocabulary learning.

Robinson's (2003) study showed a retention rate of up to 70% on explicitly learnt vocabulary, which is higher than most results from incidentally acquired vocabulary within the same time frame. A study conducted by Qian (1996) involving Chinese learners found that explicit learning of decontextualized academic vocabulary combined with repeated exposure to the target vocabulary was highly effective for Chinese university students. These results are consistent with the findings in Nagy et al.'s (1985), Saragi et al.'s (1978), Ellis' (1994b), Schmidt's (1990) and Huckin and Bloch's (1993) studies, demonstrating that a large proportion of vocabulary is acquired through a combination of explicit and implicit learning methods.

It is important to note that most studies in incidental vocabulary acquisition cited above were conducted for L1 vocabulary learning, Although fewer studies have been carried out on second language incidental vocabulary acquisition, there is little reason to believe that L2 learners will not benefit as much from the weak approach. Nagy et al. (1985: 19) claim that as far as the foreign language classroom is concerned, "there are more words to be learned than can be covered in even the most ambitious program of vocabulary instruction, and there is more to be learned about each word than can be covered in even the most intensive instruction." Nagy et al. argue that for pragmatic reasons, learners' time and effort may be better rewarded if they acquire the sub-skills and strategies for vocabulary learning, and focus their attention on applying suitable cognitive processes for both explicit and implicit vocabulary learning processes.

Theoretically, the proponents of incidental vocabulary acquisition may adopt either a strong view or weak view of incidental vocabulary acquisition for the sake of argument. In reality, however, most researchers would be positioned somewhere in between these extreme views. It is likely that many researchers may even agree that successful incidental acquisition is often a blend of both explicit and implicit learning methods. I have used the arguments in this section to construct a framework for studying incidental vocabulary acquisition in my

study that is based on the weak view. The effectiveness of incidental vocabulary acquisition depends on several factors, which I go on to discuss.

2.3.4   *Factors Influencing Incidental Vocabulary Acquisition*

In this sub-section, I discuss five factors that may facilitate or constrain incidental vocabulary acquisition.

2.3.4.1 Repetition

Some studies have shown that the key to effective incidental vocabulary acquisition is repeated exposure. Nagy, Herman & Anderson (1985), Nation (1990), Henriksen (1999), Paribakht and Wesche (1993, 1996, 1997) and Herman et al (1987) state that the probability of acquiring a word contextually correlates positively with the number of exposures the learner has to the word. Paribakht and Wesche (1997) suggest that an initial encounter with a word draws the learner's attention to that item, but it takes multiple encounters with that same word to provide the learner with the opportunity to determine, gather and ultimately acquire relevant semantic and syntactic information about the word.

Nation's (1990) survey demonstrated that full acquisition could be attained with 15 to 16 contextual word exposures. The results of Pigada and Schmitt's (2006) study show a sharp increase in L2 acquisition rates with anything from 10 to 20 word exposures. In another similar study of incidental word knowledge acquisition, Webb (2007b) found that after only 10 exposures, significant acquisition gains in their learners' vocabulary knowledge across a good number of word knowledge categories could be observed. These results are consistent with Nagy, Herman & Anderson (1985), Herman et al.'s (1987) and Nation's (1990) arguments that the probability of acquiring a word contextually correlates positively with the number of exposures the learner has to the word.

Henriksen (1999) argues that incidental vocabulary acquisition is a multi-staged learning continuum, with different vocabulary items situated at different points of the continuum at any given time. She states that vocabulary acquisition should be seen as a system in flux, where multiple encounters to the same word are required in order to understand its full meaning. Henriksen also argues that when learners encounter the same word in different contexts, they become involved in processing the deeper and more complex forms and contextual meanings of the word. However, Henriksen states that not all learners benefit equally from the same number of word exposures. Many learners may require more or less word exposures in order to attain the average results reflected in incidental vocabulary acquisition studies.

Schmitt (2008) claims that the progression from form acquisition to meaning acquisition is a "commonsense notion that the more a learner engages with a new word, the more likely they are to learn it" (p. 338). He argues that, although an average of 8 to 10 reading exposures are necessary for a word to be learnt incidentally, the exact number of encounters required depends on the general proficiency level of the learner, which is difficult to pin point. In fact, early studies on L2 incidental vocabulary acquisition did not produce encouraging results. Horst, Cobb and Meara's (1996) study showed a disappointing learning rate of only 1 out of every 12 words tested, suggesting a weak link between learners' transformation of word form into word meaning. This could have been due to the amount of exposure the learners had to the target words. By extending the exposure time and increasing the number of target words, Horst (2005) found that his learners were able to learn up to 50% of the target words incidentally. Pigada and Schmitt's (2006) month-long extensive reading study on orthographical forms, grammatical knowledge and meaning shows an even better acquisition rate of 1 in every 1.5 words. The authors argue that the number of exposures to a target word is important to the effectiveness of incidental acquisition of the word.

Baddeley's (1990) investigation into vocabulary retention showed that the most forgetting occurs immediately after initial learning. However, vocabulary

retention tends to accelerate with quick back-to-back and repeated word exposures, indicating the significance of early vocabulary recycling as soon after initial acquisition as possible. Nevertheless, Schmitt (2008) maintains that the low pick up rates from reading exposure reflected in earlier vocabulary acquisition studies were due to a number of methodological weaknesses such as very small amounts of reading, insensitive measurement instruments, inadequate control of text difficulty, small numbers of target words, and no delayed post-tests, rather than the type of learning the learners were exposed to.

2.3.4.2 Orthographic Knowledge

For incidental acquisition of deep vocabulary knowledge, Koda (1996), Zahar, Cobb and Spada (2001) highlight the significance of the connection between orthographical knowledge and word meaning (discussed in 2.3.3). They hold the view that the more stable a learner's orthographic knowledge of new words is, the faster and more successfully he/she tends to acquire the deeper meanings of those words. This view is consistent with Schmitt's (2008), argument that the link between orthographical knowledge and knowledge of word meaning for effective vocabulary acquisition should not be down played. Schmitt claims not only is orthographical form the earliest component of vocabulary knowledge that most learners attempt to acquire, many learners seem to encounter difficulties in acquiring and storing this component of word knowledge.

Schmitt (2008: 337) also argues that word misidentification or inefficient orthographic processing are often the reasons why learners fail to infer word meanings correctly and acquire incidental vocabulary incorrectly. He claims that a stable knowledge of new word forms helps learners to understand and remember their corresponding new deep word meanings more effectively. Schmitt also maintains that an important aspect of L2 vocabulary acquisition is establishing an initial form-meaning link as early as possible.

2.3.4.3 Prior Knowledge

Grabe and Stoller (1997) and Parry (1993, 1997) argue that a learner's prior knowledge influences his/her success in acquiring vocabulary incidentally. In Schmitt's (2008) review of De Groot's (2006) studies on L2 acquisition of orthographical and phonological patterns, he reports that L2 vocabulary which shares the features and systemic rules of its L1 counterpart are more easily learnt incidentally and rapidly transferred out of the learner's short-term memory into the long-term memory. These words are less likely to be forgotten than words with no matching features with any of the Learner's L1 vocabulary. Hall (2002) explains that since both L1 and L2 acquired vocabulary share the same storage space in the learner's long-term memory, it is likely that learners retrieve a representative L1 form that corresponds to the new L2 vocabulary to facilitate the processing and learning of the new word incidentally.

In the case of L2 vocabulary acquisition, Hall claims that the learner's tendency to understand and remember new L2 words seems to depend on his or her prior L1 vocabulary acquisition experiences. Koda (1996) argues that during vocabulary acquisition the L2 learner is consciously constructing and testing hypotheses about his or her new L2 vocabulary against knowledge of an existing L1 vocabulary. Zahar, Cobb and Spada (2001) claim that the more proficient learners are and the larger their L1 vocabulary sizes are, the faster and more successfully they tend to acquire L2 vocabulary incidentally. Although the relationship between L1 and L2 vocabulary knowledge is significant for L2 vocabulary acquisition, very often the cognitive processes involved with L2 vocabulary acquisition are in opposition to the processes that were involved in the acquisition of L1 vocabulary. While L1 vocabulary is learnt from birth and mostly acquired incidentally, L2 vocabulary learning begins later on in life and tends to be sensitive to other forms of prior knowledge that constrain learning. For instance, a learner's knowledge of the world, solid recognition of cognates and knowledge of reading skills in general seem to affect incidental L2 vocabulary learning outcomes (Schmitt, 2008).

Doughty (2003) and Ellis (2006) suggest that L1 vocabulary is inherently more readily acquired through incidental means than L2 vocabulary. They posit that this may be because the mind seems to be more innately attuned to the processes for learning L1 vocabulary than L2 vocabulary. Schmitt (2008) argues that incidental L2 vocabulary learning tends to be more difficult because not only do learners need to learn new forms of vocabulary they must learn new ways of processing and storing the new vocabulary as well. This problem is compounded by the fact that the mind has a finite processing capacity (Bancroft, 2002). Bancroft argues that when attention is given to the processing of new L2 forms, it leaves less capacity for the processing of meaning and vice-versa. While this is potentially a constraining factor for effective incidental L2 vocabulary acquisition, Bancroft explains that the use of elements from L1 vocabulary processing conveniently located in the same short-term memory space for learning L2 vocabulary forms has the advantage of freeing up cognitive space for the learner to focus on L2 meaning acquisition. Therefore, one may argue that a learner's prior knowledge may be a facilitating and constraining factor for incidental L2 vocabulary acquisition.

2.3.4.4 Communicative Meaning of the Target Words

Krashen (1989), Smith (1993), Hulstijn and Laufer (2001) and Schmitt (2008) argue that the object of learning partially influences the type of learning that is likely to take place. That is to say, during incidental vocabulary acquisition, the learner's attention tends to be focused on the underlying communicative meanings of words, which vary contextually. Schmitt (2008) believes that the effectiveness of incidental vocabulary acquisition seems to depend on the learner's ability to infer the meaning of unknown words from their contextual surrounding.

Earlier work by Haynes (1984), Holmes and Ramos (1993), Chern (1993) and Huckin and Bloch (1993) show that when learners are mistaken that they know a word, they tend to ignore contextual clues that highlight the deeper semantic meaning of the word. There are other factors beyond the control of the learner,

such as text type and the availability of textual and contextual clues in the text, which could interfere with contextual guessing and affect incidental vocabulary acquisition. These interferences often lead to inaccurate or incomplete text comprehension, which may cause the learner to acquire imprecise word meanings. The results of these studies suggest that the primary limitation of incidental vocabulary acquisition is that it involves complex interlocking processes that complicate the matter. Not only does contextual guessing, which is prevalent in incidental vocabulary acquisition, have a strong influence on the effectiveness of incidental vocabulary acquisition; its outcomes correlate with the learner's language proficiency levels and cognitive abilities.

2.3.4.5 Learner Motivation

Some researchers (Laufer, 1991; Julian, 2000; Schmitt & Zimmerman, 2002) have been interested in questions concerning the role of learner motivation in incidental vocabulary acquisition. In Laufer's (1991) study of the productive derivational knowledge of a group of advanced learners, she found that her learners became unmotivated to explore and learn deeper vocabulary meanings as soon as the necessity to use these word meanings was lost. Laufer's study indicates that not only does learner motivation influence the acquisition of new vocabulary knowledge and deeper components of word knowledge, the opportunities available to the learner to use that knowledge tends to affect vocabulary acquisition outcomes as well. This is related to the Vocabulary Threshold Hypothesis, which states that a minimum level of vocabulary knowledge is necessary for new words to be learnt (Laufer, 1991). Laufer (2010) suggests two thresholds - "an optimal one, which is the knowledge of 8,000 word families yielding the coverage of 98% (including proper nouns) and a minimal one, which is 4,000-5,000 word families resulting in the coverage of 95% (including proper nouns)" (p. 1).

In Schmitt and Zimmerman's (2002) study of the productive knowledge of 16 derivational word meanings of 106 postgraduate EFL learners, they found that their learners' productive knowledge plateaued at various stages until most of

the derivational meanings of the target words were acquired, and opportunities for them to use these words meaningfully were available to them. Julian's (2000) study of the target word production of adult learners showed similar results. The results of his study show that his learners' motivation to explore new vocabulary knowledge during reading tended to taper off as soon as they were able to fulfill their communicative needs with an initial set of vocabulary.

Two studies carried out by Parry (1993, 1997) also suggest that learner motivation could be a disadvantage for incidental vocabulary acquisition because it could reduce the amount of reading that is necessary to secure the required number of text repetitions that would facilitate incidental vocabulary acquisition. This would slow down the effects of incidental vocabulary acquisition. Parry's studies indicate that texts that are personally interesting or potentially profitable to learners have a better chance for stimulating incidental vocabulary acquisition. For instance, the results of these studies show that students who need to pass English language placement tests are very motivated to read their course readings extensively. The learners' extensive reading of exam materials resulted in quantitative and qualitative gains in vocabulary knowledge at the end of the course. However, these findings also seem to suggest that a lack of interest could prevent the learner from being sufficiently involved with the vocabulary that will lead to incidental acquisition. Schmitt (2008) lists nine factors facilitating incidental vocabulary acquisition. They are:

> "increase frequency of exposure,
> increased attention focused on the lexical item,
> increased noticing of the lexical item,
> increased intention to learn the lexical item,
> a requirement to learn the lexical item (e.g. by teacher, test, syllabus)
> a need to learn/use the lexical item (for task or for a personal goal),
> increased manipulation of the lexical item and its properties,
> increased amount of time spent engaging with the lexical item,
> amount of interaction spent on the lexical item" (Schmitt 2008: 339).

Schmitt's checklist suggests that effective incidental acquisition of vocabulary meanings involves a balanced input from all or most of the above factors. Schmitt uses the cover term "engagement" (Schmitt, 2008: 338) to describe all the involvement possibilities that encourage incidental vocabulary acquisition. He states that activities inducing the learner to increase engagement would lead to better incidental vocabulary acquisition results. Although Schmitt's list implies some degree of conscious attention such as 'noticing', 'intention' and 'manipulating' in his checklist, it does not contradict incidental vocabulary acquisition. Rather, it suggests that even for incidental vocabulary acquisition, some deliberate attempts to direct attention to explicit learning methods may be useful for some learners and learning contexts.

2.4   CHAPTER CONCLUSION

In section 2.1, I reviewed Richard's and Nation's vocabulary knowledge frameworks and argued that it is more realistic and accurate to describe learners' vocabulary knowledge in terms of the different components of word knowledge. This argument supports Schmitt's theory of incremental vocabulary acquisition, which states that the learning of deep word meanings is more important than the learning of word forms. I then went on to discuss various cognitive approaches to vocabulary acquisition including explicit and implicit learning. I argued that the strong approach to incidental vocabulary learning may be more suitable to word form learning whereas the weak approach may be more effective for the acquisition of deeper and more complex components of word knowledge. This implies that that weak approach tends to be appropriate for the acquisition of contextual vocabulary knowledge.

Chapter 3

LITERATURE REVIEW II
READING COMPREHENSION STUDIES

INTRODUCTION

Researchers have different views on how vocabulary knowledge and reading relate to each other. Sternberg (1987), Haastrup (1991), Nagy, Herman and Anderson (1985), Nation and Coady (1988) and Stoller and Grabe (1993) are of the opinion that vocabulary knowledge is crucial to reading comprehension. Krashen (1985), Gass (1988; 1997), Chaudron (1985), Anderson (1995), Dubin and Olshtain (1993) and Nassaji (2003b, 2006) on the other hand, hold the view that the learner's vocabulary knowledge plays a more indirect role in reading comprehension than the learner's abilities or skills to deal with vocabulary during reading and understand it. This group of researchers are interested in investigating reading comprehension and vocabulary knowledge in terms of how learners apply cognitive strategies for understanding vocabulary and contextual meanings in a text. Studies associated with these two views demonstrate that reading is a complex and interactive process whereby the learner needs to call on different knowledge sources and apply a range of mental strategies for effective comprehension outcomes.

3.1   The Object of Reading

3.1.1   What Reading Involves

Goodman (cited in Singer and Ruddell, 1967) describes reading as a psycholinguistic guessing game where learners need to predict and interpret complex messages in a text. Goodman states that the reader needs to draw from all the resources in the text such as the format, words, syntax, discourse markers, cohesive devices, graphic representations and pictures in order to mentally construct meaning. Although Goodman's argument is an example of a rather

extreme view, which many researchers do not subscribe to these days, it suggests that reading comprehension is a complex cognitive process. Laufer (1997: 20) states that the underlying mental processes regulating reading comprehension are more closely associated with the processes regulating contextual vocabulary understanding than the processes regulating understanding of individual vocabulary meaning. Laufer argues that to process individual word meaning, a learner may need to recall knowledge of word forms or the syntactic rules governing the grammatical categories of the word. However, for constructing the meaning of a word within a contextual environment, the learner needs to activate mental processes for decoding deeper vocabulary meaning.

Smith (1993) and Daneman and Merikle (1996) point out that reading is a complicated process during which the learner decodes and infers textual and contextual meanings in the text. They assert that for learners to understand what they read, they must be able to utilize their psycholinguistic knowledge and apply suitable cognitive processes to decode and infer meaning that is encoded in the words. Daneman and Merikle argue that comprehension depends on the ability of an individual to mentally compute semantic and syntactic relationships among words, phrases and sentences into meaningful representations of a text. Although Smith and Daneman and Merikle are concerned with studying the complicated processes associated with reading comprehension, their approaches stem from two different analytical traditions which I go on to discuss.

Daneman and Merikle's (1996) description of reading represents a bottom-up text processing system whereby the learner focuses on the understanding of individual word meanings and syntactic forms in text. During bottom-up processing, the learner relies on his understanding of word meanings to work out the global messages in the text. De Bot (1997), Nagy (1997) and Nassaji (2003; 2006), who are interested in discussing reading processes in terms of the role of learners' linguistic knowledge sources to understand texts, also refer to bottom-up reading processes in their work. For instance, Nagy suggests that effective reading depends heavily on the learner's current phonological

knowledge, knowledge of punctuation, knowledge of word association and knowledge of cognates to understand written texts. These components of word knowledge are similar to the linguistic knowledge that Nassaji (2003; 2006) investigated in his study of the different knowledge sources his learners activated during reading. He describes linguistic knowledge in detail and concludes that his learners' reading outcomes are influenced by their grammatical and lexical knowledge. Blakemore (1992) on the other hand, suggests that the primary objective of reading is to build a coherent representation of the content in a text. He argues that for this to happen, it is also essential for the learner to focus on non-linguistic structures because not all the information required for decoding vocabulary is explicitly contained in the words or even in the text itself. This implies that effective reading comprehension is a complex cognitive activity associated with the learners' ability to select appropriately from a range of knowledge sources.

When discussing the challenges of reading comprehension, there are some researchers who believe that a learner's understanding of individual word meanings plays a rather small role in reading comprehension. Adams (2004) claims that "relative to the overall literacy challenge, learning to recognize words really is a very small component" (p. 1240) during reading. He asserts that even during bottom-up processing, the learner's cognitive abilities to organize and apply existing vocabulary knowledge play a more important role for developing deeper understanding of a text. Adams seems to support the top-down approach, which assumes that the learner is more interested in understanding the global structures in the text rather than working out the individual word meanings. This approach tends to regard reading as a constructive process revolving around a combined use of different types of knowledge sources for constructing overall text comprehension.

Although it is possible to make a theoretical distinction between top-down and bottom-up reading processes, Carrell and Grabe (2002) state that during actual reading, learners tend to activate both types of text processes simultaneously and rely on a range of background knowledge for understanding the text.

Likewise, Lunzer and Garner (1979) and Nunan (1999) argue that the different purposes that learners have for reading a text can cause the interaction between reader and text to vary. They also claim that readers tend to activate different knowledge sources and apply different strategies to fulfill different reading purposes. In fact, many researchers would tend to argue that truly effective reading is generally related to the learner's ability to activate both types of mental processes rather than to allow only one process to dominate. Eskey and Grabe (1988) point out that although many researchers attempt to contrast the two approaches and try to persuade each other whether the true starting point for reading is the attention on words or meaning, the reality of the reading process which appears to be complex, is that it is usually a pragmatic combination of both approaches.

3.1.2   Reasons for Reading

Nunan's (1999) study shows that people read with different aims in mind and that different psycholinguistic resources are required to help them achieve the various reading objectives. This seems to add to the complexities of the reading process. Interestingly, Nunan's study indicates that learners seem to be aware that reading is more than the simple matter of recalling information. His study involved asking a large number of people why they read and how they go about their reading activities. Nunan's participants reported that depending on the purpose of the reading task and their motivation to read, they would retrieve different knowledge sources and activate different strategies in different reading contexts. For instance, most learners are aware that reading a label on a bottle of wine does not involve activation of the same schematic resources as reading a magazine or an academic text. The results of Nunan's study show that people are fully aware that they have different reading objectives in different contexts, and they understand that different processes are associated with them.

Early researchers such as Bartlett (1932) (cited in Thorndyke, 1977) and Spiro and Pearson (1980) view other aspects such as the learner's personal goals, attitudes and understanding of the communicative content as significant factors

affecting reading comprehension and vocabulary inferencing outcomes. Nevertheless, researchers seem to differ in their opinions about the extent to which decoding of word form or comprehension of semantic meaning is a more prominent reason for reading. Goodman (1989) and Carrell (1988) argue that the understanding of content plays a more major role in reading over the decoding of words. On the other hand, Eskey (1988) and Gough and Wren (1999) are in favour of a stronger role of vocabulary decoding during reading. Ehrich (2006) who has discussed the differences between top-down and bottom-up reading processes, argues that in reality two contrastive but simultaneous processes seem to be involved during reading – the decoding of individual words which is associated with analytical evaluation; and global content or contextual understanding which in in conjunction with a broader perspective. Ehrich claims that learners tend to rely more on contextual inferencing than on word form decoding to understand unfamiliar vocabulary during reading.

In spite of the differences in emphasis, there seems to be a general consensus that reading is a complex process involving the extraction of the learners' knowledge sources to serve two objectives – to understand the overall content of the text and to understanding individual vocabulary meanings in the text.

3.1.3   Understanding Content

Alderson (2000) states that it is commonplace in literature to distinguish between the process of reading, which is usually what we mean by reading; and the product of reading, which is the related to the purpose for which the reading task is undertaken. Alderson suggests that reading for meaning is usually the main purpose of reading, and the reading process is primarily mentally regulated by top-down processes which tend to be expanded for the purpose of exploring and understanding content information in the text. That is, reading may be interpreted as a process that begins with a learner being focused on working out the macro elements in the text such as its general content and global messages first, before the learner attends to the micro aspects such as the textual and contextual meanings of individual words.

Although this view suggests a top-down orientation, it does not mean that these researchers view vocabulary decoding during reading as less important than the construction of overall meaning. Rather, they believe that effective reading does not result from the precise identification and understanding of all the elements in a word, but from the learner's skills in selecting from their schemata to make meaningful sense of a text (Goodman, 1976; Colley, 1987). Colley describes reading comprehension as "the processing of information at several levels, from the recognition of individual words to the application of the reader's knowledge to interpret the text and make necessary inferences" (p. 113). Ratcliffe and McKoon (1978) and Rickheit et al. (1995) suggest that should a learner's attention be directed towards lexico-grammatical items in a text during top-down reading, there is still a definite sense that individual words and sentences are individually processed for the purpose of achieving a coherent interpretation of the whole text.

3.1.4   Understanding Vocabulary

Paran (1997), Anderson (1999), Alderson (2000), Grabe and Stoller (2002), Carrell (1991) and Gough (1972) argue that for some learners, their primary purpose of reading seems to be to understand and learn vocabulary. These learners may tend to focus more on the individual lexico-grammatical items in the text rather than content information whilst they read. Mental process associated with vocabulary decoding rather than contextual inferencing would be activated. In contrast with contextual inferencing, vocabulary decoding is regulated by processes that transform the graphemic information that enters through the visual system, from graphemic representation into a phonemic representation. The phonemic representation is next converted into a word that passes on to the next level, which is meaning.

Nevertheless Jared, Levy and Rayner (1999) argue that it is rather far-fetched to imagine that a learner's purpose for reading is driven only by the intention to understand vocabulary. Beaugrande and Dressler (1981: 108) argue that part of the realities about reading is that the learner will always focus on decoding

unfamiliar words at some point during a reading task because it is common for learners to encounter unfamiliar words in any text. Beaugrande and Dressler argue that learners will usually try to decode the meaning of new words in a way that is consistent with establishing an overall understanding of the text and coherence. They suggest that even if the learner is invested in decoding vocabulary whilst reading, the processes involved will be operational at least at the textual level rather than purely on the word level. They argue that more often than not, decoded vocabulary knowledge will be used for understanding contextual meaning or content information.

These arguments seem to suggest that whether a learner begins reading with the intention of focusing on vocabulary and acquiring it or not, it is unlikely that he/she would avoid dealing with content information or to attend to global meanings in the text. Rather than to argue about which processes are more important for different reading purposes, it may be more interesting to study learners' cognitive processes whilst they are reading. According to Van Dijk and Kintsch (1983) and Bernhardt (1991), the object of reading for decoding vocabulary meaning is still relatively rooted in the understanding of word senses, which tends to be more manageable for less-skilled or younger learners. Nonetheless, the researchers seem to agree that it is rather counter-productive to discuss reading in terms of the relative significance of vocabulary decoding or contextual understanding processes as this is a debatable subject even amongst researchers from either bottom-up or top-down traditions.

The literature I have discussed so far suggests that although different reading purposes seem to be regulated by distinct mental processes that are associated with top-down or bottom-up processing, in reality, both processing mechanisms tend to be simultaneously involved during reading. The model of reading comprehension I have constructed here is based on the moderate view that while some learners may have specific reading goals, in reality, reading comprehension is the result of both top-down and bottom-up processes.

3.2   Mental Resources of the Reader

3.2.1   Interactive Reading Processes

Adams (2004) identifies 3 simultaneously occurring mental processes for the learner to understand a text. They are:

(1) Orthographic Processing – At the word level, the orthographic processor in the learner's mind helps the learner to visually process letters in the text, translating print to meaningful, connected text as they go. It is also responsible for the correct eye-movements that are necessary for the reading task. Ultimately, orthographical processes are responsible for the smooth and holistic manner in which a learner constructs meaning or words and ideas in a text. But since literal comprehension is not the goal of reading, according to Adams, fuller interpretations of a text require the processing of contextual meanings on a more global level. This requires a different cognitive processor.

(2) Context Processing – In order to achieve a meaningful and coherent interpretation of a text, the learner's mind must process the overall contextual information in it. The context processor achieves this by priming and selecting word meanings from the learner's mental lexicon appropriate to the context of the text to interpret its message. When suitable vocabulary is found, the learner will then be able to process the contextual meanings in the text, which is regulated by yet another cognitive processor.

(3) Meaning Processing - Meaning processing is similar to orthographic processing in that it helps the learner to construct the meaning of words and ideas in the text. Although this processor is mainly responsible for incidental vocabulary learning processes, when it works together with the context processor, it enables the learner to decode new word meanings and infer contextual meanings. (Adams, 2004: 1223-1239)

Adams' model is interesting because it is a framework that describes reading in terms of how the reader interacts with and processes incoming textual and contextual information. This framework follows from earlier research, which provided explanations of how these mental processes are triggered during reading. For example, Chamot and O'Malley (1987, 1994) state that contextual processing is triggered by a learner's encounters and interactions with unfamiliar words during reading. These unfamiliar words signal the onset of problems that require intervention at the cognitive level. Gass and Veronis (1994) suggest that the processes regulating the different vocabulary decoding and inferential processes during reading are similar to the processes activated for general problem solving. They assert that learners' problem-solving processes are essential to successful reading comprehension. These mental processes assist learners in identifying areas of learning and testing their hypotheses and are necessary to assist them in achieving a deeper understanding of and for acquiring deep contextual vocabulary meanings. Grabe and Stoller (2002) refer to these processes collectively as interactive text processing mechanisms in the learner's mind during reading.

Laufer (1997) states that the two reading processes which learners most commonly activate when they encounter unfamiliar vocabulary during reading are contextual inferencing and lexical decoding. Studies by Haastrup (1991), Nagy (1997), Paribakht & Wesche (1999), Fraser (1999), de Bot et al (1997) and Nassaji (2002; 2003; 2006) show that inferencing is the most popular method of decoding the meaning of unknown words by second language learners during reading in several other studies. These results are consistent with the findings of Gass (1999), Ard and Homburg (1992) and Henriksen (1999), whose studies show that inferring from context not only allows learners to work at overall comprehension, it generates the necessity to work out word-level meanings during reading. The results of Nassaji's (2006) study show that lexical inferencing accounts for between 58% and 80% of his learners' mental processing for dealing with unfamiliar vocabulary during reading.

3.2.2   Schema Theory

Goodman (1994) states that although texts are written by authors to be understood by readers, the real meaning of a text is in the author, and the understood meaning is in the reader. Since all our life experiences vary, the schemata involved in encoding and decoding meaning in a text will be different. He argues that this is because a text "has a potential to evoke meaning but has no meaning in itself" (Goodman, 1994: 1103). Goodman also asserts that the learner's understanding of meanings encoded in written texts is so closely associated with his/her schemata that the knowledge sources which the learner brings to the text, that it could sometimes be more important than the text itself. In fact, Rosenblatt (1994) claims that learners may also signal shifts in perspectives according to their cultural knowledge during reading. Rosenblatt suggests "the same text takes on different meanings in transactions with different readers or even with the same reader in different contexts or times" (Goodman, 1994: 1078). Goodman seems to suggest that the learner's ability to activate appropriate background information to understand a text depends on his or her experience, perspectives, attitudes towards reading and the amount of attention allocated to constructing meaning. This background knowledge is loosely referred to as the learner's schema. Goodman argues that during reading, the leader retrieves suitable schematic knowledge to decode and construct meaning.

Goodman's theory represents the strong view of schema theory, which though has not been proven, is useful to discuss because it provides some insight into the reading process from a cross-cultural perspective. Laufer (1997: 31) suggests that one factor responsible for helping a learner to attain a good understanding of a piece of written text is the compatibility between the learner's schemata and the concepts and ideas in the text, which, she argues, tends to be culturally-biased and full of implied meanings. Earlier empirical studies (Anderson, 1977; Anderson et al., 1991; Pichert & Anderson, 1977; Steffensen et al., 1979; Parry 1987) have also shown that a learner's schemata could affect understanding and learning from a cultural perspective and that

effective text processing depends on learners' abilities to develop personal interpretations of the text that help to clarify its meanings. The results of these studies suggest that learners are able to work out ambiguous meanings in the text according to their cultural backgrounds. That is, they suggest that learners may have the ability to separate important information from less significant information in a text based primarily on their cultural understandings.

Several researchers have attempted to provide working definitions of the abstract concept of schema. Rumelhart (1980) for example, states that

> "schemata can represent knowledge at all levels – from ideologies and cultural truths to knowledge about the meaning of a particular word, to knowledge about the meaning of a particular word, to knowledge about what patterns of excitations are associated with what letters or the alphabet. We have schemata to explain all levels of our experience, at all levels of abstraction. Finally, our schemata are our knowledge. All of our generic knowledge is embedded in schemata" (p. 41).

Rumelhart suggests that relevant schematic knowledge retrieval during reading helps learners to focus on decoding meaning in a text and argues that the schema which a person develops becomes theories about the realities this person encounters in life. In fact, an individual's schema is considered important in general because they help the individual to theorise and explain new information that enters his/her life. In terms of reading comprehension, Alderson (2000) defines schemata as the interlocking mental structures representing the reader's knowledge that is necessary for text comprehension. The importance of schema theory to reading comprehension lies in how the learner uses his schematic resources for mentally process incoming information in the text during reading. Although schema theory has not been proven by research; and the controversies surrounding the role of schema theory and its implications to reading comprehension have not yet been resolved by research, it is a useful concept that allows researchers to think about the role of background knowledge, how it is

activated and the role it plays for helping the learner to make sense of incoming information during reading and to predict that information.

Anderson and Freebody (1981) and Bransford et al. (1979) suggest that such a strong correlation exists between vocabulary knowledge and reading because vocabulary knowledge, which is the very essence of reading comprehension processes, is closely related to learners' schematic knowledge. Anderson and Freebody argue that the same schema, which is responsible for the writer's ability to encode meaning lexically in the text, is also responsible for the reader's ability to retrieve it during reading. They claim that a learner's schematic knowledge is important for reading because it assists him/her in predicting upcoming textual information. For instance, when a learner recalls schematic knowledge of phonology, certain phonological patterns within individual words may be recognized as familiar and may enable the learner to predict whole words during reading. Anderson and Freebody's argument is a useful explanation of how a learner's schema helps to make the uptake of syntactic patterns and discourse structures between paragraphs in a text easier and more fluent, so that the learner is able to focus on continuous reading and meaning construction.

Several arguments have also been put forward to support the role of schema for predicting incoming information during reading. Cook (1989) claims that a learner's schema consists of the "mental representations of typical situations… used in discourse processing to predict the contents of the particular situation which the discourse describes" (p. 69). Brown (1992) argues that good readers can generally recall schematic information to predict upcoming information well enough for them to read identical words presented in different contexts at different speeds for different purposes. When describing the reading skills of effective readers, Cameron (2001) writes that they are able to create a developing network of ideas for understanding individual word meanings as they work through the text. She states:

"In making meaning from a text, skilled readers use a combination of visual, phonological and semantic information, taken from the letters, words and sentences of the text. Readers build up an understanding of the text as they go along, sometimes called a 'text base'. The text is a kind of dynamic and temporary meaning for the text, that draws on information processed at different scales" (p. 127).

Anderson (1977) states that learners' schemata could have a strong influence on the mental processes for both learning and remembering words and conceptual information in a text. He claims that schema theory provides ideational scaffolding for assimilating textual information and makes new vocabulary more learnable. According to Anderson, a learner's schema may also influence the selective allocation of attention and could provide the basis for the learner to determine what is important in a text. This helps the learner to filter out only the most important words to attend to and facilitates inferential elaboration, which is a useful cognitive process for the learning of deep word meanings. Anderson also states that since no text is completely explicit, the learner's schema provides the basis for the learner to activate the necessary mental processes to infer deeper word meanings and understand global meanings in a text.

The arguments highlighted in this section suggest that reading comprehension is a complex activity involving the retrieval of appropriate psycholinguistic knowledge in a transaction between a learner and a text. Adams (2004: 1221) states, "the most striking characteristic of skillful readers is the speed and effortlessness with which they breeze through text". Before a learner's schema can be useful for text processing and reading comprehension, it has to be retrieved to do the job. This knowledge retrieval process is as complicated as the vocabulary decoding and comprehension processes they serve. Though Adam discussion focuses on the importance of the L1 reader's ability to make mental connections between the word recognition and reading, her model for discussing the relationship between vocabulary knowledge and reading is interesting for our understanding of L2 reading processes.

3.2.3   Cognitive and Metacognitive Processes

It appears that a learner's ability to decode vocabulary and infer contextual meaning whilst reading seems to be regulated by the underlying cognitive and metacognitive processes activated for understanding the incoming textual information. Sternberg (1984), Wong (1985), Rubin (1987), Garner (1987), Cohen (1998) and Hacker (2004) claim that a learner's cognitive and metacognitive processes are similar yet distinct mental processes. The main difference between metacognitive and cognitive processes is that while cognitive processes regulate the learner's ability to activate general problem-solving strategies, metacognitive processes regulate the learner's self-regulation and self-management skills during a task. Wong (1985: 138) gives a mathematical example to illustrate this subtle distinction – to find the sum of a list of numbers, the strategy used is adding up the numbers. This strategy is the result of cognitive processing. To check that the answer is correct, another strategy of repeating the procedure to test the result of the addition could be used. That is, the learner must first be aware that a mistake could have occurred in the original calculation and that repetition could be a way of monitoring the result. This monitoring strategy is the result of metacognitive processing.

Hacker (2004) suggests that one way of looking at the distinction between metacognitive and cognitive processing is to consider the learner's sense of awareness and conscious ability to initiate monitoring processes alongside the activation of cognitive processes. He claims that metacognitive processes are concerned with the learner's awareness of his/her cognitive processes. This awareness helps the learner to assess whether progress is being made toward the current goal. Indeed, Flavell (1976: 232) claims that metacognition is "one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g. the learning-relevant properties of information or data" (cited in Garner, 1987: 16). Flavell argues that a learner's metacognition enables him to plan, monitor and evaluate a task and are activated when they demonstrate the ability to exercise executive control over his/her own cognitive knowledge.

Hacker's and Flavell's arguments are interesting because they seem to suggest that a learner's cognitive processes precede his metacognitive processes. Yet the relationship between cognition and metacognition is more complex than that. Hacker argues that it is not as interesting to discuss how cognitive and metacognitive knowledge are similar or different from each other, as it is to discuss how they relate to each other during reading. He states that "as a person reads a text and constructs an internal representation of it at a cognitive level, any part of that representation can be compared to a model at a related metacognitive level" (p. 761). In addition, Hacker argues that "the basis on which the comparison is made at the metacognitive level is determined by the reader's implicit or explicit application of a standard or standards of evaluation" (p. 761). He illustrates the relationship between cognitive and metacognitive processes for reading comprehension and vocabulary learning in Figure 1 below.

Figure 1 – Model of Comprehension Monitoring, Hacker (2004:759)

Theoretical Mechanisms of Comprehensive Monitoring
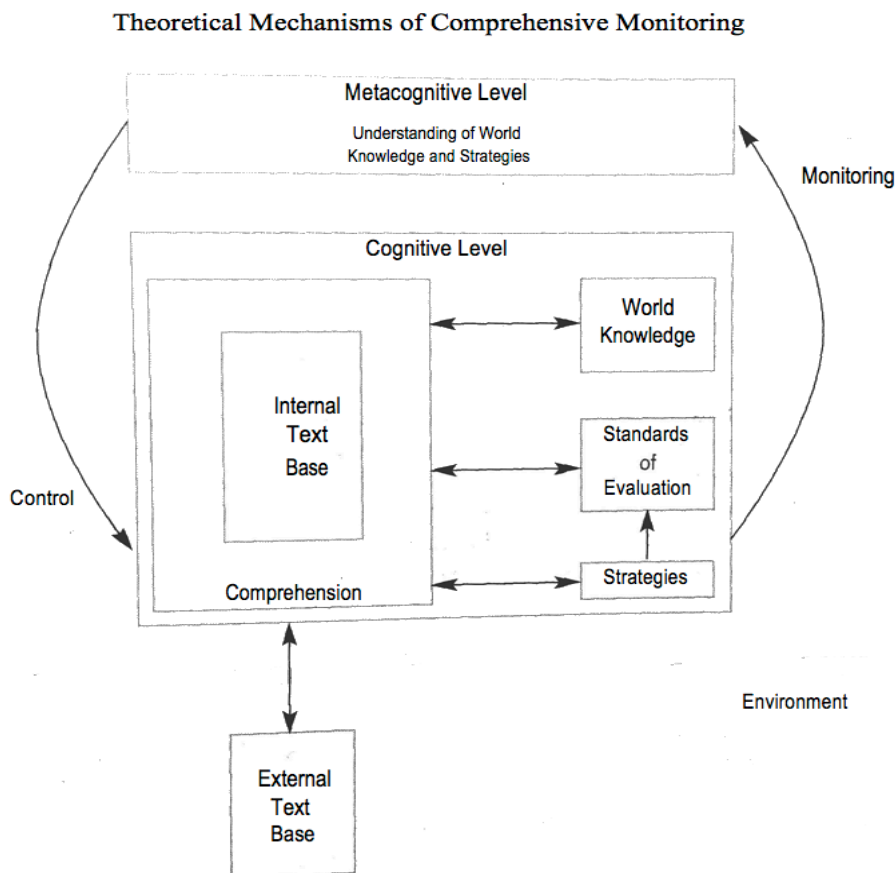
The labels in the Figure 1 suggest that the differences between cognitive and metacognitive processes do not lie in the actual strategies they activate but in their individual functions. The arrangement shows that three main domains are involved during reading - the written text itself and two separate levels of thought, which are cognitive processes and metacognitive processes. There is a clear relationship between the external text base and the learner's cognitive processes, hence the double-headed arrows between the two boxes. At the cognitive level, comprehension is achieved through cognitive processes that activate the learner's psycholinguistic resources, which Hacker lists as world knowledge, standards of evaluation and strategies.

The double-headed arrows in the cognitive level box represent the direct relationship between knowledge sources and this level of processing. Since strategies are either explicitly or implicitly activated in Hacker's model, there is a single-headed arrow between 'strategies' and 'standards of evaluation'. That is to say, the learner's understanding of words and meanings in a text depends on how the learner's knowledge system is activated at the cognitive level, which has direct references to the contents of the text itself. The flow of arrows linking the three large boxes suggests that metacognitive processes, however, are not associated with the written text. Rather, the text triggers off cognitive thought processes, which in turn triggers off metacognitive processes that influence overall thinking at the cognitive level. Hacker (p. 755-756) refers to metacognition as 'calibration of comprehension' and argues that it is as central to reading comprehension as cognitive processes.

Hacker's diagram illustrates the interlocking relationship between cognition and metacognition. The large curved arrows flowing between the metacognitive level and cognitive level boxes show the interlocking relationship between the two separate mental processes. The connection between them implies that both types of processes are likely to be activated for the same reading task. One may argue that it would not be profitable to discuss reading comprehension processes by separating one process from the other. In fact, Hacker (2004) claims that "when considering the relation between metacognitive and cognitive

processes, it is important to consider that neither one occurs in isolation" (p. 758). It is safe to assume that both types of mental processes are present and active in the learner's mind during task completion. This is consistent with Rumelhart's (1977) description of reading as the application of multiple knowledge sources for understanding a text, whereby firstly, the cognitive-level process being controlled must first be monitored; and second, it must be contained as a model within which the metacognitive level exists.

Though this discussion is interesting, researchers are not unanimous about the differences between cognition and metacognition. This is because although cognitive and metacognitive processes are distinguishable theoretically, in reality they are often difficult to recognize, especially with reference to the reading task. Cohen (1998: 12) claims that the differences are not clear-cut because during reading, it is highly likely that both types of processes have to be activated at the same time with overlapping features functioning on different levels of abstraction. Cohen considers the distinction between cognition and metacognition a superfluous point of discussion since both processes are commonly activated for the purpose of normal reading, which according to him is "to construct meaningful interpretations from texts" (p. 756). In fact, the connection between cognitive and metacognitive processes are so intimate that Stanovich (1980) suggests we are free to assume that a process at any level can be used to compensate for deficiencies at the other level. According to Nelson and Narens (1990), a learner's cognition and metacognition are a system of interacting thought processes and not a collection of independent parts. Such a perspective seems to provide the basis for some researchers (e.g. Cohen, 1998; Sternberg, 1984) to argue that metacognitive and cognitive processes are sub-sets of each other.

Skehan (1998: 49) describes reading as the constant process of simultaneously retrieving knowledge and applying strategies to make meaning. How these processes are activated and how schematic knowledge is retrieved for decoding individual vocabulary meanings and inferring contextual meanings whilst reading is associated with the learners' short and long term memory functions.

So far I have explained several cognitive models for studying learners' vocabulary decoding and contextual inferencing during reading. In Section 2.2, I discussed the role of the learner's short term and long term memories for processing and storing vocabulary. In the next sub-section, I discuss the role of learner's short-term and long-term memory functions for reading.

3.2.4   Short and Long Term Memory Functions

Skehan (1998: 43) claims that during reading, there is a tension between the learner's need to decode rules and forms on the one hand, and to establish communicative meaning on the other. To achieve both objectives, the learner retrieves relevant schemata to mentally process new meaning in the light of known meaning. This behaviour is possible only if the learner is capable of selecting and activating suitable mental processes that are specific for carrying out these two tasks. Nonetheless, Skehan claims that there are constraints in the human information processing system that prevent simultaneous attention to be given to form and communicative meaning extraction. This is why information processing during reading is handled by two different memory functions – the short term memory and the long term memory. These two memory functions process incoming textual information in similar ways as they do for processing and storing lexical entries in the learner's mind (discussed in Sub-sections 2.2.2 and 2.2.3).

Clark and Clark (cited in Potter and Lombardi, 1990) state that while the long term memory contains schematic knowledge such as strategic knowledge, contextual knowledge and systemic knowledge that are needed for constructing meaning during reading, the short term memory is the residence of the 3 mental processors described in sub-section 3.2.1 – orthographic processor, context processor and meaning processor. Not only do the two memory spaces hold different knowledge sources, they have distinct functions for reading comprehension. Clark and Clark claim that the short term memory is capable of processing a large amount of incoming data, but it has limited storage capacity. The long-term memory, on the other hand, has almost infinite space for holding

psycholinguistic knowledge, but is incapable of processing large chunks of information. Atkinson and Schriffin (1968) assert that in comparison with the short term memory which is responsible for the cognitive and metacognitive processing of incoming textual and contextual information in real time, the long term memory is primarily concerned with psycholinguistic knowledge retrieval.

It has been suggested that the processes in the short and long term memories do not function separately during reading. In fact, one could argue that both memory functions are required simultaneously to bring about comprehension of textual and contextual meanings during reading (Anderson and Lynch, 1988). The researchers state that at the word and sentence levels, comprehension begins when the learner's mental processes in the short term memory trigger off the retrieval of suitable linguistic knowledge sources from the long term memory such as phonetic knowledge, word class knowledge and ability to predict sound sequences within individual words for the purpose of working out syntactic rules and understanding the contextual meaning of sentences. They go on to explain that overall comprehension beyond the word and sentence levels is achieved when the short term memory processes signal the need to retrieve suitable external knowledge and mental strategies from the long term memory for constructing contextual and global meanings in the text. According to this model, short and long term memory processes are triggered off simultaneously to perform many functions during reading. This enables the brain to continuously process incoming information, retrieve schema to work out the various meanings in a text, to acquire new meanings and to store them for future procedures.

Daneman and Tardiff (1987) explain that when unfamiliar information is encountered during reading, whether this is a new word, a new syntactic structure or new sense meanings, the short term memory holds it temporarily as it attempts to process it. Through repeated exposure to the new information and the frequent activation of existing knowledge sources and strategies for understanding it, the short term memory becomes increasing familiar with the new information until it achieves full recognition of it, after which it is classified

as acquired knowledge. This freshly acquired knowledge is then transferred to the long term memory where it is stored as schemata for subsequent retrieval by the short term memory processors for inferring word meanings and constructing contextual meanings during reading.

Skehan (1998) suggests that there is a cognitive sequence in the mind that regulates information processing, storage and transfer procedure that are characteristic of reading. This sequence is influenced by the learner's cognitive awareness or noticing processes whilst he/she is engaged in active reading. Figure 2 below, taken from Skehan (1998), illustrates how information flows between the two memory functions after it has undergone 'noticing' processes. Skehan uses the term 'working memory' to refer to the learner's short term memory in his diagram. Although some researchers distinguish 'working memory' from 'short term memory' and an entanglement of terms and definitions can be found in the literature, the distinction is not important for my discussion.

Figure 2 – Model of Short and Long Term Memory Interaction, Skehan (1998: 49)
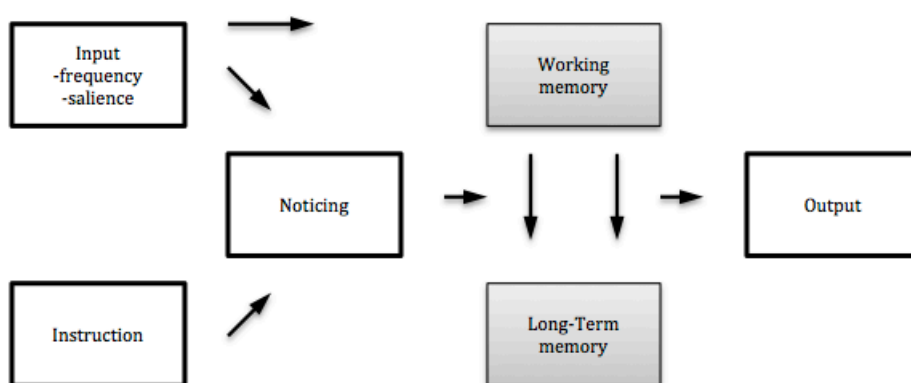
Influences upon noticing (Skehan, 1998: 49)

Figure 2 shows that information processing occurs in several steps, beginning with the presentation of external material depicted in the two boxes on the far left. With a combination of 'input', which is the information contained in the written text, and 'instruction', which consists of both explicit and implicit

learning methods, a text undergoes mental processes and results in measurable output in the form of comprehension or knowledge acquisition. For new information to be processed, the learner must notice the need to activate mental processes, which is the next important stage of selection and attention to detail.

Both Skehan (1998) and Schmitt (1990) argue that when unfamiliar lexis is encountered during reading, the learner would naturally activate the most commonly retrieved schema for processing meaning before retrieving less-frequently used schemata. The researchers suggest that learners tend to notice schematic gaps for understanding semantic meaning earlier than they would notice problems associated with understanding word forms or syntactic structures. Apparently, this same noticing function allows the learner's information processing mechanisms in the short and long term memories to prioritise a job list for processing incoming information on the one hand and retrieving relevant schematic knowledge for decoding and inferring meaning on the other hand. As Skehan (1998) argues, the learner does not normally recognise all the areas requiring processing at once. In fact, he suggests that not all the input receives equal noticing attention, and not all the input that has been noticed will be reacted to. Similarly, Hedge (2000) suggests that the advantage of activating selective noticing processes is that it enables learners to follow a longer text and to focus only on the necessary or most interesting information in the text. She argues that it is neither necessary nor efficient for learners to focus careful attention on every word or to decode every piece of unfamiliar information in the text. It therefore follows that learners could attain better comprehension outcomes by noticing, selecting and applying appropriate strategies during reading.

3.3   Non-Strategic Knowledge Sources of the Reader

3.3.1   Linguistic and External Knowledge

Carrell and Grabe (2002) argue that at the textual level, the learner concentrates on processing the phonological, morphological, syntactic and semantic elements

in the text whilst reading. At the contextual level on the other hand, the learner is involved in a long list of mental tasks including goal setting, text-summary building, interpretive elaboration from knowledge sources, monitoring and assessment of goal achievement, and making various adjustments to enhance comprehension. Carrell and Grabe go on to argue that these text-processing activities are carried out under intense time constraints whilst other resources such as the learners' linguistic knowledge sources and mental strategies are simultaneously retrieved and integrated into the reading task, making reading a very complex psycholinguistic process.

Nassaji (2006) found that activation of non-linguistic knowledge such as discourse knowledge contributed to positive comprehension and inferencing outcomes. He defines discourse knowledge as the learner's understanding of the relationship between sentences and paragraphs, which enables the learner to construct different meanings based on the interaction between the different parts of a text. Dubin and Olshtain (1993: 183) propose 2 other types of non-linguistic knowledge that help learners regulate their reading processes. They are 'extratextual knowledge' and 'thematic knowledge'. Dubin and Olshtain describe these knowledge sources as the learner's background knowledge that is accumulated from personal experiences, which is brought to bear on the reading situation. These non-linguistic knowledge sources have been broadly referred to as 'world knowledge' in earlier research (Meyers et al., 1990; Huckin and Bloch, 1993; Nagy, 1997). In the next sub-section, I summarise the linguistic and external knowledge sources found in previous empirical studies.

3.3.2. *Nassaji's Classification of Linguistic and External Knowledge*

Although Nassaji's studies seem to concentrate on the role of his learners' strategic knowledge for reading comprehension, he seems to distinguish between strategic and non-strategic knowledge source retrievals. He defines strategies as "conscious cognitive or metacognitive activities that the learner used to gain control over or understand the problem without any explicit appeal to any knowledge source as assistance" (Nassaji, 2003: 655), whereas he states

that appeals to knowledge sources are "instances when the learner made an explicit reference to a particular source of knowledge, such as grammatical, morphological, discourse, world or L1 knowledge" (Nassaji, 2003: 655). Nassaji's classification of non-strategic knowledge could be interpreted to stem from two broad categories of Linguistic Knowledge and External Knowledge. These two categories have their subordinate categories that can be organized as in Table 2 below.

Table 2 – Nassaji's Classification of Linguistic and External Knowledge Sources

Knowledge Source	Type of Knowledge
Linguistic Knowledge	Grammatical Knowledge Morphological Knowledge
External Knowledge	World Knowledge L1 Knowledge Discourse Knowledge

In Table 3 below, I present Nassaji's (2003) definition of the 5 linguistic and external knowledge sources classified in Table 2.

Table 3 - *Definitions of Linguistic and External Knowledge Sources Used to Make Lexical Inferences, adapted from Nassaji (2003: 656)*

Knowledge Source	Definitions
Grammatical Knowledge	The learner uses knowledge of grammatical functions or syntactic categories such as verbs, adjectives or adverbs to infer meaning.
Morphological Knowledge	The learner uses knowledge of word formation and word structure, including word derivations, inflections, word stems, suffixes and prefixes to infer meaning.
World Knowledge	The learner uses knowledge of the content or the topic, that goes beyond what is in the text to infer meaning.
L1 Knowledge	The learner attempts to figure out the meaning of a new word by translating or findings a similar word in the L1.
Discourse Knowledge	The learner uses knowledge about eh relation between or within sentences and the devices that make connections between the different arts of the text in order to infer meaning.

Nassaji's definition of linguistic knowledge refers primarily to the learner vocabulary knowledge, whereas external knowledge refers to other forms of background knowledge the learner has. Nassaji (2003: 649) refers to all the psycholinguistic knowledge sources that learners require for decoding

vocabulary meaning and inferring contextual meaning during reading collectively as 'prior knowledge'. Laufer (1997), Nassaji (2003), Frantzen (2003), Qian (2002) and Paribakht (2004) refer to the learner's prior knowledge broadly as schematic knowledge. Frantzen argues that the learner's schema is significant for reading and incidental vocabulary acquisition because it shapes his/her preconceptions about the possible range of textual and contextual word meanings in the text. He asserts that all the different components of psycholinguistic knowledge are equally essential for bringing about effective reading comprehension and vocabulary inferencing outcomes. The question is the role of each of these components for bringing about successful reading comprehension in different contexts.

Nassaji's classification system is relevant to my study because it offers an opportunity for me to analyse my learners' vocabulary knowledge retrievals separately from their retrievals of non-vocabulary based knowledge.

3.3.3 *Dubin and Olshtain's Classification of Linguistic and External Knowledge*

Dubin and Olshtain's (1994) study investigates the effectiveness of predicting word meanings through contextual clues. The conceptual framework of their coding system is based on the interactive reading model that focuses on top-down and bottom-up processes and cognition-driven and data-driven strategies applied by their learners during reading (Dubin and Olshtain, 1994: 182). The authors referred to the work of Goodman (1967), Eskey (1988), Rumelhart (1977) and Parry (1987) for developing their coding categories. Unlike Nassaji's and Meyer et al.'s classifications, Dubin and Olshtain's codes are fewer and broader; and the authors did not code their data for strategies because their study concentrated on external and linguistic knowledge sources only. In total, they identified 5 categories of knowledge sources and described them as follows:

1. Extratextual knowledge – the reader's general knowledge extending beyond the text.

2. Thematic knowledge – the reader's overall grasp of the content of this particular text.

3. Semantic I – information extending over larger discourse units in the text, beyond the paragraph level.

4. Semantic II – information available locally at the sentence or paragraph level.

5. Syntactic – relationships within the immediate sentence or paragraph (Dubin and Olshtain, 1994: 183).

These categories are arranged hierarchically, beginning with the most global and contextual type of processing, which their study set out to investigate, to the most textual. That is, the first two categories involve top-down reading processes and schema-driven categories, which are most important for studying the knowledge sources associated with contextual understanding. The last three categories are associated with data-driven categories, which are more relevant to the decoding of vocabulary rather than the construction of overall contextual meanings during reading.

The linguistic and external knowledge sources found in Nassji's and Dubin and Olshtain's studies are some examples of the background knowledge that learners retrieve for decoding vocabulary and constructing contextual meanings whilst reading. This background knowledge may be broadly referred to as the learner's Schematic Knowledge or Schema. For some researchers (Anderson and Freebody, 1981; Rumelhart, 1980; Samuels, 1994; Alderson, 2000), Schema Theory which I have already discussed is central to their study of the interaction between reading comprehension and learners' background knowledge which also includes strategic knowledge, as I go on to discuss.

3.4 Strategic Knowledge Sources of the Reader

3.4.1 Strategy Activation

In my discussion of Schema Theory in sub-section 3.2.2, I mentioned Goodman's (1994) view regarding the importance of a learner's mental resources for understanding written texts. Goodman states that a learner's text comprehension processes are so dependent on the knowledge sources which he/she brings to the reading task itself, that the actual words and meanings in the text itself may be of secondary importance to the act of mentally processing incoming textual information during reading (Goodman, 1994: 1103). That is, the actual meanings encoded in the words, sentences and paragraphs in a text are rather meaningless unless they are decoded by the learners. If we consider a learner's mental strategies to be part of the range of background knowledge or schematic knowledge that he/she needs to retrieve and apply for processing written texts, then we may be suggesting that strategy application steers vocabulary decoding and contextual inferencing during reading. In fact, Anderson and Lynch (1988) claim that text comprehension is a complicated process which begins when the learner's short-term memory processes signal the need to retrieve suitable strategic knowledge from his/her long term memory for the purpose of constructing textual and global meanings in a text (discussed on page 69).

While all the different types of knowledge sources that a learner has are necessary for effective reading comprehension, some researchers argue that a learner's strategic knowledge is most essential to vocabulary decoding and contextual inferencing. They claim that text processing is a very challenging mental activity in which the learner is expected to decode individual words and understand meaning simultaneously under severe time constraints. For example, Cameron (2001) describes skilled reading comprehension as the learner's ability to retrieve suitable strategies that will allow him/her to make sense of the "combination of visual, phonological and semantic information taken from letters, words and sentences of the text" (Cameron, 2001: 127) (discussed in

sub-section 3.2.2). This does not mean that a learner's linguistic and external knowledge is not essential for comprehension. In fact, there is continuing research interest in studying the role of learners' vocabulary knowledge for reading comprehension (Hamada, 2014; Gablasova, 2014; Prior et al., 2014). Nevertheless, the results of Gablasova's study which aimed to investigate the differences between learners' breadth and depth of L1 and L2 lexical knowledge on reading comprehension outcomes show that even the most advanced L2 learners are disadvantaged in terms of reading comprehension outcomes compared to their L1 counterparts because of insufficient breadth and depth of L2 vocabulary knowledge. In order to attain effective reading comprehension outcomes, learners must apply a range of mental strategies, which is suggested in other empirical studies.

This argument is consistent with Anderson and Freebody's (1981) and Bransford et al.'s (1979) claim that when a learner recalls knowledge of phonology whilst reading, it is his/her mental ability to predict and process whole words that is sought after during the reading task (discussed in sub-section 3.2.2). In Prior et al.'s (2014) study of the relationship between language proficiency and lexical inferencing skills of Russian adolescents learning Hebrew, the results show that learners who were better able to decode the text had more superior vocabulary knowledge. Additionally, the study shows that in order for the learners to process incoming textual information and contextual meaning effectively at speed, he/she must be able to predict upcoming sequences in the text, all the while forming and testing hypotheses. The researchers conclude that although a certain amount of vocabulary knowledge is necessary for successful text comprehension, the usefulness of a learner's vocabulary knowledge for understanding the text is driven by his/her individual decoding and inferencing skills. These skills are associated with the learner's ability to retrieve and apply suitable mental strategies in order to deal with the unfamiliar words and meanings he/she encounters during reading.

Though there is still a tradition in investigating the relationship between learners' linguistic and external knowledge and their comprehension results,

there is now a growing interest to research and identify the factors influencing reading comprehension processes rather than outcomes. Researchers such as Hamada (2014) and Dhanapala and Yamada (2015) argue that there seems to be a clear link between the component skills of reading and effective reading. The sub-skills discussed by these researchers include inferencing, finding specific information, the ability to identify main ideas and details, metacognitive awareness, planning and predicting. They argue that these sub-skills are better predictors of reading comprehension success than learners' vocabulary knowledge or knowledge of the world. Hamada's study in particular shows that initially during reading, learners tend to infer meaning based on morphology and later knowledge of syntax and text structure as well as contextual clues. To test their inferences, they have to retrieve and apply suitable mental strategies. The author suggests that this hypothesis testing process is the cornerstone of effective reading comprehension; and argues that it is almost more important than the actual vocabulary decoding and contextual inferencing processes especially for skilled readers.

The results of Dhanapala and Yamada's and Hamada's studies are similar to the outcomes of previous studies which have shown that a learner's mental strategies are at least as important as his/her linguistic and external knowledge sources, if not more important. This argument is consistent with Hacker's (2004) argument that a learner's mental processes in the working memory are very powerful tools for monitoring comprehension and learning vocabulary because they "can cause one to abandon goals and establish new ones, or they can lead to the activation of cognitive or metacognitive strategies" (Hacker, 2004: 757). More recent studies by Park, et al. (2014), Tavakoli (2014), Karimi (2015), Khaki (2014) and Razi (2014) also seem to highlight the importance of strategy instruction and strategy application for helping learners to become more skilled readers.

There is rigorous ongoing research on the effects of strategy-directed reading intervention on L2 comprehension in present times. Though a large portion of this research relies on quantitative research paradigms such as tests to measure

learners' vocabulary decoding and contextual inferencing abilities, there is an increasing number of empirical studies using qualitative research methods such as interviews and recall protocols to study strategy application and other sub-skills of reading comprehension. In both Karimi's (2015) and Razi's (2014) studies which were based on data derived from think-aloud protocols, the learners were asked to report the strategies they used during reading in a self-reported strategy use inventory that was based on the Metacognitive Reading Strategies Questionnaire. The results of Karimi's show that the application of different strategies such as comprehension monitoring, elaborative and coherence inferencing, prediction, planning, concept mapping and summarizing have a strong impact on the learners' reading comprehension outcomes. The results of Razi's study demonstrate that metacognitive strategy use correlates with comprehension success. This prompted the researcher to conclude that strategy instruction is highly beneficial for L2 reading and suggested that further research on the role of strategy application for L2 reading should be conducted. Collectively, this body of research shows that the more mental strategies the learner retrieves and applies for forming hypotheses about the reading text and testing them whilst reading, the better his/her vocabulary decoding and contextual inferencing outcomes tend to be.

Cohen (1990) suggests that a strong element of learner autonomy tends to be involved when mental strategies are selected during reading. He argues that there is at least partial awareness in strategy activation even in instances when full attention has not been given to the task. Nevertheless, some researchers suggest that the retrieval of strategies from a learner's long-term memories is not always a conscious decision of the learner. Samuels (1994) and Van Patten (1996) suggest that there is a natural order of cognitive and metacognitive mental strategy application inherent in the learner's mind that is activated during reading. Van Patten argues that cognitive and metacognitive strategies do not have the same propensity to be retrieved. Van Patten claims that cognitive strategies are the mind's default strategies which tend to be retrieved before metacognitive strategies. When a learner encounters problems during reading his/her cognitive processes are triggered to retrieve default cognitive strategies

to mitigate the situation. When these default strategies do not bring about comprehension sufficiently, the learner's metacognitive processes are triggered to activate the less automatised metacognitive strategies, such as monitoring and self-evaluative strategies. Samuels (1994: 823) asserts that default strategies are essential for reading comprehension because the capacities in the human mind for processing information are limited. This claim is supported by Skehan (1998) who states that when a learner is occupied with the cognitively demanding task of continuously constructing meaning with short-term memory processes during reading, attention cannot be directed at integrating, relating and combining meanings of words that need to be decoded in an on-going manner unless some processes can be performed without conscious attention being given to them. Having default retrieval processes is also advantageous when the automatically activated strategies prove to be effective for bringing about comprehension. In such cases, the learner would not have expanded any unnecessary amounts of cognitive processing effort in the selection process.

Samuels (1994: 818-819) draws our attention to 3 mental processes that are associated with strategy selection during reading. The first skill is the learner's ability to identify only relevant schematic knowledge relating to letter-sound relationships, syntactic categories or semantic categories for reading and understanding the text. The second skill is the learner's ability to specifically notice and attend to the information that requires processing whilst reading. The third skill is the learner's ability to activate the automatized processes for attaining comprehension without effort. Samuels argues that at the cognitive level, if some schemata such as pre-existing letter-sound relationships, word meanings, syntactic knowledge and strategic knowledge can be automatically retrieved to process information in the text, cognitive space can be freed up and used for the more demanding mental processes. One such challenging task during reading is the process of selecting and applying the most appropriate and effective mental strategies to decode vocabulary and infer contextual meaning.

3.4.2 Cognitive Strategies

Researchers interested in cognitive psychology such as Brown (1980), Baker and Brown (1984) and Chamot and O'Malley (1987, 1994) broadly describe cognitive strategies as the mechanisms used by an active learner to solve problems during an ongoing activity. Brown et al. (1996) list a total of six cognitive strategies that are most commonly applied during reading. They are - clarifying the purpose of reading, activating content knowledge, critical evaluation of the content in the text, monitoring the learner's own ongoing activities during reading, drawing inferences and testing inferences. Brown et al. argue that cognitive strategies are essential for comprehension. Kominsky and Kominsky (2001) list 4 strategies that are identical to Brown et al.'s strategies of clarifying, self-evaluating, summarizing and predicting. Collectively, these studies have found that application of cognitive strategies correlates positively with reading comprehension outcomes. They are among some researchers who are interested in discussing the effectiveness of certain cognitive strategies for vocabulary decoding and contextual inferencing.

Huckin and Bloch (1993), Dubin and Olshtain (1993), Brown, et al. (1994), Nassaji (2003; 2006), Fukkink (2005) and Zhang and Suaini (2008), who are interested in the role of mental strategies for solving problems specifically during reading, have also conducted empirical studies to answer questions about the effectiveness of cognitive strategy application for reading comprehension. Their studies provide evidence that systematic application of cognitive strategies during reading results in positive gains in vocabulary inferencing and overall reading comprehension outcomes. For instance, in a series of studies involving both primary and secondary learners, Brown, et al. (1994) found that when learners were coached in four cognitive strategies – summarizing, self-questioning, clarifying and predicting, their top-down comprehension abilities improved significantly. Nassaji's (2003) study of cognitive strategies for decoding unfamiliar L2 vocabulary meaning through contextual guessing and lexical inferencing show that his learners' bottom-up reading comprehension outcomes improved when they applied cognitive strategies such as elaborating,

signaling understanding, reasoning, analysing and using analogy. In a more recent study by Daskalovaska (2014), the author used the Vocabulary Levels Test (Nation, 1990) to test the learners' vocabulary knowledge from reading the first eight chapters of Jane Austen's "Pride & Prejudice". Not only do the results show that that a statistically significant amount of new vocabulary was gained through reading, they suggest that the learners' previous vocabulary size had no effect on the rate of learning unknown words through contextual reading. The researcher concludes that as the study focused on word meaning which is associated with bottom-up processing, inaccurate vocabulary decoding led to incorrect answers and assumptions about unfamiliar words in the text. Daskalovaska argues that even for bottom-up processing, learners' application of cognitive strategies was still a better predictor of comprehension success and vocabulary learning than other factors such as their existing vocabulary knowledge or word frequency.

Garner (1987) suggests that cognitive strategy retrieval is sometimes associated with metacognitive processing. This is because metacognitive processes sometimes serve as a basis for signaling the necessity of strategies in general. She describes metacognition as the learner's ability to examine his or her own knowledge of the reading process, monitor their reading comprehension and apply a variety of appropriate strategies to facilitate a sound understanding of a text, whether they are cognitive or metacognitive strategies. In Garner's opinion, learners' metacognitive knowledge is an integral part of their reading comprehension abilities at the cognitive level. Overall, the studies discussed in this section seem to highlight that it is sometimes difficult to distinguish between cognitive and metacognitive strategies, as I go on to discuss.

3.4.3   Metacognitive Strategies

Sternberg (1984) was amongst the first researchers to assign separate categories of reading strategies associated with executive control processes such as planning, monitoring and evaluating one's reading skills, which are governed by metacognitive processes. Garner (1987) includes strategies such as slowing

down and assigning extra processing effort to particular words or passages in the text are part of the process of monitoring the learner's application of strategies in order to facilitate better reading comprehension. Hacker (2004: 760-761) lists several monitoring strategies that are activated by metacognitive processes to improve understanding during reading. These include rereading a difficult passage, looking back to prior text, predicting upcoming information and comparing two or more propositions. Hacker states that monitoring strategies are activated to increase the effectiveness or accuracy of several control strategies to regulate reading outcomes. Examples of control strategies are summarizing text information, clarifying text information and correcting incomplete or inaccurate text information. These control strategies are in fact listed as examples of cognitive strategies in some of the literature reviewed in sub-section 3.3.2 above, highlighting the difficulty in establishing a clear distinction between cognitive and metacognitive reading strategies.

Nassaji (2003: 392) lists the most frequently activated metacognitive strategies as repetition, verification, self-inquiry, monitoring, evaluation and revision. Interestingly, in Nassaji's data coding scheme, metacognitive strategies are classified as sub-categories of cognitive strategies, indicating the close relationship that these two types of strategies share. For example, Nassaji's analysis shows that when his learners applied cognitive strategies of identifying word forms, reasoning, hypothesizing or predicting, it was not uncommon for them to apply metacognitive strategies such as repetition and revising at the same time. Not only do the results of Nassaji's study show that both cognitive and metacognitive processes were involved in attaining common reading comprehension objectives, his study also shows that distinguishing one type of strategy from the other in research data is not always a straightforward task.

Flavell (1985) proposes a model of metacognition that takes into account the learner's age and frequency of strategy retrieval that could help researchers to understand the underlying differences between metacognitive and cognitive strategies in use. Flavell suggests that a learner's mental processing mechanisms are susceptible to various external conditions such as the reading context and

learner age. Flavell claims that while some studies show that older learners tend to demonstrate cognitive strategy application during reading, the results of these studies show that cognitive strategies tend to be less regularly demonstrated by younger learners. Flavell's arguments may be traced back to Baker and Brown's (1984) findings which draw on the concept of statability. Baker and Brown's study shows that cognitive strategies tend to be less statable than metacognitive strategies for certain groups of learners. Baker and Brown draw our attention to the possibility that due to the low statability of cognitive strategies, some learners may have the tendency to acknowledge the existence of metacognitive strategies more explicitly than cognitive strategies.

Baker and Brown (1984) argue that the pragmatic differences between cognitive and metacognitive strategy use lie in their usefulness for facilitating reading comprehension. They provide a broader perspective of looking at the subtle differences in terms of the fallibility of the strategies. Baker and Brown claim that metacognitive strategies tend to be more fallible than cognitive strategies when applied for decoding and inferring meaning during reading. They suggest that this is due to the possibility that while metacognitive strategies help learners to assess their strengths and weaknesses; evaluate the purpose of the reading task; select the information in the text that they need to pay attention to; and make decisions as to how they should approach the reading activity, learners often wrongly believe they know some facts about a particular topic or task during the monitoring process and retrieve incorrect knowledge sources as a result. These 'mistakes' often lead to poor comprehension outcomes. This resonates with Nagy's (1997) claim that sound strategic knowledge stems from the learner's knowledge of reading strategies that are suitable for decoding different types of meaning during reading.

3.4.4   Classification of Strategic Knowledge Sources in Previous Studies

In my discussion of cognitive and metacognitive strategies in sub-sections 3.3.2 and 3.3.3, I argued that in spite of the differences between the two types of strategic knowledge, both knowledge sources are essential for successful and

effective reading comprehension. The results of the empirical studies that I mentioned in my discussion suggest that the differences between cognitive and metacognitive strategies are so subtle that it is often difficult to distinguish between them in terms of the underlying mental processes that regulate their application. Most studies show that, in reality, learners tend to apply both types of strategies for understanding written texts. In this sub-section, I present Nassaji's (2003; 2006) classifications of the cognitive and metacognitive strategies his learners applied during reading.

Nassaji's (2003) classification system is based on several concepts in Huckin and Bloch's (1993) studies, which state that learners appeal to various cognitive strategies for inferring word meanings from context. Huckin and Block's classification system is in fact based on more in-depth analysis of the relationship between strategy use and successful reading comprehension. The categories that Nassaji developed for the mental strategies in his study were based on lists of vocabulary learning and lexical inferencing strategies from de Bot et al.'s (1997), Haastrup's (1991), Huckin and Bloch's (1993), Parry's (1993) and Schmitt's (1997) studies. Nassaji coded his data for the following types of strategies - repeating, verifying, self-inquiry, analysing, monitoring and analogy, which I elaborate on in the Table 4 below.

Table 4 – Definitions of Knowledge Sources and Strategies Students Used to Make Lexical Inferences, adapted from Nassaji (2003: 657)

Strategies	Definitions
Repeating	Repeating refers to repetition of any portion of the text, including the word, phrase or the sentence in which the word had occurred.
Verifying	Verifying refers to the learner's attempts to examine the appropriateness of the inferred meaning by checking it against the wider context.
Self-Inquiry	Self-inquiry involves asking oneself questions about the text, words or meaning already inferred.
Analysing	Analysing is when the learner attempts to figure out the meaning of a word by analysing it into its subordinate components.
Monitoring	Monitoring is when the learner shows conscious awareness of a problem or the ease and difficulty involved in completing a task.
Analogy	Analogy refers to attempts to figure out the meaning of a word based on its sound or form similarity with other words.

In Nassaji's (2003) study, the 6 strategies in Table 4 were not sub-categorised into more detailed categories because the study was carried out to investigate L2 vocabulary learning from context. In his later study (Nassaji, 2006), which focused on lexical inferencing strategies, Nassaji sub-coded three types of mental strategies into individual strategies showing how they relate to his learners' comprehension outcomes. His sub-classification system is shown in Table 5 below.

Table 5 –Sub-classification of Mental Strategies, adapted from Nassaji (2006: 392)

Strategy Type	Strategy Used
Identifying	Word repeating (cognitive)
	Section repeating (cognitive)
	Word-form Analysis (cognitive)
	Word-Form Analogy (cognitive)
Evaluating	Self-inquiry (metacognitive)
	Verifying (metacognitive)
Monitoring	Monitoring (metacognitive)

In Nassaji's sub-classifications a distinction is made between cognitive and metacognitive strategies. This distinction has its origins in Huckin and Bloch's

(1993) definition, which distinguishes the cognitive strategies of Identifying and Evaluating from the metacognitive strategies of Monitoring. We notice that the use of sub-categories allows the coding of the raw data to be more detailed and specific. For instance, for the strategy 'Identifying', Nassaji sub-categorises the strategy into word and section repeating strategies, which is a more nuanced way of describing the strategy.

Although the differences between cognition and metacognition is not crucial to my study, Baker and Brown's discussion of the differences between types of strategies in terms of fallibility and statability is interesting because it takes into account the learner's underlying mental processes regulating strategy application. This approach may also be useful for coding and classifying data.

3.5   CHAPTER CONCLUSION

At the beginning of this chapter, I introduced reading as a psycholinguistic activity. To support this view, I discussed the role of the learner's knowledge sources and the mental processes that are necessary for constructing meaning and learning vocabulary during. I referred to Schema Theory as one way of highlighting the importance of the learner's pre-existing knowledge for decoding textual and inferring contextual meaning of words during reading. I also discussed two reading purposes in the light of top-down and bottom-up processes – (1) understanding content and (2) decoding and acquiring vocabulary. My discussion suggests that no matter which the reading objective may be for a learner, in reality, it is difficult to divorce one process from the other. Although a linear discussion of the topic may seem neater, clear demarcations are neither possible nor desired in my study, as this would not illustrate how truly complicated reading is.

Alongside this, I considered the role of the learner's cognitive and metacognitive processes during reading. I provided examples of cognitive and metacognitive reading strategies in previous studies, and argued that the differences between these strategies are very subtle. I also made the point that for some researchers,

it is more interesting to study these strategies in terms of how they relate to each other during reading, and to describe their importance for different groups of learners and various learning contexts. Adams' (2004) insights on the most important aspects of reading suitably summarise the main arguments in this chapter. She states that "the full interpretation of a complex text may require retrieval of particular facts or events that were presented many pages earlier. It also may require consideration of knowledge and construction of arguments that are entirely extraneous to the text. And it certainly requires the critical and inferential activities necessary for putting such information together" (p. 1240).

My discussion of Vocabulary and Reading Comprehension Studies in Chapters 2 and 3 deal primarily with studies involving adult L2 learners. Although these studies are relevant and insightful for my study, the vocabulary learning and reading processes of adult learners are different from the developing cognitive abilities of young learners. In the next chapter, I discuss some vocabulary learning and reading processes that are specific to young learners.

Chapter 4

LITERATURE REVIEW III
YOUNG LEARNER VOCABULARY LEARNING
AND READING COMPREHENSION

Introduction

In my discussion of vocabulary knowledge and vocabulary learning in Chapter 2, I highlighted the importance of depth of vocabulary knowledge and its role in incidental L2 vocabulary acquisition. In Chapter 3, I discussed the interlocking relationship between learners' knowledge sources and reading comprehension. I constructed a cognitive framework for studying this relationship that is based on the activation of the learner's schematic knowledge and application of mental strategies to decode words and infer meaning during reading. I also provided a list of linguistic and external knowledge as well as some of the most frequently applied cognitive and metacognitive strategies classified in previous empirical studies. These classifications are derived mainly from adult studies. In this chapter, I discuss the vocabulary learning and reading processes of young learners and focus on the mental strategies that young learners activate during reading.

I begin this chapter with a look at children's thinking processes. This is discussed in the light of social cognitive theory and helps to frame my arguments that young learners approach the learning of word knowledge components differently from adult learners. I also argue that an important factor influencing how young learners acquire vocabulary is the suitability of the learning method; and suggest that one of the most natural and effective ways for children to acquire vocabulary knowledge is through incidental learning. To that end, I discuss the key role that stories play in young learner literacy learning and incidental vocabulary acquisition.

4.1 Vocabulary Learning

4.1.1 Social Cognitive Theory

Fischer (1980) states that while the cognitive processes of adults may be considered developed, in comparison, the cognitive processes of young learners are just developing. Yet he argues that it is the child's own consciousness of its development that propels language learning, suggesting some similarity between children and adult cognition. In fact, Wertsch (1985a; 1985b), Donaldson (1978), Cameron (2001), and de Guerrero (2004) argue that learning is as much a cognitive process for children as it is for adults. Nevertheless, Fischer (1980: 477) asserts that in terms of vocabulary learning, there are fundamental differences between the learning processes of children and adult learners. These differences can be better understood in the light of social cognitive theories, which have their roots in the work of Piaget and Vygotsky. Although the theories developed by Piaget and Vygotsky explain child development in naturalistic settings rather than in language learning environments specifically, they are useful in helping us to understand the learning processes of young learners.

The Piagetian and Vygotskyan paradigms concentrate on how young children learn by assimilating experiences and input from their immediate surrounding. According to these theories, children seek out intentions and purposes in the words they encounter in their daily experiences with the aim of increasing their schematic knowledge. Their interpersonal and social experiences and their growing schemata help them make sense of their environment as their intellect develops and grows. Van Lier (1996) describes the young learner's cognitive processes as the socio-cognitive processes of intellect and affect, whereby the strong social influence of human interaction shapes the child's development of mental processes such as attention, logical memory and conceptual formation. These processes are vital to language learning. Nonetheless, Van Lier argues that the interpersonal and social relations which fuel the intellectual development of the young learner are not the same as the cognitive and metacognitive processes that regulate adult language learning (discussed in Chapters 2 and 3). The main

issue here is not whether young learners are capable of cognitive and metacognitive processing, but a question of when these adult-like processes become available to them and how they learn language-related skills whilst these processes are developing.

Fischer (1980) claims that at each step of the cognitive developmental process, the child acquires a set of integrative skills, which includes social skills, language skills and perceptual motor skills, all the while gradually moving on to higher levels of cognitive control for these skills until they begin to resemble the skills that more mature learners and adults have. This process may influence the way in which children acquire vocabulary and literacy skills. Referring to Piaget's (1955) (cited in Cameron, 2001: 4) concept of the child's developing intelligence, Cameron states that the child is in the process of continuously accommodating and assimilating his/her environment in a natural process of meaning-making in order to improve mentally stored knowledge or schemata. Cameron argues that this meaning-making quest of children, however, is not necessarily specific to vocabulary learning or any particular learning context. They represent the cognitive processes that children are continuously and actively developing in order for them to learn anything, including vocabulary and literacy skills.

According to Vygotsky's (1962, 1978, 1985) sociocultural theory (cited in De Guerrero, 2004 and Ehrich, 2006), the most common way for children to develop and learn is to actively deal with their mental thoughts. Vygotsky claims that young learners can often be heard talking aloud whilst they organize themselves during tasks. This talking aloud, which he refers to as inner speech, is a mechanism that is unique to children, and is very important for their cognitive development. Wertsch (1985) argues that inner speech is an important mode for early vocabulary acquisition because it provides young learners with a way to practise their problem solving skills and develop the more advanced cognitive processes that are needed for the learning of more advanced vocabulary as the child grows. Wertsch also states that older children and adults seem to lose their tendency to verbalise their thoughts as naturally as children do, thereby making their vocabulary learning processes different from children's.

Other studies conducted by Sokolov (1972), de Guerrero (2004) and Ehrich (2006) incorporating Vygotsky's theory to investigate child language acquisition also show that inner speech plays a crucial role in young learner vocabulary learning. Sokolov and Ehrich claim that the inner speech of the young learner is a function that is directly connected to the cognitive processes for solving problems. These problem-solving processes are central for vocabulary acquisition and the learning of other language skills. De Guerrero argues that during reading or speaking, the child is required to match the words and ideas in the text or the conversation to an existing schema. De Guerrero posits that when the learner is placed in the position of having to think, he/she activates his/her developing cognitive processes through his/her inner speech functions, which causes him to naturally think aloud.

De Guerrero (2004) argues that when the child's inner speech and problem-solving processes combine, vocabulary learning and the learning of other language-related skills may occur. This point of view is supported by Ehrich (2006), who refers to inner speech activity as "a product of higher thought, (arising) through a series of developmental stages, going from the external world and travelling inwards, its genesis a result of an initial need to solve problems" (Ehrich, 2006: 15). In fact, Ehrich suggests the young learner's socio-cognitive skills precede his language-learning skills. One may suppose that a young learner's cognitive propensity for vocabulary learning is linked with a phase of social learning that is necessary for the development of more conscious and controlled cognitive processes associated with the language learning processes of more mature learners. This implies that unlike adult learners whose object of language learning may be the vocabulary or the learning itself, children tend to acquire vocabulary knowledge and other language skills as a result of developing their problem solving and social-cognitive skills.

In a study of young Iranian learners of EFL, Behroozizad et al. (2014) found that by focusing on providing their learners with a socially enriched language-learning environment, their learners seemed to acquire both vocabulary knowledge as well as the socio-cognitive skills that are necessary for language

learning in young children. The results of the study seem to suggest that by giving the children opportunities to develop socially functional and communicative language competences, and engaging the children within their ZPD and incorporating scaffolding instruction to the teaching methods, the children became more communicative and capable of self-regulating and self-assessing their learning processes. The young learners in the study were capable of giving feedback, asking leading questions, drawing tables and charts, and engaging in effective group work activities. Based on the outcomes of the study, the researchers make a case for incorporating Vygotsky's socio-cognitive theories into young learner language teaching. To that end, they advocate that traditional explicit vocabulary teaching pedagogies such as memorization and fill-in-the-blanks exercises should be replaced by activities that support the learning of problem solving and social-cognitive skills. They argue that even for vocabulary instruction, teachers should aim to help their young learners become interested and active agents of learning rather than just passive recipients of knowledge. They may achieve this objective by focusing on socio-cognitive learning objectives in the classroom and scaffolding instruction.

4.1.2   Word Forms and Word Senses

As far as we know, some processing mechanisms of young learners for vocabulary learning are similar to the mental processes of adult learners in that both learner groups tend to focus on learning word meanings rather than word forms. Gass (2003), who is concerned with the effect of explicit learning processes on the learning of semantic categories, found that focused attention is more useful for the learning of syntactic and morphological forms than for word meanings. She argues that since the learning processes of young learners tend to be focused on cognitive development rather than for explicit tasks such as vocabulary learning, young learners are less likely to learn syntactic and morphological forms. Gass suggests that young learners tend to learn word forms later and more slowly, especially in a foreign language, because of the low occurrence of syntactic forms in inner speech.

This does not mean that young learners are incapable of learning word forms. In fact, there is research evidence demonstrating successful acquisition of some components of word form knowledge such as inflections and word syntax by young learners (Cummins, 1979; Harley, 1986; Scovel, 2000 and Fullan 2005). Cameron (2001) argues that "young learners do not make random word orderings and forms, but somehow work out how to use the language and then try out their hypotheses in saying things" (p. 102). We could imagine that such vocabulary learning outcomes are not the result of the same conscious attention that is given to learning the grammatical rules of a language by adult learners. Some researchers claim that for young learners, rule learning is associated with the learning of other components of word knowledge. Gass (1999), Service and Craik (1993) and Stubbs (1980) argue that the learning of word form is seldom a stand-alone process for young learners, as is sometimes the case for adults when they adopt explicit vocabulary learning methods. These researchers argue that for young learners, form learning is highly dependent on other forms of vocabulary knowledge such as the learning of word meaning. Robinson (2006: 543) claims that for the young learner, word form learning takes place through, not before, learning about word meanings.

Several studies have demonstrated that young learners focus on word meanings before they attend to word form knowledge. One such study is an NFER Evaluation Project study carried out by Brustall et al. (1974). The study shows that young learners had little trouble acquiring wide knowledge of vocabulary meanings, doing so quite naturally by assimilating new word meanings without difficulty (p. 69-70). Brustall et al. concludes that this shows young learners are more likely to activate mental processes for learning word meaning than for analysing word forms. Other studies conducted by Verhallen and Schoonen (1993, 1998), which involved young Turkish immigrants learning Dutch in Holland, demonstrate how slowly young learners acquired L2 word forms. The results show that this group of learners had very little knowledge of grammatical forms for Dutch words in comparison with what they had in their L1. Yet they were able to use the target L2 communicatively.

Several significant implications for understanding the vocabulary learning processes of young learners arise from these findings. First of all, since the learners were proficient users of their L1, the results imply that, contrary to Gass' argument, word forms may in fact occur quite frequently in inner speech. At least, there is a suggestion that the L1 inner speech of this particular group of learners contains word forms. Verhallen and Schoonen's (1993, 1998) suggest though, that the late onset of word form knowledge found in their study may be a phenomenon of L2 vocabulary learning, whereby other factors apart from the contents of inner speech may influence vocabulary learning. The results of Verhallen and Schoonen's studies demonstrate that the learners' knowledge and understanding of Dutch word meanings was so sufficiently developed for the Turkish learners that they could understand and use the target language before they gained mastery of its syntactic forms. This suggests that one reason why children tend to learn word forms later may be because this component of word knowledge is unnecessary for them at the early stages of L2 language learning.

Nation (1990) argues that when young learners learn word meanings, they are usually dealing with word senses. Nation claims that word sense is distinct from word meaning in that word senses include broader categories of meaning such as semantic relations. Cameron (2001) uses the example of the sentence "I'll go and fetch the milk" to explain the concept of word sense. She explains that for a British child, the schema associated with 'milk' might still include the idea of going to the front door and picking up bottles of milk that has been left by the milkman. However, for a child in other cultures, the schemata for the same word 'milk' may involve a visit to the fridge, a farm or a supermarket. Therefore the meanings that young learners construct at a specific point of language learning reflect their current schemata, which is likely to be more specific and limited until they undergo changes and additions to become the more developed schemata of adult learners. Lyons (1995), who is interested in studying the vocabulary acquisition processes of young learners for semantic categories, distinguishes between 'semantic relations' and 'lexical relations' for word sense. He argues that when processing and learning vocabulary, younger learners tend

to focus on understanding semantic relations such as antonymy, synonymy, hyponymy and meronymy.

4.1.3 L2 Vocabulary Learning

Hasselgreen (2000) and Brown (2001) believe that in order to learn L2 word meanings, a learner must be able to process concepts. They claim that given the immature cognition of young learners, they are not ready to learn conceptual meanings. They argue that younger learners are rather more connected with the physical and tangible sensations that surround them. As a result, children tend to incorporate these senses into new vocabulary. Often, word senses contained in the learner's L1 are transferred to the learner's L2. Liu (2009) states that in the case of L2 vocabulary learning especially, children often refer to their knowledge of L1 word meanings to help them make sense of new L2 vocabulary. This view is consistent with Cameron's (2001) claim that when new words are encountered, one way in which young learners work out their meanings is by devising a translation into L1. She argues that since L1 and L2 are in the same mind, they are not completely isolated systems for young learners. Instead they form a language super-system whereby the learner's L2 vocabulary is likely to be associated with its L1 counterpart. As the learner has already learnt how to categorise these words from his L1 experiences, these steps are not likely to be retraced during L2 learning. In fact, Takac (2008) claims that young learners tend to create new L2 senses in order to extend their current L1 knowledge so that in its early stages, L2 vocabulary learning seems to involve a mapping of new forms onto already existing knowledge of word senses in the learner's L1. Singleton (1999), Harley (1986), Collier (1987), Johnson and Newport (1989) and Garcia Mayo (2003) point out, young learners' acquisition of components of word knowledge is influenced by factors such as the suitability of the vocabulary learning method.

Researchers differ in their opinions as to which vocabulary-learning methods are most effective for young learners. These differences tend to be based on the effectiveness of explicit and implicit vocabulary learning methods. A study by

Campbell, Campbell and Dickinson (2004) found that in some young learner L2 learning contexts, a remarkable amount of explicit vocabulary learning takes place for learners to learn vocabulary in a relatively short period of time. The authors go so far as to conclude that this condition does not favour implicit vocabulary learning processes, making the debate between explicit and implicit vocabulary learning methods for young learners interesting. On the other hand, there seems to be a consensus amongst Singleton (1999), Harley (1986), Collier (1987), Johnson and Newport (1989) and Garcia Mayo (2003) that because of their age, young learners may not benefit from explicit vocabulary knowledge learning. This group of researchers suggests that the immature cognitive resources of young learners may limit their abilities to process aspects of vocabulary knowledge such as word forms, which tends to involve explicit learning methods.

The differences discussed here are based on the arguments that distinguish the strong and weak views of vocabulary learning for young learners. This distinction is similar to the differences between the weak and strong approaches to vocabulary learning I discussed in Chapter 2, wherein I argued that most researchers no longer subscribe to the strong view. In the case of young learners, there are many proponents for a moderate approach to discussing young learner vocabulary learning methods. For example, Asher and Price (1967) suggest that there is no real benefit of relying on lopsided learning methods with children. Their study shows that 8-year old L2 learners have very poor vocabulary retention rates from many hours of explicit learning at school alone. Similarly, Singleton's (1999) observations of primary school vocabulary lessons in two separate studies showed that acquisition of word forms through explicit learning produced fragmentary results. Singleton concluded that children are less likely to retain as much word meaning through explicit learning methods, and recommended that they might benefit from more naturalistic and implicit ways of learning vocabulary. Bialystok (1991; 2001) and Cameron (2001) also argue that more naturalistic and incidental language learning approaches seem to appropriate for children. Bialystok argues that children tend to be more willing to create new linguistic categories that extend their developing L1, which is why

they respond to more naturalistic vocabulary learning methods that older learners may be less prepared to try.

From the standpoint of social cognitive theory, young learners may be better candidates for implicit learning. As I discussed in sub-section 4.1.1, young learners' acquisition of vocabulary knowledge and other language-related skills tends to result from their learning of other skills such as problem-solving skills and social-cognitive skills. Cameron (2001) points out that whereas adult vocabulary learning usually refers to L2 vocabulary, for young learners, vocabulary acquisition refers to both L1 and L2 vocabulary. She argues that while the schematic knowledge of adult L2 learners could increase through conscious language learning, young learners expand their L2 vocabulary schemata in more natural ways, mainly through interactions with their natural environment, which resembles the natural characteristics of L1 vocabulary acquisition. Therefore, while adult learners may very well profit from explicit vocabulary learning, young learners may benefit more from implicit or contextual learning.

The arguments supporting more implicit vocabulary learning methods are particularly relevant to the acquisition of deep vocabulary knowledge. As Nation (1990: 51) claims, the cognitive processes for vocabulary learning activate the retrieval of the young learner's existing schematic information that is needed for the processing of deep word meaning. He compares this type of vocabulary processing with Craik and Lockhart's (1972) model of Depth or Levels of Processing Hypothesis which states that vocabulary has a better chance of being remembered when the learner pays more attention to it. Nation argues that the attention of the learner for learning vocabulary increases when more opportunities are given to him to encounter the vocabulary contextually. This implies that the more exposure to vocabulary the child gets, the better the vocabulary learning outcomes may be. In fact, all the above arguments suggest that a viable model for studying young learner vocabulary learning is one that is based on incidental vocabulary acquisition, which I go on to discuss.

4.1.4 Incidental Vocabulary Acquisition

When some researchers frame their discussion of young learner vocabulary learning within a social cognitive framework, they appear to be arguing that young learners have a natural proclivity for incidental vocabulary acquisition. A considerable amount of research has been published on gains in young learners' vocabulary knowledge through incidental learning methods. Most of this research is based on the Piagetian concept of accommodating and assimilating aspects of the young learner's environment for learning, which I briefly mentioned in sub-section 4.1.1. Meara and Milton (1995: 8-11) suggest that the vocabulary learning methods that are most suitable for children are those that emphasise the natural cognitive learning processes of the learners. They argue that given the apparently strong correlation between vocabulary knowledge and successful reading, hardly anybody would recommend a purely explicit vocabulary learning approach for children.

Other researchers such as Scovel (2000), who subscribe to this approach, argue that the earlier one is exposed to a new language, the better it is for acquiring the vocabulary in the language. Scovel states that exposing young learners to a large amount of written texts is not only a good method for building vocabulary, it is also a means to develop the literacy skills that are required for incidental vocabulary acquisition. The results of a study by Horst (2005) involving the use of graded storybooks for emergent learners show that her learners learned over 50% of the unfamiliar words they encountered in the stories through plentiful exposure to these stories. The results of this study verify the importance of L2 incidental vocabulary acquisition, which is a point that Meara and Milton (1995) make. They suggest that exposure to "pregnant" contexts for incidental vocabulary acquisition is one of the most suitable vocabulary learning methods for young learners.

Meara and Milton define pregnant contexts as "contexts rich enough to allow a learner to guess the meaning of a word s/he is encountering" (Meara and Milton, 1995: 8). Nonetheless, Meara (2001) claims that the final objective of vocabulary

learning is a factor influencing the suitability of the method for younger learners. Meara argues that if the objective of vocabulary learning were to enable the learner to understand as much authentic texts as possible for the acquisition of deep vocabulary meaning, then they would greatly benefit from more incidental vocabulary learning methods. If, however, the learner has other learning goals such as initial word recognition, then other methods may be more beneficial. The some discretion may be necessary when discussing the vocabulary-learning methods for children. Meara suggests that in addition to incidental vocabulary acquisition, early literacy learning could benefit from some attention being given to breadth of vocabulary knowledge such as the shape of words, which is part of word form knowledge. Meara argues that it is essential for children to learn to recognize word shapes because this knowledge helps to develop fluency in reading.

Kersten (2010) and Fukkink (2005), who hold the same view as Meara, nonetheless suggest that a flexible approach is necessary when discussing young learner vocabulary learning methods. They state that incidental acquisition tends to support the learning of deep word meanings and argue that learners may be better off acquiring deep word meanings in immersion contexts in which language tends to be internalized through exposure rather than conscious attention. Kersten argues that different learning methods may be necessary for the learning of other components of word knowledge amongst different young learners and at different phases of their cognitive development. He suggests that a combination of some explicit vocabulary learning methods and extensive reading works well for young learners, implying that the weak version of incidental vocabulary acquisition is favourable. This approach is consistent with Dekeyser and Larson-Hall's (2005) argument that since young learners are more likely to rely on incidental vocabulary learning strategies, which are not particularly suitable for the learning of morphosyntactic categories, a combination of incidental and explicit vocabulary learning methods would result in better retention rates.

The arguments so far show that there is an on-going debate within the research community regarding the effectiveness of explicit and implicit vocabulary learning methods. These arguments seem to suggest that when discussing the suitability or effectiveness of certain vocabulary learning methods for young learners, there is a need for discretion. Perhaps a more moderate approach that considers the benefits of both explicit and implicit L2 vocabulary learning should be adopted. This is consistent with Cameron's (2001: 93) argument that a fusion of language learning methods that place a strong emphasis on vocabulary learning through stories is a sensible way for children to learn a language.

4.1.5   Learning through Stories

Cameron (2001) advocates the use of stories for children because they offer many opportunities for vocabulary learning. She has many important insights to offer on this perspective. She argues that the rich language found in stories facilitate language learning. She states,

> "Because stories are designed to entertain, writers and teller choose and use words with particular care to keep the audience interested. Stories may thus include unusual words, or words that have strong phonological content, with interesting rhythms or sounds that are onomatopoeic. The context created by the story, its predictable pattern of events and language, and pictures, all act to support listeners' (and readers') understanding of unfamiliar words. Children will pick up words that they enjoy and, in this way, stories offer space for growth in vocabulary"
> (p. 163).

In fact, stories are so essential to language learning that Cameron is concerned young learners may not be given sufficient exposure through reading these days. She states that children are

> "getting more and more global in their interest through the internet, television and video, and computer games. Their worlds are much bigger,

from much younger ages, than used to be the case. It may be that young learners could take on much more vocabulary…" (p. 90).

She claims that one of the best ways to provide young learners with opportunities to learn vocabulary is through stories addressing authentic issues which children typically deal with while growing up. Cameron (2001: 166) argues that quality stories have characters and plots that naturally engage children. She also argues that the artwork and illustrations that are so typical of children's storybooks encourage young learners to explore the meanings of new words in the stories. Cameron also suggests that the fantasy characters, plots and settings are all familiar themes that capture the attention of young learners and motivate them to search for deeper meanings as they read. She states that

> "the qualities of content, organization and language use… are potentially useful tools in the foreign language classroom, since they have the potential to capture children's interest and thus motivation to learn, along with space for language growth" (p. 167).

Cameron is not the only young learner researcher who is interested in studying the benefits of stories for incidental vocabulary acquisition and literacy development in children. Elley (1989) provides evidence that children with a wide range of cognitive abilities and language learning competencies are able to learn large amounts of incidental vocabulary that was retained over months just by listening to stories. The results of Elley's large-scale empirical study in 1989, involving 7 and 8-year old school children show that low-ability children gained the most incidentally-learnt vocabulary from this method. His study also demonstrated that the number of word repetitions in the story correlates with vocabulary learning success. Elley (1991) presented results of 9 different studies that exposed young learners to a large range of high-interest illustrated storybooks in an L2 literacy orientation program. The results from a series of pre and post-tests of target words demonstrated that after each of 3 repeated story exposures over a week, vocabulary gains of 20% were recorded.

Although Elley's studies are based on listening, the results are insightful for incidental vocabulary learning because reading and listening to stories are both examples of receptive language processing. And though most of Elley's studies were based on L1 vocabulary acquisition, his findings are still relevant to L2 research because the results of his study in 1991 involving L2 learners were consistent with his other L1 studies.

Coady (1997: 228) states that Elley's studies illustrate 5 parameters for successful young learner L2 vocabulary acquisition. They are (1) incidental language learning methods, (2) integration of oral and written language, (3) focus on word meanings rather than word forms, (4) fostering of high intrinsic motivation, and (5) use of stories. Jenkins et al. (1984), Eller et al. (1988), Leung and Pikulski (1990) and Nagy, Anderson and Herman (1987), who have also conducted studies on young learner vocabulary acquisition through incidental learning, albeit via verbal contexts, verify that there significant gains in young learner vocabulary acquisition and literacy learning can be attained through the use of stories. They provide two main arguments. Firstly, they claim that the child-oriented context in which words are encountered seem to contribute to children's understanding of word meanings and assist in developing the reading skills that are necessary for understanding more complex and challenging stories. Secondly, they state that the story context plays a major role in encouraging children to derive the meanings of unfamiliar words and helps to develop their literacy skills and reading strategies. Chlapana and Tafa's (2014) recent study on the effectiveness of storybook reading for teaching immigrant kindergarteners in Greece also suggests that the children who received regular storybook reading with some additional vocabulary instruction tend to acquire L2 vocabulary skills well. Interestingly, Lee's (2015) recent study of the role of pictures and children's stories for adult language instruction suggests that stories and picture books are equally relevant for older language learners as well. In Lee's study, children's picture books were used for L2 literacy instruction in Taiwanese colleges with positive results. The author argues that the gains in his learners' linguistic knowledge in the study demonstrate the usefulness and validity of using children's stories and pictures as a vocabulary and literacy

teaching resource for all beginner learners of a foreign language. This seems to verify the importance of the narrative genre for foreign language learning in general, which is consistent with Yilmaz's (2015) study demonstrating the positive results that short-story reading has on language and literacy learning. The results of Yilmaz's study show that narrative genre reading has positive effects of learners' literacy skills, vocabulary knowledge gains, creativity and motivation. The learners reported that they found the texts more relatable through the images and topics in the stories, which verifies the arguments made by Nagy, Anderson and Herman (1987) discussed earlier in this paragraph.

The arguments concerning the usefulness of stories and the relevance of incidental vocabulary acquisition theory for young learner language learning I have discussed in this section are based on the assumption that the child is literate. Though I have not dealt with this issue specifically, it is an important assumption for without the ability to read, there will be no basis for discussing incidental vocabulary acquisition or the relationship between vocabulary knowledge and young learner reading skills. In the next section, I discuss the literacy learning processes of young learners.

4.2   Literacy Learning

4.2.1   Cognitive Approach

Studies by Frawley and Lantolf (1985), Appel and Lantolf (1994), Roebuck (1998; 2000) and Anton and Di Camilla (1998) suggest that two main cognitive processes are active in young learners during reading. The first process is problem solving, and the second process is the retrieval of word sense schema. I begin by discussing problem-solving processes and then move on to discuss knowledge retrieval.

Studies that are concerned with investigating the reading processes of children in terms of their cognitive processes for solving problems incorporate Vygotskyan inner speech theory into their design. This is a useful starting point

for discussing the reading processes of young learners. Ehrich (2006) states that when unfamiliar words are encountered during reading, it signals to the child that a problem has occurred. The child responds to this impulse by activating problem-solving processes, which are part of his/her inner speech (discussed in sub-section 4.1.1). Leontiev (1978) (cited in Ehrich, 2006) claims that young learners activate thoughts for understanding meaning whilst reading in a similar way that adult learners activate short-term memory processes to decode and infer meaning. The main difference between the adult and child versions is that for the adult learner, these processes are usually silent and remain in the mind unless they are elicited as verbal protocols. For the young learner on the other hand, these cognitive processes, or inner speech (discussed in sub-section 4.1.1), are often verbally expressed.

Evidence that verbalisation of inner speech is essential for children's reading comprehension can be found in Sokolov's (1972) study. His study shows that children demonstrate strong motor speech impulses when they encounter difficult and unfamiliar words during reading. The results of Sokolov's study demonstrate that when the difficulty of the text was reduced, cognitive processing decreased and together with it, the levels of speech musculature. This finding suggests that there is a positive correlation between children's verbal activities for solving problems and their reading processes. According to this finding, the child's reading processes are driven by problem-solving processes first and foremost, and then other learning objectives such as understanding information and decoding vocabulary (Ehrich, 2006). Ehrich claims that inner speech as a cognitive process serves as a direct link between the young learner's memory functions. It assists the learner in retrieving appropriate word sense schema from the long-term memory in order to understanding the text.

Van Dijk and Kintsch (1983) and Kintsch (1988) argue that during normal reading, the cognitive processes in both memories, which are triggered by inner speech, tend to be simultaneously activated so that the learner builds up an understanding of the text in incremental stages. They suggest that the young learner's understanding of a text is organized in such as way that text-level

meanings are focused on first before paragraph-level, sentence-level and word-level meanings are attended to. This is similar to the top-down processes that I discussed in section 3.4, and is consistent with the argument I presented in section 4.1.2 that young learners tend to focus on word meanings rather than word forms during reading. Eskey (1988) argues that certain reading goals may be cognitively more suited to some learners such as less-skilled and very young learners. Eskey claims that reading for understanding content is a less common purpose amongst young learners because it requires them to retrieve a lot of strategic knowledge such as predicting meaning or using contextual clues and combining them with schematic knowledge to work out the content of a text, which they may not be able to do. In fact, Eskey also argues that less proficient learners who have not acquired a great deal of autonomy at reading are more likely to focus on decoding word level meanings during reading rather than explore content meaning in great detail.

Adams (1990) states that while a skilled adult reader can read, access and understand information simultaneously on all the levels of abstraction, young learners attain an understanding of a text by relating its contents to more concrete elements. This is because young learners tend to relate better to visual information in the text. For instance, they respond first to familiar sight vocabulary in a text, which encourages reading fluency. Phonologically, the young learner tends to relate letter shapes to their sounds in order to read individual words. They tend to notice initial and final consonants, which assist them in reading strings of words. Textually, young learners tend to process a text in terms of familiar text structures such as stories or other writing genres that are known to them. Cameron (2001) claims that young learners tend to begin by establishing overall meaning at whole text level, then progress towards the sentence and word levels in much the same way that skilled adult learners construct macro meaning during reading.

The studies discussed here are part of a growing body of literature describing reading as a cognitively demanding process for young learners whereby the learners are occupied with the simultaneous processes of vocabulary decoding

and understanding contextual meaning. Cameron (2001) suggests that children seem to tackle each letter and sound in a word individually until they learn to recognize whole words and assign appropriate meanings to them as whole units. She argues that sentence and word-level processing is tedious and difficult for emergent readers (Cameron, 2001: 130). Cameron claims that in order to process sentences, the learner needs to work on each word in the sentence as a separate unit, and temporarily store the meaning established for each word in their short term memory before moving on to the next word until all the words in the sentence have been processed. She argues that in reality, many young learners are unable to deal with this many sequences simultaneously. It has been suggested that in the midst of transforming visual forms into conceptual meaning, some information that has been processed along the way may be lost. Adams (1990) claims that one of the cognitive challenges of a young learner during active reading is to find a way to minimise data loss when the mind switches between the two memories.

Cameron's and Adams' points of view are consistent with Ehrich's (2006) argument that one major challenge of the young learner is to retain content in the short-term memory long enough for schematic information in the long-term memory to be retrieved. He suggests that an important function of inner speech during reading is to rehearse information and prevent decay or memory loss in the time between the activation of problem solving processes in the short term memory and the retrieval of appropriate schema from the long term memory. Ehrich (2006) posits that "the more difficult a word, the more inner speech 'expands' as a sub-vocal rehearsal mechanism during reading to extract hidden meanings" (p. 17). Collectively, these arguments suggest that young learners have psycholinguistic resources for decoding vocabulary and understanding contextual meaning during reading. In the next sub-section, I discuss the reading strategies of young learners.

4.2.2   Reading strategies

In order to process and understand written language, the young learner is expected to engage with the kind of intentional and strategic thinking than he would not ordinarily be required to. Yet Bruner (1986) states that written texts are a less natural form of language for young learners to deal with than spoken language. He attributes this to the fact that children acquire the skills to process spoken language before written language and refers to written texts as second-order meaning representation for children. Others (Afflerbach et al., 2008) have highlighted the necessity for young learners to be "aware of the different aspects of the reading process, understand how they work together, and practise combining them into successful reading experiences" (p. 368). Nevertheless, researchers acknowledge that this is not the easiest learning task for children. Reid (1990) states that a child who is faced with a written text has several options to decode and understand meaning. The child could use previous knowledge that includes existing word sense knowledge, he/she may use clues built in by the writer such as pictures and diagrams, or rely on some personal knowledge of cognitive strategies.

Afflerbach et al. (2008: 364-373) claim that children's early reading strategies are very important in the early stages of literacy learning because they need the motivation to continue reading. They argue that the pride children attain from being able to read would eventually give them the confidence to develop more advanced skills for fluent, accurate, effortless, controlled and adaptable reading as they mature. Afflerbach et al. (2008) suggest that "strategic readers feel confident that they can monitor and improve their own reading so they have both knowledge and motivation to succeed" (p. 370) much in the same way as adult readers often do. In fact, research shows that young learners have a wide range of reading strategies and are capable of applying them, though these strategies develop differently in different age groups. Van Daalen-Kapteijns et al. (2001) argue that although young learners may not generate as many hypotheses for decoding meaning during reading as their more mature

counterparts do, they are strategically resourceful and are able to demonstrate application of cognitive strategies.

Fukkink's (2005) study of the mental processes for decoding contextual vocabulary amongst a group of primary school children shows that though his learners' vocabulary decoding and contextual inferencing outcomes were not particularly impressive, the results indicate that the children were completely capable of applying a small range of cognitive strategies for understanding written texts. He also found that some of the learners were even able to check their inferences and evaluate them before arriving at their final interpretations, which is evidence of some simple metacognitive strategy application. In fact, Fukkink reports that in spite of the challenges his learners faced in inferring word meanings through context, some of their strategies were so effective that they were able to infer more than one word meaning for some unfamiliar words. Fukkink concludes that not withstanding his learners' comprehension outcomes, they are capable of applying both cognitive and metacognitive reading strategies.

Clay (1982) claims that emergent readers often rely on only one or two cognitive strategies to understand written texts at first. One of the most frequently used strategies is the act of verbalising the words on the page. Some researchers find it useful to discuss this strategy in the light of inner speech theory. For instance, Reid (1990: 91) claims that young learners process words and letters on the page by speaking the words to themselves, sometimes repeatedly. He refers to these utterances as the 'voice in the head', which is not different from inner speech. Apart from verbalising words in a text during reading, young learners often repeat some of those words in order to commit them to memory. Several researchers argue that word or section repetition is one of the most regularly used and most important cognitive strategies of young learners. Stanovich (1980) claims that first of all, it is essential for young learners to convert the incoming written language written texts into inner speech, which is the more natural form of language for them to process. Then through inner speech, they repeat and rehearse the processed information until it makes sense to them. In a similar vein, Ehrich (2006) argues that through inner speech and repetitions,

"whole paragraphs and chapters can be reduced to the sense of just a few words"
(p. 22).

Afflerbach et al. (2008) provide another perspective on the relationship between
inner speech and strategies. They argue that emergent readers, being visual
learners (discussed in section 4.2.1), seem to devote a substantial amount of
processing effort to match visual patterns of letters with their phonemic
pronunciations. From the point of view of the young learner, whose cognitive
processes are more suited to understanding spoken language, the strategy that is
most appropriate for decoding phonemic pronunciations is sounding out
unfamiliar words in a text. Through this strategy, the learner identifies the sound
of the individual letters in a word and then connects the individual sounds to
produce a string of phonetic utterances corresponding to the orthographical
representation of the word. While this strategy sometimes occurs during adult
L2 reading, it is uncommon for most adults to decode individual letter sounds
aloud during reading, even in a foreign language.

Beggs and Howarth's (1985) study shows that letter-sound decoding strategies
are so important for young learners that they have a strong influence on reading
comprehension outcomes. The study demonstrates that by paying attention to
the prosodic elements of the text such as rhythm, stress and intonation during
reading, the child to gives voice to the silent words on the page. To investigate
this idea, Beggs and Howarth tested the effect of short prosodically enhanced
passages on the reading comprehension outcomes of young learners. For the
study, the texts were marked for stresses and pauses. In post-reading
comprehension tests, the researchers found that the learners who read the
prosodically enhanced texts had better understanding of what was being read.
Beggs and Howarth argue that their learners' inner speech verbalisations
allowed them to repeat and rehearse the sounds until they were able to
construct the meaning of the word with its contextual environment.

Huckin and Coady (1999) argue that when studying children's cognitive
strategies for reading, it is important to discuss the overall efficacy of their

cognitive strategies. The researchers state that visual strategies and inner speech rehearsals and repetitions for decoding word-level meanings are insufficient for the young learner to attain an enhanced and accurate understanding of the vocabulary and contextual meaning in a text. According to Afflerbach et al. (2008), young learners need to be able to apply more advanced word-guessing strategies such as reasoning, analysing, using analogies and prediction to decode deeper word meanings, infer contextual meanings and attain successful comprehension outcomes. Afflerbach et al. argue that the young learner's ability to analyse and discern the sounds within words and to predict how letters are strung together to make words facilitate fluency in reading are essential for comprehension. This is because these abilities free up cognitive space in the child's short term memory for more complex cognitive strategies such as summarizing the text, finding main ideas and skimming; as well as some metacognitive strategies such as slowing down reading rate, rereading parts of the text and monitor ones own reading to be activated.

Cameron (2001) argues that even for information that derives from the text itself such as in the words and pictures, children's cognitive skills in recognizing syntactic patterns may not be helpful for comprehension processing beyond the word and sentence levels. She claims that young learners need to apply both cognitive and metacognitive strategies to decode deep vocabulary meaning and infer contextual meaning during reading, in very much the same way that adult learners do and argue that only when young learners have developed more advanced cognitive and metacognitive reading strategies would they be able to make holistic sense of what they read. The arguments presented so far suggests that young learners are indeed capable of activating cognitive and strategic processes to understand written texts.

4.2.3   *Meyers et al.'s Classification of Strategic Knowledge Sources*

Previous empirical studies have shown that young learners have and are capable of applying a wide range of cognitive strategies during reading. In this sub-section, I discuss the strategies that have been classified in Meyers et al.'s (1990)

study involving young learners. Meyers et al.'s (1990) study, which investigates the reading comprehension outcomes of fourth and fifth-grade students, provides the most relevant reference classification system for my study because it was developed after analysing the verbalisations of young learners.

The authors identified 6 categories of mental strategies, which they refer to as 'moves' (Meyers et al., 1990: 117). Though similar in sense, the use of the word 'move' here has a different meaning from the term introduced by Sinclair and Coulthard (1975) to refer to the smallest unit of speech used to describe a pragmatic function in discourse analysis. Meyers et al. used the word 'move' to refer to the act of performing a strategic task that is backed up by the learner's intention to alter his or her understanding of micro and macro meanings whilst reading. Each move in their classification system represents one sub-category of strategic knowledge, and may comprise several separate but related component moves. I summarise their classifications and definitions in Table 6 below.

Table 6 – Definition of Strategic Moves, adapted from Meyers et al. (1990: 117).

Moves	Definitions
Monitoring Moves	The learner… - monitors doubts reflecting awareness of poor understanding or word or sentence - monitors conflicts within the text or between the text. - monitors his or knowledge or belief.
Signaling Understanding	The learner… - simply reports understanding of the text without paraphrasing - paraphrases the meaning of the sentence. - paraphrases inaccurately - paraphrases tentatively - summarises the meaning of the text by synthesizing three or more sentences.
Elaborative Moves	The learner… - uses sensory imagery such as visual, auditory or kinesthetic - recalls prior knowledge or experience external to the text. - refers to ideas stated previously in the text and note the connection to the current text - adds details to the text without the use of imagery - provides personal reaction such as interest, like or dislike, or other emotional reaction.
Reasoning Moves	The learner… - forms tentative hypotheses about the text. - predicts what may happen - asks self-questions or searches for evidence by re-reading.

	- uses evidence to infer or check hypotheses in order to answer his own questions or resolve doubt - revises prior reasoning move.
Analysis Moves	The learner… - analyses words - analyses sentences including punctuation, grammatical structure and length - analyses functions of paragraphs or sentences by comparing, restating and expanding - analyses stylistic aspects such as tone and type of discourse.
Judging Moves	The Learner… - judges ides such as appropriateness, effectiveness, difficulty and importance - judges text features such as appropriateness, effectiveness and difficulty.

In my opinion, the strength of Meyers et al.'s categories lies in the fact that they were developed with the cognitive developmental theories of young learners in mind. For example, their category 'Signaling Understanding', which does not appear in Nassaji's (2003; 2006) classifications (discussed in sub-section 3.3.4), takes into consideration the possibility that young learners may sometimes only be capable of indicating their understanding of what they read rather than verbalise their mental strategies as explicitly as adult learners may be able to. This is not to say that young learners do not have strategies at all to report. Rather it acknowledges the developing cognitive abilities of the young learner. Their inclusion of 'audio', 'visual' and 'kinesthetic' images for Elaborative Moves suggests that they have taken into consideration concepts related to young learner language learning styles such as learning modalities (Dunn, Beaudry and Klavas, 1989) when they were developing their analytical categories. The advantage of developing a classification system that takes cognitive developmental theories into account is that it makes the strategies and definitions more relevant to young-learner research.

Another strength of Meyer et al.'s classification system is that it is derived from the verbalisations of children whilst they were reading stories. Stories are an important part of the language-learning environment of young learners and there is a growing interest in investigating how and where children learn new words and deeper word meanings from their environment (Monique et al., 1996

and discussed in Sub-section 4.1.5). Senechal (1997) suggests that one way for researchers to examine vocabulary and literacy learning in young learners is to investigate the role of stories for vocabulary acquisition and reading skills development, which the present study focuses on.

4.3 Research Questions for the Present Study

My discussion of vocabulary knowledge and reading comprehension suggests that my inquiry should not focus on measuring the learning 'product' or 'outcomes' of reading. This approach is consistent with Afflerbach and Johnston's (1984: 307) argument that "research should focus more on the reading process than on the product of reading if progress were to be made toward understanding the nature of comprehension." Therefore my first two research questions deals with my learners' retrieval of non-strategic and strategic knowledge sources for decoding vocabulary meaning and inferring contextual meaning during reading.

RQ 1. What types of non-strategic knowledge do my learners retrieve during reading?

This research question deals with the range of linguistic and external knowledge my learners retrieve for understanding written texts. In Chapter 2, I discussed the importance of the learner's linguistic knowledge for vocabulary decoding and contextual inferencing wherein I argued that effective reading comprehension outcomes correlate more with depth of vocabulary knowledge than vocabulary form knowledge (Schmitt, 2008). However, in Chapter 4, I provided evidence from the literature to argue that young learners' knowledge of word senses is more important than their knowledge of word forms or syntactic structures for understanding stories. In sub-section 4.2.1, I discussed Adam's (1990) argument that children are visual learners who relate to concrete elements rather than abstract grammatical forms. By answering this question, I may gain a better understanding of the types of linguistic knowledge and external knowledge my learners tend to retrieve during reading.

RQ 2. What mental strategies do my learners use for

    (a) decoding unfamiliar vocabulary, and

    (b) inferring contextual meaning

    during reading?

This research question investigates the coping strategies that my learners apply for understanding unfamiliar vocabulary and contextual meanings in stories. In sub-section 4.2.1, I argued that young learners acquire vocabulary and literacy skills in the light of the cognitive processes associated with problem-solving and the learning of social skills. This implies that their vocabulary decoding and contextual inferencing processes during reading are closely related to their problem-solving processes. These problem-solving processes are regulated by the learners' underlying cognitive and metacognitive processes. During reading, the learners' cognitive and metacognitive processes in the short term memory are triggered to retrieve mental strategies from the long term memory for decoding vocabulary and inferring contextual meaning (discussed in sub-section 3.2.4). By analysing the mental strategies applied by my learners, I would be able to better understand the cognitive and metacognitive processes regulating reading comprehension.

RQ 3. What is the relationship between strategy application, depth of vocabulary knowledge and success in lexical inferencing and contextual guessing?

The literature I have discussed suggests that learners' reading comprehension results depend on the retrieval of both strategic and non-strategic knowledge. There is a suggestion that a learner's depth of vocabulary knowledge is more important than breath of vocabulary knowledge (discussed in Chapter 2). This research question investigates the extent to which my learners' depth of vocabulary knowledge influences their reading comprehension results. Since studies such as Cameron (2001) have shown that mental strategy application is essential for successful reading comprehension even for young learners, this

research question also deals with the effect that strategy application has on my learners' reading comprehension results.

RQ 4. To what extent is TAM an effective method for studying the knowledge source retrievals of my learners?

This fourth research question is important because through my literature reviews, I provided arguments to support a study of my learners' vocabulary learning and reading comprehension processes within a social cognitive framework. This framework is based on Simons' (1971) argument (to be discussed in Chapter 5, Section 5,2) that a study of the mental strategies and background knowledge that learners use during reading would shed light on the mental processes regulating vocabulary learning and reading comprehension. Nevertheless, I highlight several limitations of the think-aloud method, especially for studies involving young learners, which my study must take into consideration. Therefore this research question allows me to reflect on the suitability of this research method for my study. This is an important inquiry because it assists me in evaluating the validity of my study and the reliability of my findings.

4.4   Chapter Conclusion

In this chapter, I discussed several differences in the vocabulary learning and reading processes of children and adult learners. I referred to the relevance of a social cognitive framework for understanding the learning processes of young learners and highlighted the importance of children's social and interpersonal relationships for language and literacy learning. I highlighted arguments in the literature to show that young learners tend to focus on word senses rather than word forms during vocabulary learning, and discussed the importance of incidental vocabulary acquisition methods for young learners.

In the next chapter, I go on to discuss the research method for my study.

Chapter 5

RESEARCH METHODOLOGY AND PILOT STUDY

INTRODUCTION

In this chapter, I describe the Think-Aloud Method (TAM) which I have chosen as my research methodology. I consider the limitations and strengths of TAM in terms of its theoretical referents; and discuss the advantages and disadvantages of using this method with young learners. I then go on to report my pilot study. I discuss the aims of my pilot study, describe the procedures I used for data collection and analysis, and reflect on the lessons learnt from it. I begin the chapter with a brief discussion of qualitative research methods in vocabulary and reading comprehension studies.

5.1   Interactionalist Research Methods

5.1.1   Qualitative Research Paradigms

Although there is a tradition of studying learners' vocabulary knowledge and reading comprehension through tests (Richards, 1976; Anderson and Freebody, 1979; Faerch, Haastrup & Phillipson, 1984; Meara and Buxton, 1987; Nation, 1983; Arnaud and Bejoint, 1992; Wesche and Paribakht, 1996; Laufer and Nation, 1995; 1999; Schmitt, 1998; Henriksen, 1999), Pulido (2007) argues that qualitative research methods are better because the basis of qualitative research lies not in methodology which includes or excludes factors affecting learning processes, but in that which explores the open-ended possibilities that are available to the learner for language learning during reading. Meara (1996) and Laufer and Nation (2001) suggest that a good method of investigating learners' vocabulary knowledge, mental strategies and reading skills is to study how effectively they can perform vocabulary decoding and contextual inferencing tasks during reading. Researchers refer to this approach as the interactionalist approach. In contrast with investigating learners' vocabulary knowledge and

reading skills through tests, the interactionalist approach attempts to understand a learner's knowledge and abilities by studying his or her behaviour and thought processes whilst he or she is engaged in a particular task.

Bachman (1990) was one of the first researchers who approached vocabulary knowledge and reading comprehension from an interactionalist perspective. His study demonstrates that a learner's vocabulary knowledge, mental strategies and reading comprehension skills are less effectively studied through quantitative methods such as vocabulary tests, experiments and corpus analyses. Research at the end of the twentieth century and in the first decade of the twenty-first century saw an increase in the use of qualitative research paradigms to investigate vocabulary knowledge and reading comprehension. For example, studies by Meara (1996), Read (1997, 2000), Read and Chapelle (2001), Laufer and Nation (2001), Ellis (2001), Nassaji (2002), Robinson (2003) and Schmitt (2008) have concentrated on how learners activate deep-word knowledge and text-specific background knowledge such as passage sight vocabulary for understanding unfamiliar vocabulary in a text; while studies by Meyers et al.'s (1990), De Bot et al. (1997), Haastrup (1991), Hulstjin (1992), Hirsch and Nation (1992), Coady et al. (1993), Haynes (1993), Fraser (1999), Cooper (1999), Laufer (1997) and Nassaji (2003) added to the growing interest of the research community to understand the mental strategies used by L2 learners to decode meaning during reading. These studies used different research methods such as eye-movement analysis, the use of silent reading and reading aloud, miscue analysis, interviews and think-aloud techniques or a combination of these methods for studying L2 incidental vocabulary acquisition and reading comprehension.

Nassaji states that the interactionalist approach is one of the most significant contributions to vocabulary and reading research. It is a revolutionary approach in that it challenges the traditional unidimensional conception of the role of a learner's background knowledge for reading comprehension. Nassaji argues that if a learner had knowledge of vocabulary or a particular type of mental strategy, it does not necessarily follow that their knowledge would be central to their

comprehension of written texts (Nassaji, 2003: 645). The interactionalist approach suggests that apart from the learner's vocabulary knowledge and mental processes, other factors could influence reading comprehension and vocabulary learning success. This reasoning gave rise to a branch of qualitative studies aimed at understanding how the learner arrives at an understanding of words and contextual meaning during a communicative task. Nassaji's (2003, 2006) and Meyers et al.'s (1990) studies investigate the role of learners' knowledge sources and mental strategies for decoding vocabulary and inferring contextual meanings written texts. The studies are based on analyses of learners' verbal reports during reading.

5.1.2 Verbal Protocols in L2 Research

Cohen (1998: 34) states that valuable insights about the kind of strategies that learners use for reading and vocabulary learning can be obtained from verbal reports before, during and after they perform reading tasks. He describes three types of verbal reports, which I paraphrase and summarise below:

(1) self-reports, which contain learners' descriptions of what they are doing. These verbalisations tend to be statements about their learning behaviour. An example he gives of such a report is 'I tend to be a good listener.'

(2) self-observation, which is a specific introspective statement (within 20 seconds of the mental event) or retrospective statement (much later after the mental event) of a behaviour during the task. An example would be 'What I just did was skim through the incoming text as I listened, picking out key words and phrases.'

(3) self-revelation, which is commonly referred to as the 'thinking aloud'. This is different from the first two types of self-reporting in that thinking-aloud consists of a continuous stream of conscious disclosure of the learner's thought processes while the information is being attended to.

Researchers have relied on data from these three types of verbal reports to effectively describe L2 vocabulary learning and reading strategies and processes (Garner, 1982; Flower and Hayes, 1984 and Pressley and Afflerbach, 1995). Young (2005) states that verbal reports are capable of providing such rich and insightful data that they can help us to deepen our understanding of the nuances and individual variations in language learning. She asserts that verbal reports are especially valuable to the increase of vocabulary and reading research because they effectively highlight new or emerging phenomena rather than just test or confirm what is already known.

An example of an early study using verbal reports to investigate reading is Olshavsky's (1976) comparative study. Olshavsky used the data derived from verbal reporting to identify and compare the comprehension strategies of good and poor 10th-grade readers. Several other similar studies conducted later by Garner (1982) and Hare and Smith (1982) also relied on the same kind of data to investigate their learners' reading style. They account for the differences in reading performance amongst their learners in terms of the learners' application of mental strategies. Hare and Smith identified specific reading strategies such as rehearsing, rereading, skipping parts of the passage, changing the reading speed and relating the text to the reader's own experiences. Several well-known models of reading strategies and vocabulary learning have also been developed from analyses of learners' verbal protocols. For instance, Pressley et al (1987) gave us the "Model of good strategy users" while Huckin and Bloch (1993) developed the "Cognitive model of vocabulary learning from context".

Protocol analysis is also a common method for investigating learners' reading processes, knowledge source retrieval and comprehension strategy application. For example, Afflerbach and Pressley's (1995) study demonstrates that verbal reporting yielded rich and elegant descriptions of their learners' reading processes. Their methodology, which was used in 38 data studies, focused on eliciting introspective and retrospective reports that told the researchers what was happening in their learners' minds during the reading task. They concluded that the verbal reports were "extremely revealing about the dynamics of

comprehension difficulties and how understandings of a text shift in reaction to comprehension difficulties and surprises (their learners encounter) in texts" (Pressley and Afflerbach, 1995: 38). There is an increasing reliance on the use of verbal protocols, recall protocols and learners' self-reports to investigate the role of strategy application for reading comprehension in more recent times (Karimi & Alibakhshi, 2014; Karimi, 2015). In terms of investigating the sub-skills of reading comprehension, Bilikozen (2014) and Chiu (2015) used recall protocols and learners' verbal feedback whilst they were on-task. These researchers were interested in investigating the importance of linguistic proficiency, prior knowledge and learner motivation on variance in reading comprehension results for advanced and intermediate EFL learners. The verbal protocols of these studies indicated that text difficulty played an important role for comprehension success. Verbal protocols are also particularly useful for identifying factors causing reading anxiety (Güvendir, 2014), for studying the role of learners' sociocultural backgrounds for reading comprehension (Joh & Schallert, 2014) and factors affecting learners' decision-making and meaning construction during reading (Park, et al., 2014). Yilmaz's (2015) and Uhrig's (2015) investigation of learners' reading and writing skills using protocol data collected during interviews demonstrated the importance of concurrent verbal reporting in empirical studies. These studies verify that verbal protocols can be elicited from learners of different ethnic and linguistic backgrounds and be given the status of valuable data in a wide variety of empirical studies.

Perhaps one of the most common methods of eliciting verbal reports from learners is the Think-Aloud Method (TAM) (Ericsson & Simon, 1993; Pressley & Afflerbach, 1995), which I discuss in this chapter.

5.2   THE THINK-ALOUD METHOD

5.2.1   Background and Development of TAM

TAM can be traced back to the work of Thorndike (1917) (cited in Afflerbach and Johnston, 1984), Huey (1908), McCallister (1930), Piekarz (1954) and Strang

(1964, 1970), who initiated a new era of scientific investigations based on the study of human reasoning processes. Afflerbach and Johnston claim that by the mid 1900s, a revolution in cognitive psychology had ushered in a new era of 'thinking about thinking' in applied linguistic research. The Think-Aloud Method gained ground in reading research during the last quarter of the twentieth century. Studies such as those by Bridge & Winograd (1982), Brown & Day (1983), Garner (1982), Olshavsky (1976) and Johnston & Afflerbach (1983) (cited in Afflerbach and Johnston, 1984: 307) show that the popular use of TAM for investigating reading comprehension is in fact a continuation of a sporadic period of using participants' verbal reports in the history of reading research. Empirical studies that stem from this tradition are considered revolutionary because for the first time, researchers attempted to answer research questions about language learning by investigating the creative tools of the learners' minds whilst they are actively engaged in tasks.

Nassaji (2003) states that TAM is the closest to which the researcher is able to come to understanding the complexities of language learning, so much so that in the last 2 decades, the method has been increasingly used for gathering data to study the mental processes and strategies involved in reading comprehension and vocabulary learning. Dole et al.'s (1991) study is an example of research in the behaviourist era, which focused on methodology aimed at obtaining data that came as close as possible to the learner's mental processes during actual reading itself (p. 240).

Gradually, researchers became more interested in identifying the difficulties that learners were experiencing for reading content-area texts. McCallister's (1930) study, for instance, which at first uses error-analysis of his learners' verbal protocols to identify the mistakes they had made during reading, demonstrates that miscue analysis alone was insufficient for shedding light on what his learners were thinking whilst reading. His findings were more insightful when he asked his participants to think about what they were thinking as they were responding to the various reading tasks. McCallister suggests that this is because the think-aloud method allows the researcher to pursue the question of how the

learner progresses from the start of the task through to the end when language output can be observed and measured. Nonetheless, the effectiveness of TAM research depends on the researcher's awareness of several theories on learners' cognitive functions that influence its effectiveness.

Simons (1971) reviewed several reading comprehension studies using TAM studies and described the studies as weak. Nevertheless, Simons attributed the weaknesses to poor theoretical grounding of the studies rather than poor methodology. He claims that any inability of TAM research to shed light on the processes of reading comprehension is the result of the research not being based on theory, rather than the inadequacies of the method itself. Simons argues that TAM researchers must base their research designs firmly on sound theoretical rationales. I discuss three theories that could potentially affect the outcomes of TAM research.

5.2.2   Inner Speech Theory

The main objective of TAM studies is to collect verbal protocols that represent the silent language in the learner's mind. When carrying out TAM research, the researcher should consider the fact that the verbal protocols are reflections of the learner's natural thought processes which are not typically intended for communicating with the outside world. According to Vygotsky's (1962) inner speech theory, learners' utterances, which begin as thought units, are not stored verbally because a learner's thought "does not have its automatic counterpart in words…" (p. 150). Rather, one's thoughts usually develop in the mind as mental networks that become more abstract and elaborate before they are translated into audible language for the outside world to perceive. In fact, most thoughts tend to stay as silent components in the one's mind. When learners verbalise their thoughts, the audible language reflects partial meaning of those thoughts. Usually their full meaning remains with the speakers.

Smagorinsky (1998) describes thinking aloud as the learner's verbal descriptions of the silent thinking processes in the mind and describes

verbalised thoughts as speech that has been processed to reach a new level of articulation. He claims that the thinking aloud process serves as a tool "that potentially enable changes in (one's) consciousness" (Smagorinsky, 1998: 157) and argues that human beings are subjects of social conditioning, where thinking aloud has very little limited conventional social and communicative purposes. Smagorinsky asserts that in everyday life, active verbalisation of our innermost thoughts is suppressed because it would be socially unacceptable to constantly verbalise all our thoughts publicly. Therefore it is essential for TAM researchers to be aware that even under the best research conditions, the verbalisations of the participants typically represent only a fraction of all their thoughts. Ericsson and Simon (1980) suggest that TAM studies should always be designed with the aim to elicit and capture as much of this mental data as possible. However, TAM researchers should remember that what they claim to understand from TAP data is at most their own personal interpretations of the data.

5.2.3 Limitations of Short-Term Memory Processes

Newell and Simon (1972) claim that typically, TAM data reflect the contents of the learner's short-term memory which are responsible for regulating his problem-solving processes (discussed in sub-section 3.2.3.). The writers state that both introspective and retrospective thoughts tend to be active during problem solving. However, since TAM data collection occurs when the learner is attending to information in real time, TAM data tend to reflect the learner's introspective processes which regulate immediate reasoning. Newell and Simon state that TAM procedures do not usually focus on learners' retrospective processes such as recalling and recounting which are associated with their afterthoughts. The results of Henderson (1903) study, which focused on analysing what learners remember after reading, suggest that remembering and recounting are seldom the simple act of activating mental processes in the short-term memory for retrieving information and applying strategies in order to solve problems during reading. Retrospective thinking requires the learner to mentally reshape initial information, then reassess and interpret previous opinions and attitudes with information obtained from the long-term memory.

Newell and Simon argue that retrospective thinking is an integral aspect of a learner's problem-solving processes and should not be ignored in TAM research (Newell and Simon, 1972: 73). They argue that one important methodological issue for TAM researchers to consider is how to elicit verbalisations that most accurately reflect the naturally occurring processes in the learner's short-term memory during reading. Ericsson and Simon (1980) claim that the thoughts in a learner's short-term memory, in which the processes of reasoning, retrieving, reshaping and verbalising are concurrent, tend to be difficult to elicit and interpret because they do not exist in verbal form. Nonetheless, they argue that since the learner's short-term memory processes are responsible for both introspective and retrospective reasoning, TAM researchers should aim to elicit both types of data and distinguish them during data analysis.

5.2.4   Introspection (Cognition) versus Retrospection (Metacognition)

In their article 'Verbal Reports as Data', Ericsson and Simon (1980) make a clear distinction between introspective and retrospective TAP data. They state that introspective data represent the immediate awareness of the participant during problem solving, and is the kind of verbal data that should be elicited for cognitive strategy research. Retrospective data on the other hand, refer to the results of probing by the researcher after the completion of a given activity. The researchers claim that retrospective data are more useful for the study of metacognition or 'noticing' strategies, such as error detection or self-monitoring strategies during task completion. Afflerbach and Johnston (1984) assert that the two types of mental data form a continuum rather than a dichotomy, and each has its own strengths and weaknesses (see Section 3.2). For example, introspective reporting may yield data that are distorted and fragmented, requiring the interpretations of the researcher. Retrospection however, frees up some of the learner's cognitive processing load that introspection imposes during the reading task, and reflects the type of learner-oriented processes which do not require as much interpretation by the researcher.

Often, verbal data that is collected for a particular study consists of the entire thought process continuum of the learners. Afflerbach and Johnston (1984) claim that when a preference for one type of data over the other is expressed, this is usually due to the objectives of the research rather than rules or traditions associated with the research method. They argue that it is essential for TAM researchers to bear in mind that the validity of their studies may be questionable if they exclude retrospective analysis completely from their study. Eliciting verbal data that represents an accurate and wide range of learners' thoughts require the researchers to carefully consider the type of materials and tasks to use for data collection.

5.2.5   TAM Materials and Tasks

Ericsson and Simon (1980) claim that the use of suitable research materials, researcher's tasks and research procedures is essential for conducting a good TAM study. The researcher needs to begin by identifying the type of processes or strategies he or she would like to investigate, then move on to designing suitable tasks and selecting appropriate materials to elicit data from the learners. Ericsson and Simon argue that all these steps are essential for ensuring the validity of the data collected and the results of the study. Nonetheless, they state that task suitability is the strongest variable affecting the reliability, credibility and validity of TAM research. This argument is consistent with the results of Olshavsky's (1976) study, which demonstrate that task difficulty was the strongest variable that affected the reliability, validity and credibility of her study. At first, Olshavsky designed her investigation to take into account the constraints and abilities of her participants, and then matched the interests and levels of her participants to the complexity of the texts they were asked to read. However, she reflected later on that the validity of her study would have been better if she had taken the cognitive abilities as well as the language level of the learners into consideration when selecting the tasks to use for data collection.

Ericsson and Simon (1980) argue that tasks involving overly high cognitive loads tend to interfere with verbalisation because the attention for other mental

processes such as those for coping with cognitive 'overload', crowd the verbal information network in the working memory. They suggest that longer tasks should be broken down into shorter units so that each segment can be worked on one at a time to reduce the cognitive strain on the learner. Johnston (1992) suggests that various forms of scaffolding could be provided during data collection so that space in the working memory may be freed up for the learner to focus on higher-order thinking processes. With regard to balancing task difficulty in TAM research, Johnston argues that learners must be occupied with problem-solving processes which are too difficult for automated answers to occur, but manageable enough for them to verbalise their thoughts independently.

Some researchers claim that the use of multiple texts and tasks of increasing levels of difficulty during data collection seems to encourage non-automatic responses. Aykel and Kamisli (1996) argue that TAM tasks should involve "cognitively demanding language use" beyond mere word recognition levels so that learners cannot rely overly on surface-level processes to respond. In a similar vein, Bernhardt and Kamil (1995), Carrell (1991), Clarke (1980) and Cziko (1978) suggest that the texts used in TAM studies should challenge the learner cognitively and require him/her to activate a mass of linguistic knowledge and mental processes to read adequately. Bernhardt and Kamil argue that since it is necessary to create problems for the learner to solve during reading, the texts used should not be threshold texts. This is so that difficulties may naturally occur during reading and authentic opportunities for inferencing and strategy activation may arise. Ericsson and Simon (1980) assert that conducted with proper procedures, TAM is capable of producing rich verbal protocols that have the potential of providing deep insights into even the most complex research topics.

5.2.6   *TAM Research Procedures*

A common procedure in TAM is to encourage the learner to verbalise continuously is to use the "keep talking" cue. Prompts such as "Remember, we

are interested in your processes: what you are doing as you are reading"
(Johnston & Afflerbach, 1983) are also useful for eliciting verbalisations. In the
'Direct Explanation Approach' (Roehler and Duffy, 1984), the researcher models
the act of making thinking public before the learner is asked verbalise his/her
own thoughts. The Direct Explanation Approach begins with the researcher
demonstrating the acts of hypothesis formation, comprehension monitoring and
error correction whilst reading a text aloud. Roehler and Duffy suggest the
modeling of five most-commonly-applied reading strategies in this phase –
predicting, visualizing, making analogies, expressing confusion and
demonstrating fix-up strategies. Next, the researcher invites the learner to
participate in the same strategic activities. Finally, the learner is left to read
aloud and think aloud independently. Throughout the independent verbalising
phase, the researcher continuously reminds the learner to keep talking and
verbalising everything that is going on in his/her mind as he reads.

Due to the limitations of the learner's short-term memory processes (discussed
in sub-section 5.2.2.2), thoughts from the working memory may not be complete
since some thoughts are not held long enough in the working memory for them
to be verbalised (Sugirin, 1999). As a result, some retrospective prompting is
necessary in order to triangulate TAM data collection procedures (Sugirin, 1999:
2). Nunan (1992) argues that retrospective questioning is a useful way of
expanding on introspective data and adding depth to the verbal protocols. Qi
(1998) suggests that follow-up interviews very soon after TAP data collection
are good opportunities for the researcher to probe for retrospective thinking
processes. Qi argues that triangulating data collection with interview data is a
good idea because the data can be used to test and validate the researcher's
interpretation of the introspective TAP data. Davis and Bistodeau (1993) refer to
this procedure as the recall protocol, usually carried out during exit interviews
that focus on eliciting the learner's thoughts regarding the content of a task or to
review what was verbalised during TAP data collection. The writers recommend
that time-lapse between the think-aloud session and the exit interview should be
kept to a minimum in order to minimise memory loss.

Fontana and Frey (2000) argue that during data collection, it is imperative for TAM researchers to manually notice and record all paralinguistic data from the learners. Apart from verbal language, the learner's nonverbal communication such as pace and volume of speech, eye-movement, body movement, variations in tone and fidgeting should all be noted. All this information serves to triangulate verbal data. A common TAM procedure used to capture as much data as possible from the learner is to record the verbalisations with a recording device or a video camera. The benefit of using a voice recording is that it allows the researcher the freedom to observe the learner's behaviour and take notes without having to write down all the verbalisations. A video recording would reduce data loss to a minimum. Nevertheless, Fontana and Frey assert that if any of these methods is used, the researcher should consider the disadvantages that are associated with the intrusiveness of being recorded. They claim that live recordings may be distracting and intimidating especially for younger learners. Some researchers collect TAP data with the help of an observer whose main task is to observe and takes notes of how the learner behaves whilst thinking aloud. However, the presence of an observer may obstruct the natural flow of the verbalisations. This is especially so for children when the observer is an unfamiliar person.

Afflebach and Johnston (1994) claim that one of the trickiest TAM procedures is data transcription. They describe data transcription as one of hardest and most tedious procedures in TAM due to the typically large amount of data collected at TAM sessions and exit interviews. They also claim that verbal protocols tend to consist of a flow of continuous verbalisations that do not always explicitly, efficiently and effectively convey the learner's meaning and intentions. This tends to make transcription procedures time consuming and often expensive (Afflerbach and Johnston, 1994: 65). Cooper (1999) states that a common method of transcribing TAP data is to divide the protocols into individual communications units which are more or less equivalent to the grammatical units of main clause and subordinate clause. The next step is to match up these units to a list of psycholinguistic concepts corresponding to the "minimal

terminal unit of meaning for each communicative unit" for coding and analysis (p. 242).

Although many researchers have used TAM effectively in both quantitative and qualitative research, Pressley and Afflerbach (1995) argue that many methodological issues have to be considered for a TAM study to be reliable and valid. Pressley and Afflerbach argue that with the use of proper research procedures and tasks, systematic treatment of the data collected, as well as a fair and accurate interpretation of the learners' verbalisations, TAM research is capable of shedding light on the richness and complexity of human thought processes. Although the importance of TAM research for vocabulary learning and reading research is widely accepted, its use is not without limitations. In fact, Simons (1971) argues that its very strength, that is the closest possible way for researchers to study cognitive processes, has also been criticized as being the root of its limitations, which I go on to discuss.

5.2.7   Limitations of TAM

Pressley and Afflerbach (1995) state that as a TAM researcher, one must have a clear understanding of what the method is capable of measuring and the conditions that it requires for it to do its job effectively. Therefore care and caution must be taken to preserve the validity and reliability of the data collection procedures. However, like all other research methods, there are limitations and risk factors involved in TAM research.

A main concern of TAM is the issue of reactivity. Young (2005) defines reactivity as the negative effects of asking a participant to think aloud. Young discusses several problems related to asking learners to think aloud. The first problem is the doubtfulness surrounding the learner's ability to think and attend to a task at the same time. Young suggests that concurrent task completion and verbalisation may be too demanding for most learners. Stratman and Hamp-Lyons (1994, cited in Branch, 2000) and Wilson (1994) assert that we have limited resources in our working memory to attend to tasks and verbalise at the

same time. Their studies show that listening to one's own inner voice during TAP sessions seems to be a problem for some learners, causing them to fall into long periods of silence. Wade et al. (1999) state that there is a general concern of 'underproduction' in TAM studies because some of the cognitive processes that TAM studies aim to observe may never reach consciousness for them to be verbalised. They argue that this threatens the validity of the data. While Roehler and Duffy (1984) suggest that this risk could be reduced if the tasks are thoroughly explained to the learners through the 'Direct Explanation Approach' (discussed in sub-section 5.2.6) whereby the researcher models fix-up strategies for the learner, Young (2005) and Collins and Smith (1982) criticize this method as one of the most serious issues of reactivity in TAM studies. They argue that when learners internalise a list of verbalisations performed for their benefit, their own verbalisations could be influenced or even limited by it.

Another drawback of TAM discussed in the literature is the tediousness and expense involved in data collection and data analysis (discussed in sub-section 5.2.4). Afflerbach and Johnston (1984) argue that naturalising the verbalisation process to accurately reflect the actual contents of the participant's working memory means the researcher can expect to find almost anything in the TAP data. The process of thinking-aloud produces a large amount of verbalisations that are elliptical, fragmented and haphazard in nature, making transcription and analysis very time consuming, difficult and expensive to carry out. Afflerbach and Johnston state that the transcription and analysis processes often raise the problem of subjectivity of the researcher. Nevertheless, they argue that the effort involved is usually worth it because TAM is in fact one of the best methods for the researcher to explore the nuances and underlying messages of verbal data.

Some researchers argue that there is a potential risk of data loss during the transcription and coding procedures because TAP data may not be able to take into account sarcasm, cynicism or humour. Ericsson and Simon (1993), Brown and Day (1983), Chi et al. (1982) and Garner (1982) assert that even some of the best transcription procedures may not be able to capture all the insightful information in the TAPs. They state that some superficial transcription

procedures may cause sequences and interactions of reported strategies during the TAPs to be ignored or lost. Afflerbach and Jonhston (1984) suggest that if prompting or elicitations were involved, the transcription process must reflect them and the data analysis procedures must take them into account.

In spite of the limitations of TAM highlighted in this section, it has been suggested that the best way to develop good TAM research technique is to conduct more research with the method. In the next sub-section, I discuss several studies in which the researchers have argued persuasively and convincingly for the advantages of TAM.

5.3   YOUNG LEARNERS AND THE THINK-ALOUD METHOD

Several American case studies have illustrated the suitability and effectiveness of TAM data collection procedures with students from grade 2 to grade 5 (Meyers, 1985; 1988; Meyers & Kundert, 1988; Meyers & Lytle, 1986) which may be similar in age to the year 2 to year 5 students in my study context. Chamot and El-Dinary's (1999) study reports that children as young as grade one or younger (equivalent to year 1 or kindergarten in my study context) have been observed to be able to verbalise detailed strategy information. Pressley and Afflerbach (1995: 119) refer to verbal reports as a maturing but underdeveloped method for younger learners. They claim that the positive results from young learner TAM studies provide arguments to convince researchers of the benefits of the think-aloud method for young learner research.

5.3.1   Arguments in Favour of TAM for Young Learners

In her small-scale exploratory TAM study of Year 2 children's interactions with stories, Sainsbury (2003) points out that "there (seems to be) nothing in (TAM) to preclude children of this age, provided that they were fluent readers". She attributes the effectiveness of TAM for her study to a combination of factors such as the choice of text and readers, as well as the effectiveness of the demonstration procedures. She argues that there are many familiar similarities

between the thinking aloud procedures and the classroom activity of a teacher sharing a book with her students. Sainsbury claims that both activities tend to be led by the children's spontaneous comments about the story, characters and pictures in the book. The findings in her study support the assertion that TAM is a good research method for young learners.

Although my study does not focus on pedagogical issues, it is interesting to note that Sainsbury (2003) is so convinced of the suitability of TAM for young learners that she is inclined to make a strong claim for its wider use. Alvermann (1984), who shares a similar perspective as Sainsbury, argues that the think-aloud method has many practical applications for young learner research. He suggests that the method is useful for researching the differences of strategy use among groups of learners or individual learners, diagnosing reading performance and vocabulary learning strategies of young learners, and instructing and modeling good strategy use for reading and other complex cognitive tasks in the classroom.

The suitability of TAM for young learner studies is somehow associated with child developmental theories. The Piagetian model of cognitive development argues that a learner's fundamental cognitive skills develop during childhood provide evidence that pre-school children are able to introspect on their own mental processes (Meadows, 1993; Flavell et al, 1995; Vygotsky, 1962). There is research evidence suggesting that, in fact, young children's metacognitive abilities develop quickly in their early school years. In a series of experiments conducted by Flavell et al. to find out if pre-school children show an awareness of their thinking processes, the researchers found that seven to eight year old children were fully capable of carrying out introspective reporting. Scott (2000) assert that children's cognitive and metacognitive skills develop and advance so rapidly that by the age of eleven, children could have mental abilities that appear to be very similar to those of adults. For example, the results of his study show that children of this age are able to remember and verbalise their inner thoughts as competently as adult learners, thereby making them suitable participants of TAM studies.

To illustrate the effectiveness of TAM for young learners, Gu (2003) reports the positive results of Chamont and El-Dinary's (1999) six-year longitudinal study at George Washington University. The study involved young learners from kindergarten children to sixth graders in three immersion programmes. Extensive data were collected through systematic and intensive work with think-aloud protocols. The researchers did not report any problems in using TAM for their study. From their close-up classroom observations, interviews with teachers and questionnaire methods, they have concluded that talking aloud is in fact not an unusual occupation of children, who are known to talk to themselves much more naturally and frequently than adults do.

In spite of the positive outcomes of many young learner TAM studies, researchers have not been unanimous about TAM as a reliable method for investigating children's mental processes, and TAM researchers need to be aware that the method has several limitations that may implicate its use in studies involving young learners.

5.3.2   Limitations of TAM for Young Learner Research

Gu et al (2005) states that the use of TAM to study children's use of strategies for reading and vocabulary learning is, in general, a thinly researched area. They were able to report only six full TAM studies involving young learners. Of these six studies, two included lower primary children, and only two studies used pure TAM procedures for eliciting data. Two early TAM studies involving young children conducted by Hare and Smith (1982) and Alvermann (1984) indicated that the method was difficult to use with young children. In a study with grade-2 children, Alvermann observed that young children reported less about thinking and doing compared to what is being read. She also noted the necessity of multiple individual practice sessions for these children before actual data collection was feasible, making it tedious and bothersome for the children involved in her study.

Garner (1987) states that there are several problems with the think-aloud method that are relevant to both adults and children. However, she argues that because of the age and the lack of maturity of young learners, the research situation becomes delicate. For instance, there is an inherent risk of inadvertent cuing, where researchers cue entire protocols with specific comments. With young children, this tendency could be more pronounced, especially when the children require a lot of clarification, explanation and encouragement in order to verbalise. Garner also mentions the problem of "verbal facility confounding results" (1987: 74). Should verbalisations be skimpy, the researcher would not know for sure if the reason behind it was limited cognition, inadequate vocabulary knowledge, lack of understanding or interest, or some form of combination.

Other researchers have similar concerns. For instance, Arlin's (1975) study shows that only 50% of adults ever attain the 'problem-finding' or 'problem-solving' stage. This moved Arlin to question the logic behind asking young children to perform this task. This question raises some ethical concerns surrounding the use of TAM in young learner research. One concern is the imbalance of power between the researcher and the participant when young children are being researched. Even if we were to consider anthropological paradigms (Mayall (2000: 123) (cited in Gu et al, 2008), which encourage adult researchers to adopt less-adult roles or 'social positioning' during data collection, the power gap between the child ad the adult will always be present. In more conservative Asian research contexts especially, where the unquestioned authority of the adult over the child tends to be more ingrained and inflexible, the imbalance of power during data collection in TAM studies could place young learners under considerable stress. Nonetheless, I believe that the power imbalances between adults and children could be tackled in several ways. Instead of abandoning the method because of the potential risks of stress to the participants from one-to-one interview sessions, data could be collected from pair or group work. Bringing small groups of participants to interact would have the two-fold benefit of reducing the pressure on the individual to perform, as well as to create a more natural environment for the participants to verbalise.

Pulido (2007) asserts that any limitations of the method tend not to be usually associated with the method itself, but rather with the procedures used by the researcher for conducting the research. He suggests that TAM researchers need to work with the strengths and limitations that are both inherent in the methodology. One way of ensuring that as much data as possible is collected is triangulation. Especially for young learners, it is essential for researchers to include different sources of data to supplement the verbal protocols. Using covert strategies to observe and note down body language, behavioural patterns, bodily movements and hand-eye coordination would contribute to the plentiful and rich data that researchers need. In the next sub-section, I discuss several TAM procedures that are suitable for young learners.

5.3.3   *Young Learner Oriented Research Procedures*

Meichenbaum (1985) advocates that an alternative training procedure to the Direct Explanation Method (discussed Section 5.2.4) for young learners is to train them how to think rather than what to think. Meichenbaum developed a five-step training approach that begins with the adult modeling the task while talking about it. In the next step, the adult invites the child to join in with the task. Following that, the adult's verbalisations become gradually fewer whilst the child goes on to complete the task more independently. This phase is accompanied by the adult's oral encouragements or support. Next, the child carries out the task whilst talking aloud, and then finally just with the adult whispering the instructions. In the final step, the child is able to follow his/her own nonverbal or inaudible self-instructions. Pressley and Afflerbach (1995) point out that "researcher silence about how the (task) might be processed is more defensible than directions that prompt particular processes, especially when the goal is to learn about the processes people naturally use" (pp. 132-133). Therefore, the researcher's verbalisations should have a scaffolding effect to support the children's attempts at thinking aloud. Bowles and Leow (2005) refer to this type of TAP elicitation as 'metalinguistic think-aloud'. Their method involves the researcher directing the learner's attention to important aspects of the text or material in order to support their verbalisation processes.

In Cameron's (2001, 2002) studies, she used a similar technique to elicit verbalisations from very young children. She adopted a mediating role where she found herself becoming pedagogically involved with her learners' as they verbalised their thoughts. Cameron's method involved talking with the learners and providing the necessary scaffolding that helped them to verbalise as independently as possible. Her own utterances were given the status of relevant data alongside her learners' verbalisations. In another study, Cameron (2003) asked learners to complete a reading task while considering the suitability factors of the text for children younger than themselves. She thought that this would be a better way of finding out what the learners thought rather than ask them directly. Cameron called this technique 'Goal-directed Interactive Think-Aloud'. Though the aim of Cameron's studies was not to develop TAP data elicitation techniques, the results of her studies suggest that setting child-oriented goals for young learners may enable them to verbalise their thoughts more freely and independently.

The verbal protocols of young learners need to be transcribed and coded differently from adult protocols. Johnston and Afflerbach (1983) argue that this is because young learners TAPs tend to be affected by voice volume, irregular diction or unfamiliar child-like language, which could result in large amounts of incomprehensible utterances. Extremely fragmented TAPs are very difficult to code. Young (2005: 26) provides a list of coding approaches from Payne's (1994) study that are effective for transcribing and coding young learners' TAP data, which I summarise and paraphrase below. The procedures include:

1. Breaking up the protocols into short phrase or content segments so that each carries a unit of meaning that reflects the task or assertion by the learner, then coding, computing and analysing the individual segments in the transcription.

2. Coding the frequency of reasoning-type occurrences within the protocol and computing the individual units to reflect the types of cognitive processes used by the learner.

Brown and Day (1983), Chi et al (1982), Garner (1982) and Johnston and Afflerbach (1983) suggest that for young learner protocols, it is necessary to develop response classification systems that take into account the theoretical grounding and objectives of the study. The classification schemes which should reflect research objectives that are consistent with suitable young learner theories, could be used by the researcher to test against later data in an independent bootstrap operation. Ericsson and Simon (1993) also claim that the coding scheme does not need to be fixed formally. Rather, they suggest that the researcher may start with a few categories that describe the dataset, and go on to search for other suitable categories as the data is being read and re-read.

Afflerbach and Johnston (1984: 317) state that one way of analysing and interpreting young learners' TAPs for mental strategies is to develop flow charts of the reported strategies. From these, frequency tables of the strategies, sequences and interactions may be determined. Afflerbach and Johnston argue that there will still be a need for the researcher to infer and interpret data however it has been coded. Nevertheless, they state that this in itself poses a big threat to the objectivity of the data analysis procedure since it is highly probable that the same transcribed and coded data can result in different interpretations among different raters. For instance, there could be differing opinions about whether a participant is parsing a sentence and the possible reasons for its occurrence, or whether the participant is searching for a comment or looking for a topic sentence. Afflerbach and Johnston (1984: 318) argue that reliability is not only a problem for descriptions of strategies, it is an even greater problem for descriptions of the situations in which the strategies occur.

In an early review of TAM by Nisbett and Wilson (1977), the authors raised similar concerns. They claimed that the controversy in the TAPs of young learners is whether or not the data can be regarded as a direct representation of the participants' thought processes. However, Ericsson and Simon (1980) defended the validity of TAPs in their reports and gave it the respectability that it commands in recent times. They claimed that researchers' interpretations of verbal protocols are based on what the learners' verbalisations and do not rely

too greatly on the coding categories for data analysis. Ericsson and Simon also asserted that the doubts arising from the coding procedures could be balanced off with the use of triangulated data. They argue that physical and logistical variables of the research such as observations of eye-movement, fidgeting and time of day are variables that are as valid as the protocol data itself. Ericsson and Simon suggest that the insights that the researcher can gain from this data are the strengths of the method. They also suggest that the researcher's interpretations of TAP data are as valid and admissible as any other kind of visible social activities and responses observed in quantitative research.

Although Ericsson and Simon's (1980) research procedures were tested on adult learners, their findings may be relevant for young learners. There are three important things to remember when carrying out a TAM study involving young learners. They are (1) to ensure that the research takes into account the theoretical referents of TAM discussed in sub-section 5.2.2, (2) to select suitable research materials and tasks for collecting data, and (3) to carry out the most appropriate research procedures to elicit, transcribe, code and analyse the data. In the next section, I discuss several data analysis methods found in previous TAM studies.

5.4   Analysis of TAP Data in Previous TAM Studies

The TAM studies I reviewed in Chapters 3 and 4 (Nassaji, 2003, 2006; Meyers et al., 1990) studied the different knowledge sources that learners retrieve for vocabulary decoding and contextual inferencing during reading. By analysing the verbal protocols of 36 young learners, Meyers et al. developed a reading comprehension assessment procedure that focuses on the mental strategies their learners retrieved during reading. By analysing the verbal protocols of adult ESL learners, Nassaji investigated the effects of strategy application and language proficiency on his learners' reading comprehension success. The researchers used both qualitative and quantitative data analysis methods in their studies.

5.4.1   Qualitative Analysis

The first step in Nassaji's (2003, 2006) and Meyers et al.'s (1990) analyses was to identify the various types of knowledge sources their learners retrieved during reading. To accomplish this, the researchers read and re-read their think-aloud protocols carefully and interpreted and coded their learners' verbalisations in terms of the knowledge sources they were investigating. This method of analysis resulted in the classifications and taxonomies of linguistic knowledge, external knowledge and strategic knowledge sources discussed in Chapter 3 and Chapter 4. Not only was qualitative analysis essential for data coding in Nassaji's and Meyers et al.'s studies, it was a necessary step to other methods of data analysis which I go on to discuss.

5.4.2   Obtaining Raw Counts

To analyse how frequently their learners retrieved the various strategies found in their data, Meyers et al. (1990) counted the number of times each strategy occurred in their data. This provided the researchers with the raw counts of the strategies retrieved by their learners. Using the raw counts, they calculated the proportion of each occurring strategy to the total number of strategies found in their dataset in terms of percentages. The results of the analysis show that amongst all the strategies in their study, their learners used Elaboration 34.7% of the time, Signaling Understanding 29.0% of the time and Reasoning 23.3% of the time. Of the remaining strategies found in their study, Monitoring was used 9.5% of the time while Judging was used 2% of the time and Analysis only 1% (Meyers et al. 1990: 119). While the raw counts show the number of times their learners retrieved individual strategies, the percentages suggest the likelihood for each strategy to be used in relation to all the other strategies in the study.

Nassaji (2003, 2006) used the same method of calculating the raw counts of different knowledge sources retrieved by his learners. Nassaji used this result to infer the frequency and likelihood for individual knowledge sources used by his learners to decode vocabulary and infer contextual meaning. The results of his

study (Nassaji, 2003: 655) show that World Knowledge (46.2%) and Morphological Knowledge (26.9%) were the most frequently retrieved non-strategic knowledge sources in his study.

Obtaining the raw counts in Meyers et al.'s (1990) and Nassaji's (2003. 2006) studies was a necessary step for the researchers to investigate correlations between their learners' knowledge sources and different aspects of reading comprehension. For example, Meyers et al. used their results to analyse the relationship between reading comprehension and intelligence. They used their raw counts to compute correlations between the frequency of moves in their study with other the results of global intelligence tests such as the Otis Lennon Mental Abilities Test and the Stanford Achievement Test (Meyers et al. 1990: 120). Nassaji's raw counts enabled him to analyse the relationship between strategy application, vocabulary knowledge and vocabulary inferencing success for his learners, as I go on to discuss.

5.4.3   *Mean of Success Analysis*

One of the objectives of Nassaji (2003) study was to understand the relationship between the knowledge sources his learners retrieved during reading and their contextual vocabulary inferencing results. To do this, Nassaji determined the lexical inferencing success associated with the knowledge retrieved using a 3-point scale (0 to 2) representing unsuccessful, partially successful and successful attempts. He then went on to calculate a mean of success for each type of knowledge used. He "divided the sum of the scores obtained for success in inferencing the target words by the total frequency of each strategy or knowledge source used to infer the meaning of those words" (Nassaji, 2003: 658). The results of this analysis showed that of all the non-strategic knowledge sources in the study, Morphological Knowledge and World Knowledge were associated with the highest mean of success. The results also showed that of all the mental strategies used, Verifying and Self-inquiry were associated with the highest means of success compared to other strategies.

Nassaji's mean of success results suggest that not all mental strategies were equally effective for vocabulary decoding and contextual inferencing for his learners. Nassaji also argues that his findings seem to provide evidence that metacognitive strategies play an important role in lexical inferencing and verify previous research findings suggesting that self-inquiry "may lead to more active processing of materials being read and the activation of relevant background knowledge" (Nassaji, 2003: 662).

5.4.4 Two-Way Chi-Square Test

Nassaji's mean of success analysis was a good method for him to study the relationship between two components of reading comprehension - strategy application and vocabulary decoding and contextual inferencing success. However, Nassaji was also interested in investigating the relationship between his learners' mean of success and other components of reading comprehension. For example, according to Nassaji's (2003) analysis, L1 knowledge was the least effective knowledge source for vocabulary decoding and contextual inferencing amongst his learners. To investigate the relationship between his learners' inferencing success associated with L1 knowledge retrieval in his data, he conducted a two-way chi-square test. The test results revealed no statistically significant differences in the use of different knowledge sources in this study and Nassaji concluded that although "some of the knowledge sources contributed more to successful inferencing than others, success did not depend much on what kind of knowledge source was used" (Nassaji, 2003: 659).

To investigate other factors influencing the effectiveness of different knowledge sources for vocabulary decoding and contextual inferencing success, Nassaji (2006) conducted a similar chi-square test on the proportions of unsuccessful, partially successful and successful lexical inferences for lexically skilled and less lexically skilled learners in the study. His analysis showed that the portions of successful, partially successful and unsuccessful inferences were significantly different across the two learner groups, suggesting that the degree to which his learners' mental strategies were effective for inferring word meaning in the

study depended on their group membership which was determined by their language proficiency levels in this case.

The data analysis methods used by Nassaji (2003, 2006) and Meyers et al. (1990) demonstrate that think-aloud data lends itself well to both qualitative and quantitative analysis. In the next section, I discuss my pilot study, which tests the applicability of the think-aloud method for my study.

5.5   THE PILOT STUDY

5.5.1   Aims of the Pilot Study

There were three objectives for conducting my pilot study. Firstly, I carried out my pilot study in order to establish the effectiveness of TAM for my study context. Secondly, it was to provide me with an opportunity to familiarise myself with the procedures in TAM and help me to develop a more analytical approach to studying the vocabulary learning and reading comprehension processes of my learners. Thirdly, it was to allow me to reflect on my own techniques as a researcher. Table 7 below shows the questions that my pilot study set out to answer.

Table 7 – Research Questions, Pilot Study

Research Questions	Issues to pay attention to
RQ 1. What conditions are necessary for successful TAM data collection?	1. Is there sufficient learner interest? 2. How easy is it to secure parental consent for the research? 3. Do the learners' schedules allow data collection to take place? 4. Does the research environment influence data collection? 5. What tools and equipment are necessary for data-collection?
RQ 2. Does the pilot study yield code-able data?	1. To what extent are my learners able to verbalise their thought processes? 2. Does the data provide insights to my learners' thoughts?
RQ 3. What areas of my research techniques and procedures need improvement?	1. Was I able to establish rapport with my learners? 2. Were my training procedures effective? 3. Did my own verbalisations have an influence on my learners' verbalisations? 4. Which transcription and coding methods are appropriate for my study?

5.5.2   Selection of Learners and the Research Schedule

I was aware that there are ethical considerations regarding young learner research that govern my study. Although I was not able to preempt all the ethical issues that may have arisen, I did my utmost to carry out my research procedures in accordance with the current ethical guidelines stipulated by the University of Leeds School of Education Ethics Committee. First of all, I obtained ethical approval from the University of Leeds for surveying and interviewing learners between the ages of 8 and 10 at my school. Then I began selecting learners. Learners within the age group for which ethical approval to conduct my pilot study was granted came from our Year 3 and Year 4 cohorts. In February 2012, I approached my colleagues in the Primary English Department at the Deutsche Schule Shanghai to ask for volunteers to participate in my pilot study. I requested that they excluded learners with reading difficulties and special needs such as dyslexia, speech impairments and attention deficit syndrome. This was to help reduce the risk of external variables influencing the quality and quantity of my data.

From the list of names provided by my colleagues, I randomly drew 4 for my pilot study. Before my initial meeting with the learners, I contacted the children's parents to ask for their consent. To begin with, I called the parents on the telephone to explain my study and to ask if I could work with their children. It is usual for teachers and parents at our school to work closely and communicate with each other via email or telephone calls whenever necessary. On the phone, I explained that my study had no connection with schoolwork and that the learners' participation would not interfere with their regular lessons or influence their report card grades. I assured the parents that I would take the necessary steps to protect their children's interests at all times. I assured them that I would respect the family's privacy by keeping the identity of their children anonymous and refraining from adding any personal descriptions of the children when I reported my findings. I also assured them that the children could withdraw from the study at any time without any questions or implications.

I met the 4 learners (one Year 3 and three Year 4s) for five minutes during recess to tell them that they had been selected to participate in my project, and to ask if they were still interested in collaborating with me. I explained the purpose of my research to them and reassured them that their participation would not affect their school schedule and grades. I also explained that they would spend 15-20 minutes in my classroom during two separate lunch breaks to read a story aloud with me. They all said that they would have sufficient time to eat and relax in the remaining time.

Next, I informed the learners that the tasks in the interview were based on talking and reading. They told me that they would have been less willing to participate if written components such as a comprehension test, vocabulary test or story-writing exercises were involved. I reiterated the point that they were not being assessed or judged in the interview sessions and reassured them that any potentially assessable outcomes from the TAM sessions or in the written feedback would be kept completely confidential. Since I was not the teacher of any of the volunteers, any possible risk of bias or interference with their schoolwork was minimal. I reminded my learners that they could withdraw from

the study at any time without having to give reasons or worry about consequences. As a token of my appreciation, I promised to give my learners a copy of the audio recording as a souvenir of their participation, if they wanted it.

Before I began collecting data, I obtained written consent from the parents (in Appendix 1). As I had already obtained permission from my school administration to conduct my study in my application to the university, I did not have to write in for official consent from my school to conduct the pilot study. I began scheduling data collecting sessions in March 2012 when I received all the 4 consent forms. I planned to conduct separate sessions for the training procedure and the think-aloud reading session for each learner. Since one of the main issues of the pilot study was to focus on the effectiveness of the training procedure, I decided to devote one session to deal with TAM training procedures. The second session was the actual think-aloud session. Data from both sessions were analysed.

It was difficult to set up the appointments for the TAM sessions. March and April were busy months for class tests and other big projects. The Year 3 students were preparing for their national competence ranking tests in their core subjects and the Year 4 students had a heavy class test schedule during those months. For ethical reasons, I avoided scheduling meetings during weeks when the homework load was heavy, when there was a class test or when other teachers had called for extra meetings to complete on-going projects. It was only after our two-week holiday from 27th April to 11th May, was I able to begin actual data collection. Unfortunately, Learner 1 came down with pneumonia after the holidays. After a brief discussion of the options available, his parents decided that, under the circumstances, a withdrawal from the study was the best option for him. I was left with 3 learners for my pilot study. It took one month to collect 2 sessions of data from each of the 3 learners.

5.5.3   Research Materials and Recording Devices

When selecting my materials and tasks for data collection, I referred to Whitney and Budd (1996: 342) who argue that because of capacity constrains, only a small portion of text can be processed during each cycle. I used two types of materials for data collection – a picture page (found in Appendix 2a) two stories from the Oxford Reading Tree graded readers that the teachers use in their English lessons (extracts can be found in Appendix 2a and 2b).

I used the picture page as training material in the first session. The page contained two rows of pictures. The top row had adults of various ages dressed differently and doing different things. The bottom row had different suitcases containing various objects. The task for each participant was to match the suitcases to their possible owners. A small challenge existed in this task. There was one more suitcase than the number of people, and the learners were asked to decide which suitcase did not belong to anyone. After the first training session where the learners were introduced to the act of thinking aloud whilst completing a task, they returned for a second session. During the second session, they were required to read an excerpt from a storybook aloud and verbalise their thoughts. I used Read's (2007) and Schmitt's (2008) recommendations that for young learners, it is sensible to use material from graded reading texts (discussed in Section 1.2).

With reference to Craik and Lockhart's (1972) model of Depth or Levels of Processing Hypothesis for effective vocabulary processing in young learners (discussed in Sections 2.3.1 and 4.1.3), I avoided the use of threshold texts for data collection. Instead, I sampled from reading stages that were slightly beyond the current reading levels of the learners in order to increase the probability of the learners encountering unfamiliar vocabulary in the text. According to Depth of Processing Hypothesis, when the learner encounters new vocabulary during reading, the cognitive processing load for vocabulary decoding tends to increase. This would in turn raise the likelihood for mental processes and cognitive strategies to be activated during reading. I ascertained the learners' current

individual reading levels by consulting their reading records. I also discussed my text selection with the learners' English teachers. First, we selected a suitably challenging reading stage for the learners. Next, we looked at the vocabulary and structures in different stories within the stage. Finally, we selected two stories we thought the learners were able to read independently, yet containing sufficient unfamiliar words and new syntactic structures to trigger off cognitive and metacognitive processes during reading.

5.5.4 Data Collection

All the TAM sessions were recorded using the iPad application called QuickVoice Pro. Although Ericsson and Simon (1993) recommend that both the recording device and the researcher should be kept out of sight during the recording, this was not possible in my pilot study because I was the sole researcher. Hiding the recording device meant that should technical problems have occurred during data collection, I would not have been able to operate the device. To prevent any data loss, and contrary to Ericsson and Simon's recommendations, I placed the iPad on the desk where the learners could clearly see it, and explained its role explicitly to them before starting to record.

I began every session with the following sequence:
1. I asked if the learners were comfortable and feeling healthy,
2. I checked if they were thirsty or hungry,
3. I repeated that the project had nothing to do with the participants' school work and grades, and that there were no 'right' or 'wrong' answers,
4. I asked if they were still willing to participate in the interview and reminded them that they could signal an end to the session any time and without reason,
5. I drew my learners' attention to the recording device and explained that the session would be recorded because I needed to listen to our conversation again after the session.

In the training session, I modeled the thinking aloud process using Meichenbaum's (1985) 5-step approach (discussed in Section 5.3.3) to introduce

my learners to the act of thinking aloud. In the beginning, I covered the bottom row of pictures and verbalised my thoughts about the pictures on the page. I talked about the people in those pictures and verbalised questions about them. Then I uncovered the bottom row of drawings, which consisted of six suitcases with different objects in them. At this point, I invited the learners to join up with the verbalisation process. I asked them leading questions at first and then slowly reduced my own verbalisations whilst allowing them to take over.

In the reading session, my role was to provide scaffolding (Vygotsky, 1962). The support I provided my learners was based on Bowles and Leow's (2005) model of TAP elicitation known as 'metalinguistic think-aloud' (discussed in sub-section 5.3.3). Using this method, I drew the learners' attention to specific vocabulary whenever they were searching for material to talk about. This helped to activate schematic knowledge and mental processes for verbalisation to continue. I also asked my learners to pay attention to unfamiliar vocabulary or ideas in the stories and verbalise their thoughts as they decoded and constructed meaning. During extended stretches of continuous reading without introspective or retrospective reasoning, I stopped the learners and reminded them to verbalise their thoughts about the things they were reading. Since my inquiry focused on vocabulary decoding and contextual inferencing strategies during reading, I directed my learners' attention to specific words, phrases or ideas in the text and asked them to verbalise their thoughts whilst they were reading those parts. Table 8 below shows the amount of time that the learners spent on each activity in the two sessions.

Table 8 – Time Spent on Activity, Pilot Study

Learner	Time (Picture-only)	Time (Text)
1	14 minutes 06 seconds	15 minutes 56 seconds
2	12 minutes 52 seconds	08 minutes 24 seconds
3	12 minutes 58 seconds	16 minutes 45 seconds

5.5.5   *Transcription and Data Coding*

The recorded TAPs were transcribed into written transcripts, which were then coded and analysed. The TAPs from the training sessions were coded in two

different ways. The first coding was to evaluate the influence of my own verbalisations on my learners' verbalisations during the training sessions. For this, I coded my own utterances and classified them in terms of questions I asked during data collection. Next, I coded and classified my learners' responses. Then I classified the questions and responses in Table 9 below, which shows the length of my learners' verbalisations in response to the different types of questions I posed.

Table 9 - Learners' Responses to Researcher's Questions and Cues, Training Sessions

Single-Word/Short Responses	Extended Responses
How-Questions	What-Questions
Who-Questions	Why-Questions
Which-Questions	Is there anything else?
Where-Questions	Give me an example of…
When-Questions	What can you tell me about?
Have you -Questions	Talk me through it.
Do you-Questions	Keep going.
Yes/No-Questions	

The table shows that the learners tended to give extended responses to open-ended questions in the right column rather than the closed questions in the left column. The non-question cues such as "Talk me through it" and "What can you tell me about" in the right column seemed to activate more thought processes and elicited more verbalisations than the other questions in the same column. Many of the learners' responded to the cues on the right began with "it looks like", "I think" and "I don't think" and "Well…".

The closed questions in the left column tended to elicit single-word responses. The examples below, taken from the transcripts, illustrate this:

Example 5.1

Me: *Now why not There are some really obvious reasons why, aren't*
             there
Learner: *Ya*

Example 5.2

Me: *Ah… So he wouldn't be interested in wearing a swimsuit that*
             looks like this, would he
Learner: *No*

In the second round of coding, I classified the learners' verbalisations in the training in terms of the strategies they had applied. Table 10 below provides a short taxonomy of the strategies coded from the data.

Table 10 – Mental Strategies in Training Sessions, Pilot Study

Mental Strategy	Definition	Transcript Examples
Guessing	The learner offers a plausible solution to a problem or answer to a question that is based solely on personal opinion or instinct	"I think Karen belongs to… erm… this suitcase or this suitcase… I don't really know" "Ah now maybe I should say this one took this suitcase"
Referring	The learner uses a specific part of the material to arrive at a solution or answer during task completion	"Because it looks like she's doing sports or something…" "Maybe… but definitely not with THIS [voice emphasis] swimsuit [points]"
Analysing	The learner works out the solution or answer by breaking down parts of the material into smaller components	"Well it looks like she's working and I don't think older people do a lot of sports" "Maybe because they aren't so sporty anymore"
Self-Inquiry	The learner asks himself or herself questions to work out solutions or answers	"His computer Or…" [voice ascends] "Maybe this one Or…" [voice ascends["A handy Is this a handy or a tele… [voice ascends]
Verifying	The learner checks his or her verbalisations against the wider context of the material	"No. It's a lady's swimming costume and he also looks a bit older" "An artist… the hair… ya…" [confident nodding]
Clarifying	The learner offers explanations of the material so that what follows serves the problem solving better	"I don't think Maggie would take this. I think she looks quite old. And I think she looks 60 to 50. And I think people so old won't sing so much anymore" "No I don't think so… No.. Yes he NEEDS [voice emphasis] a suitcase but this is for girls…"
Repeating	The learner repeats bits of materials whilst working towards a	"I think maybe Tom would take this suitcase… Tom… yes Tom

solution or answer	would take this… Ya Tom definitely this one"
	"Businessman businessman"
	"OK Tom has THIS [voice emphasis] Karen has THIS [voice emphasis] Maggie… I don't know"

The definitions and examples in the taxonomy suggest that the data collected from the training session was code-able and classifiable. To test the codability of my data further, I developed a more complex classification scheme for the TAPs from the reading sessions. Firstly, the data was coded and classified for mental strategies. Then the strategies were re-coded and sub-classified in terms of the knowledge sources retrieved by the learners, which were then described in terms of the knowledge sources and skills associated with each strategy. Kvale (1996: 160) argues that qualitative transcribers should aim to describe the think-aloud activity in details and include non-verbal observations such as tone of voice, while acknowledging their own interpretation of the experience. Taking Kvale's argument into consideration, I included all the paralinguistic observations and on-the spot interpretations (in parenthesis) during the reading sessions in the transcription. Table 11 below shows a classification of the mental strategies, knowledge sources and skills coded from the reading aloud sessions.

Table 11 – Mental Strategies in Reading Sessions, Pilot Study

Mental Strategy	Knowledge Source	Skills	Examples
Identifying	Discourse Knowledge	Scanning	"5 times 5" [rapid eye movement, pointing]
	Word Knowledge	Skimming	"saying, shouting, softly, shouting" [points to specific words on the page]
Inferring meaning of unknown words in the story	Knowledge of word categories	Word Form Decoding	"look to see if it's a thing" [decoding a noun]
			"… a thing you can touch…" [decoding a noun]
			"… looks like it's moving…" [decoding a verb]

Guessing contextual meaning	General Knowledge	Contextual Inferencing	"Bertie is meant to calculate but he can't his ears are wiggling and the teacher doesn't like it"
Analysis	General Knowledge	Contextual Inferencing	"Mrs. Lines is a nice person… not afraid of her…"
			"No the teacher and Sadie would be the friend or a child in the same class"
Auditory Elaboration	Knowledge of voice effect on underlying meaning of a word or sentence	Contextual Inferencing	[learner uses low voice and loud voice to read out various sentences in the story]
Reasoning	General Knowledge	Contextual Inferencing	"Because she didn't really shout"

The comments in parenthesis contain my observations of my learners' behaviour whilst they were verbalising. Towards the end of one of the reading sessions, I initiated a discussion on several unfamiliar words identified by the learner. The example below is taken from a part of that particular transcript.

Example 5.3

Me: If you do not know the meaning of these words as you're reading what can you do to help you figure it out

Learner: By… mm… [pauses] by thinking… or by looking if it's a thing… And… if it's a thing you can touch then…

Me: …. If you don't know the meaning of these words like "wiggling" and "waggling" is there something in the picture to help you understand

Learner: [points to the picture on the page] There are these… er… lines It looks like it's moving…

Me: Excellent! So you know that words like "wiggle" and "waggle" and "twitch" has got to do with a movement…

Learner: Yes

This example shows that learner interacting with more than just the letters and words in the text during reading. To decode unfamiliar vocabulary, he had to apply a range of strategies, which included hypothesis testing, using knowledge of syntactic categories and inferring meaning from symbols and signs in the text.

5.5.6   Lessons Learnt from the Pilot Study

I now answer the three questions of my pilot study.

RQ 1. What conditions are necessary for successful TAM data collection?

Learner interest is one of the most important factors for successful data collection. Fortunately for me, many students at my school were interested in participating in my study. Unfortunately, with a 25% attrition rate, only three learners participated in my pilot study. For the main study, I needed more volunteers. Judging from the interest I received in my pilot study, I did not foresee problems in this area.

Having cooperative and supportive parents was helpful. Getting in touch with the parents and obtaining their written consent to work with their children was easy. However, I had lost substantial time for collecting my pilot study data whilst waiting for the consent forms to be returned to me. Rather than wait for all the consent forms to reach me before beginning data collection in the main study, it would have been more practical to start collecting data from individual learners, and in batches as I received the written forms.

Finding a suitable time frame for data collection was also an important condition for successful data collection. My pilot study showed that the month of May was not the most suitable time for data collection. For the main study, I checked ahead with the form teachers and school administration to ensure that I schedule my data collection sessions during a time that did not coincide with class tests and extra curricular activities. I also ensured that my data collection

schedule remained flexible enough to accommodate unforeseen interruptions and cancellations due to absence and withdrawals.

The QuickVoice Pro application on the iPad was an excellent program to use for recording the verbal protocols. It was a simple stand-alone device that was reliable and effective. Although I had to reschedule one appointment because the iPad did not work, the cause of the failure was user-related rather than technical. The programme cancelled out most of the background noises and amplified the main voices well. Even the naturally soft voices of 2 of my learners were clearly heard in the play back. The recorded data had easy transferability to a variety of digital file formats for ready access, which made it easy for me to e-mail a copy of the files to my learners upon request. In spite of Ericsson and Simon's (1993) recommendation that both the recording device and the researcher should be kept out of sight during the recording, the presence of the iPad during the data collection sessions in my pilot study did not cause a distraction or affect my learners' willingness to verbalise. All my three learners forgot that they were being recorded as soon as they settled into their tasks.

The pilot study also showed that my classroom was a suitable setting for data collection. It was a familiar setting for the learners so they felt comfortable in it. Holzemer and McLaughlin (1988) and McDowell et al. (1984) state that the use of natural settings provides the opportunity to study thinking processes as they occur under near-normal circumstances. It was a perfect place for recording the TAPs because it was one of the quietest places in the school during lunch break.

RQ 2. Does the pilot study yield analyzable results?

Since my learners were young, I tried to keep the length of each TAM session between ten and twelve minutes. Ericsson and Simon (1993) argue that it is important to achieve at least this amount of talk time because "a single verbal protocol is not an island to itself, but a link in a whole chain of evidence, stretching far into the past and the future, that gradually develops, molds, and modifies our scientific theories. It needs to be processed with full attention to

these linkages" (p. 280). Although the average length of each session was 13 minutes, one of my learners was able to sustain up to 16 minutes of interaction with me. The pilot study showed that my learners were able to learn the think-aloud process very rapidly and effectively. They joined in very quickly with verbalising in the training session and verbalised independently in both the training and reading sessions. This suggests that the training session in the main study could be incorporated into the reading session for the main study. Each data collection session would be longer as a result, but the outcomes of the pilot study suggest that my learners would be able to engage in it without losing interest or attention.

A concern of the examiners at the upgrade viva was whether or not my young learners would be able to verbalise in a foreign language, and whether my method would yield sufficient analyzable data for my study. The results of the pilot study suggested that all my learners, including one who was a beginner, were able to verbalise in English. I was able to collect plentiful data from the TAM sessions. The data analysis suggested that my learners were able to apply vocabulary decoding and contextual inferencing strategies during reading. The most commonly activated strategies in the pilot study were introspective strategies. In the main study, I continued to observe my learners closely during data collection and take down detailed notes. The pilot study showed that including that information into the transcriptions helped to make my data coding and classifications more insightful and accurate.

The use of proper training procedures and scaffolding in the main study would be essential for the collection of plentiful and rich data. Nevertheless, the presence of pictures and text in the material I used in the pilot data helped to balance task difficulty and provide text-related scaffolding for the less proficient learners. The materials I select for data collection in the main study were also be a combination of pictures and texts, though my pilot study suggested it was necessary to use separate picture and text materials. The use of stories from a higher reading stage than the learners' current stages also ensured that the learners encountered unfamiliar words and structures in the text. For the main

study, I selected threshold texts that helped to trigger off higher-order problem-solving processes during reading (Bernhardt & Kamil, 1995; Carrell, 1991; Clarke, 1980; Cziko, 1978; Lee and Lemonnier-Schallert, 1997).

RQ 3. What areas of my research techniques and procedures needed improvement?

One of the aims of the pilot study was to test my technique as a TAM researcher. I reflected that I was able to put my learners at ease very quickly and easily. With positive reinforcements and reminders to "keep talking", my learners were able to verbalise their thoughts with little hesitation. I was also able to apply Meichenbaum's (1985) 5-step approach to successfully train my learners to think aloud. They understood the process of thinking aloud rapidly and were able to verbalise independently. I began my main study sessions with this procedure and moved on to the reading component as soon as the learners began independent verbalisations.

Although the pilot study yielded plentiful analyzable data, the outcomes suggest that some of my research techniques need improving. The most obvious shortcoming in my technique was my eagerness to 'make' my learners verbalise, which sometimes proved the researcher's paradox. For instance, I was often too quick to verbalise on the participants' behalf, which affected both the quantity and quality of data collected for the study. The transcripts demonstrate that my learners responded well to cues such as "Keep talking". However, I could have limited my own verbalisations to those cues and employed other non-verbal cues such as hand gestures and facial expressions could be used to scaffold during the task cycle. I should also have limited my elicitations to open-ended questions rather than the closed questions, which did not yield as much verbal responses from my learners. It would also have been useful to use Bowles and Leow's (2005) 'metalinguistic think-aloud' method to draw my learners' attention to specific words and meanings in the stories that I want them to independently think and verbalise about would have been a better method of scaffolding for the learners.

5.6   CHAPTER CONCLUSION

In this chapter, I discussed the advantages of research methods for studying the knowledge sources learners activate during reading. To that end, I introduced the Think-Aloud Method and provided evidence to argue that it is a suitable method for my study. One of the main arguments I raised in favour of TAM is that it is capable of yielding rich data which captures the nuances and individual variations found in mentalist verbal protocols. I argued that these data are relatively inaccessible through other research methods. An important advantage of TAM, which I discussed in this chapter, is that TAM benefits research that aims for an open interpretation of verbal protocols. Chi (1997) and Payne (1994) state that TAM research is useful for studies, such as mine, that begin at a point where the correlates are unknown rather than to compare and contrast already known entities.

Alongside the advantages of TAM, I also discussed the limitations of the method. I stressed that these limitations are especially pronounced for young learners because of their immaturity. However, I argued that when TAM research is theoretically grounded and when the researcher uses suitable materials, tasks, and research procedures, it could be an effective method of probing the invisible and inaudible thoughts in the learner's mind. Additionally, I suggested that triangulation of data collection methods improves the reliability and validity of TAM studies.

The results of my pilot study indicate that together with the use of suitable reading materials, a sound training program for the learners and proper elicitation techniques, TAM would be a suitable research method for my study. My discussion acknowledges that there are strong ethical concerns surrounding the think-aloud method when working with young learners. Although not many serious ethical issues have arisen in my pilot study, I will take special care to ensure that the interest of the children are protected at all times in the main study. In the next chapter, I discuss my research questions and describe the data collection procedures of my main study.

Chapter 6

THE MAIN STUDY

INTRODUCTION

In this chapter I discuss my research questions and describe my data-collection procedures. In my discussion of Schema Theory in sub-section 3.1.3, I explained that the idea of a learner's schema, which includes all his cultural, linguistic and strategic knowledge sources, is useful for explaining the interaction between reading comprehension and learners' background knowledge. In sub-section 3.1.3, I argued that good readers can generally recall schematic information to predict upcoming information well enough for them to read identical words presented in different contexts at different speeds for different purposes (Brown, 1992).

My study aims to answer three research questions. The first two questions focus on the role of my learners' strategic and non-strategic knowledge sources for understanding stories. My third research question deals with the role of deep vocabulary knowledge and strategy application for effective vocabulary decoding and contextual inferencing. Since the effectiveness of my study depends on the suitability of my research method and research procedures, my last research question deals with the reliability of my research procedures.

6.1 THE RESEARCH QUESTIONS AND INSTRUMENTS

I now summarise my research instruments in Table 12 below.

Table 12 – Summary of Research Instruments, Main Study

Research Question	Data	Data Collection Method	Analysis Method
RQ 1. What types of non-strategic knowledge do my learners retrieve during reading?	Verbal reports of learners (TAP data) (Introspective and Retrospective)	TAM Interviews (audio recording)	Qualitative
RQ 2. What mental strategies do my learners use for (a) decoding unfamiliar vocabulary, and (b) inferring contextual meaning during reading?	Researcher's observations and notes

Other verbal data (Retrospective) | Researcher notes down observations during TAM sessions | Qualitative

Qualitative |
| **RQ 3. What is the relationship between strategy application, depth of vocabulary knowledge and success in lexical inferencing and contextual guessing?** | Written data (Retrospective) | | Quantitative and Qualitative |
| **RQ 4. To what extend is TAM an effective method for studying the knowledge source retrievals of my learners?** | Researcher's verbalisations in TAP transcripts | - | Qualitative (RQ 4 is answered by analysing the processes involved in answering RQ 1, RQ 2 and RQ 3) |

Table 12 shows that in order to answer my three research questions, I needed to collect both introspective and retrospective data from the learners. The main data for my study is the verbal think-aloud data. Additionally, I referred to my own notes taken during the TAM sessions and data from discussions with my colleagues. In the last column of Table 12, we see that I used both qualitative and quantitative methods to analyse the different types of data in my study

6.2   PRE-DATA COLLECTION PROCEDURES

6.2.1   Learner Selection and Data Collection

I began selecting learners for my study at the beginning of February 2013. Since the results of my pilot study did not show significant advantages or

disadvantages in sampling from different year groups, I used a strategic and practical sampling approach (Mason, 2002: 121) rather than a census approach. As the timetables and class test schedules of the Year 4 classes in the months of February and March were much lighter than the other year groups, I decided to select learners only from that year group. 24 learners were selected with the procedures I used in my pilot study. These learners were between 9 and 10 years old. They are all German-speaking learners though for many, German is not necessarily their L1 because they come from mixed backgrounds. The range of language proficiencies is wide. While there are some native speakers of English at our school, for some learners English is either learnt as a second, third, fourth language or completely new language. The learners are placed into learning groups based loosely on their existing language proficiencies. The table below describes the profile of the learners who participated in my study.

Table 13 – Learning Profiles of the Learners in the Study

Learner Group	Languages spoken	English Language learning background	Hours of instruction received presently	Language proficiency levels
Year 4 Beginners (English learnt as an additional and new language)	German, Chinese, French, Spanish, Russian, Croatian, Brazilian	0 to 6 months of prior language learning	3 to 5	Basic to no receptive knowledge of simple vocabulary and language of instruction
Year 4 Intermediate (English learnt as a foreign language)	German, Chinese, French, Spanish, Russian, Croatian, Brazilian, English	2 to 4 years of prior language learning	3 to 5	Ability to follow and produce English speech at normal speed in the classroom
Year 4 Advanced (English learnt as a second or native Language)	German, English, Chinese, French, Spanish, Russian, Croatian, Brazilian	6 to 10 years of prior language immersion or growing up with English as L1	3 to 5	Fluent to native like production in and out of the classroom

Although educators make distinctions between the teaching of English as Foreign Language, Second Language or First Language, the theoretical and pedagogical differences they discuss are not important to my study. I have used these terms in the first column of the table to shed light on how much prior knowledge of the English language each group of learners seems to have and the communicative role English plays in their day-to-day lives. From the vantage point of the learner, English would be a new language for a 9 or 10-year-old beginner with less than 6 months of formal language instruction. This learner would be learning the language for the first time in the classroom, in addition to the other languages he/she already knows or has been learning. In contrast, intermediate learners and advanced learners come with prior knowledge of English. The main difference between the intermediate and advanced learners is that while the intermediate learners may have prior knowledge and sometimes a good grasp of English, it is not usually their language for communicating outside the classroom, as is the case with the advanced learners. For intermediate learners, English is a foreign language because it is not associated with their immediate social environment, and they tend to learn it as a school subject. The advanced learners on the other hand, have grown up within an English-speaking environment. For them, English is their language of communication outside the classroom. For learners whose parents are native speakers of English, English is usually their main language of communication at home and at school they continue to learn it as a native language alongside German. For the advanced learners who come from English-speaking families but whose parents are not necessarily native speakers, English is a second language for them because it is only spoken in specific contexts or for specific reasons.

To select learners, I asked my colleagues in the English Department to ask for volunteers from their classes. Out of the list of volunteers they gave me, I drew 24 names. Next, I met with the volunteers and explained that they would be helping me with a personal project to find out more about children's reading habits. I informed them that this project had nothing to do with the school and that their participation will not be assessed or influence their school results. I explained that they would be required to meet with me during one lunch break

to read a story aloud and talk to me about what they are thinking as they are reading. I also told them that I would record the whole session. They all reaffirmed their interest in participating and confirmed that they understood the purpose and nature of the procedures. At the end of the meeting, I gave them the information letter and consent form, found in Appendix 1, to take home to their parents.

All 24 consent forms were returned to me within two weeks and I was able to start a three-week data collection schedule at the end of February 2013. However, due to illnesses and absence from school, there were 6 withdrawals and I was only able to obtain data from 18 learners collected over a three-week period. Although Ericsson and Simon (1993) and Olson et al. (1984) discuss the importance of thorough training before asking learners to verbalise, and Rankin (1988) suggested two rounds of training, I did not think that my learners required several dry runs before the actual think-aloud task. In fact, my pilot study showed that my learners were able to learn the thinking aloud process rapidly, I was certain that the learners in my main study would be able to internalise the thinking aloud process within the first 8 minutes of the session, which would leave me with 12 minutes to elicit the think-aloud protocols.

6.2.2   Selection of Reading Texts

In response to the positive outcomes of my pilot study, I selected reading texts from the Oxford Reading Tree graded reading series (ORT) for my main study. There were several advantages to this. Firstly, the English teachers had already placed the learners into their suitable reading stages in the series, which saved me time for diagnosing the reading level of every individual learner. Although the ORT series is intended for native speakers, the writers have not suggested any counter indications for their use with L2 learners. The teachers in the Primary English Department have used the series as their core reading instructional resource for 8 years, and have not given any negative feedback regarding their use.

Secondly, the stories in the ORT graded reading series contain recycled familiar high frequency words, syntactic structures and narrative structures These provided the learners with useful text-related scaffolding for schematic knowledge retrieval during reading. As I discussed in sub-section 3.2.3, some familiar information is necessary for freeing up space in their short-term memory for suitable cognitive processes to be activated during the task phase. Nevertheless, the complexity of the vocabulary and syntactic structures in the stories build up in difficulty, making it rather simple to identify non-threshold texts for the learners. Therefore, the ORT books provided a good balance of familiar and unfamiliar information in the text, which is necessary for activating non-automated, cognitively driven verbalisations from the learners.

I selected reading texts for the think-aloud sessions according to the learners' reading records and consulting with their English teachers. In my discussions with the English teachers, they reported that their learners tended to take an average of 5 to 8 weeks to acquire the threshold vocabulary and new structures in each reading stage. With reference to Laufer's (1991) Vocabulary Threshold Hypothesis, which states that a word has to be at or just beyond the learner's threshold of difficulty for it to be learnt, if a learner had stayed 5 weeks or longer on a particular stage, the use of that stage for a think-aloud session may not have triggered many cognitive processes and mental strategies during reading (discussed in sub-section 2.3.4.5). Therefore, if a learner's reading records showed that he had been on a particular stage longer than 5 weeks, I used a text from the next higher stage for the think-aloud session.

The above procedure suggests an additive learning paradigm, which does not reflect the complexities of young learner L2 vocabulary acquisition and literacy learning that I discussed in Chapter 4. My study acknowledges that L2 is not a straightforward linear process as this model suggests. Nevertheless, I chose this method for two pragmatic reasons. Firstly, it is the same method that the English teachers use to select reading materials for their learners. This method has been tried and tested over the last 9 years, and its reliability as a suitable material selection method for the learners has been verified. The advantage of using this

method to select reading texts for data collection is that I did not need to develop reliable test materials to assess the learners' proficiency levels. Researchers tend to debate over the reliability of such language proficiency tests. Secondly, I have neither found suggestions for alternative ways of selecting reading texts in the TAM literature I have reviewed, nor have I come across theories that contradict the method I have chosen.

After thorough consultations with my colleagues, 9 learners were placed on Stage 16, 6 were placed on Stage 13 and 9 were placed on Stage 11. Of the 18 learners who showed up for the actual think-aloud sessions, 8 learners were Stage 16 readers, 4 were Stage 13 readers and 6 were Stage 11 readers. The titles I chose for the TAPs were:

Stage 16 – One Girl School by Jon Blake

Stage 13 – The Personality Potion by Alan MacDonald

Stage 11 – Bertie Wiggins' Amazing Ears by David Cox and Erica James

Extracts from these books are appended at the end of this thesis as Appendix 3, Appendix 4 and Appendix 5.

6.3   DATA COLLECTION

6.3.1   Using English for Data Collection

A concern of the examiners at my upgrade viva was whether or not my young learners would be able to verbalise in a foreign language. There are several reasons to justify data collection in English. Firstly, all the learners in my study are accustomed to listening to, hearing, speaking, reading and writing in English. Since all their teachers are native speakers of English and the learners interact with them comfortably in English on a daily basis, it would not be out of the ordinary for them to use English during the think-aloud sessions. Secondly, the adult L2 studies I reviewed did not report problems related to the use of English for data collection. Even in Sainsbury's (2003) study (quoted in Sub-section 5.3.1), which stipulates reading fluency as a pre-condition for using TAM with

young learners, no counter-indications for the use of a foreign language as a medium for data collection were reported.

6.3.2   *Procedures for Training the Learners and Recording*

For my main study, I used a hybrid data collection method which combined the training procedures and the task phase in one single TAM session. At the beginning of the session, I placed a storybook on the table and explained that I was interested in hearing my learners' thoughts about anything and everything that they saw or read in the book, including their thoughts about the book. During the first few minutes of the TAM session, I familiarised the learners with the act of thinking-aloud by modeling the process. Roehler and Duffy (1984) refer to this method as the 'Direct Explanation Approach' (discussed in sub-section 5.2.6). During this explanation phase, I produced a short monologue to demonstrate the think-aloud process. My verbalisations contained Collins and Smiths' (1982) examples of introspective and retrospective strategies such as predicting, visualizing, making analogies, expressing confusion and fix-up strategies.

To reduce the risk of reactivity (discussed in Sub-section 5.2.5), I stated clearly that my verbalisations represented only a few personal examples of the many other things they can pause to think about and talk about whilst reading. I believe that the risk of mimicking the list of strategies I modeled was relatively low for several reasons. Firstly, the time spent on direct explanation was too short for them to memorise a set of strategies. Secondly, if a particular strategy was not a member of the learner's schema before the explanation phase, the learner would not have been likely to regurgitate it as his own following that brief exposure. Therefore it is safe for me to assume that the direct explanation method was not associated with significant reactivity issues in my training procedures.

After the explanation phase, I warmed my learners up to the verbalisation process by using Meichenbaum's (1998) 5-step Training Approach to talk about the cover page of the book and inviting them to join in with their verbalisations. During the reading phase, I followed Cameron's (2003) Goal-Directed Interactive Think-Aloud Method to collaborate with the learners (discussed in sub-section 5.2.6), all the while encouraging and allowing them to verbalise their thoughts. At first, I joined in the think-aloud tasks actively with them. Then I gradually channeled the tasks towards the learners by switching my cues to silent body language. Finally, I let my learners take over with their own self-instructions and questions. Whenever necessary, I provided scaffolding by using Bowles and Leow's (2005) 'metalinguistic think-aloud' method to draw my learners' attention to specific words and meanings in the stories that I wanted them to think about and verbalise independently (discussed in sub-section 5.3.3 and 5.4.6).

The main aim of collaboration was to help the learners attain as much learner autonomy and independent much verbalisation as possible. This was achieved by shifting the emphasis gradually away from researcher-driven interactions to learner-driven verbalisations. At times, it was necessary to stop the learners halfway through long stretches of continuous reading aloud, and ask them to pause and reflect about what they were reading and to remind them to verbalise all the thoughts in their minds. Whilst concentrating on decoding and inferencing tasks, the learners may have been inclined to verbalise only the cognitive strategies they believed were relevant to the task rather than all the thoughts that were present.

In sub-section 5.2.4, I discussed the point that TAM is especially sensitive to the instructions and cues which the researcher uses to probe the learners' thoughts and elicit verbalisations during the think-aloud sessions. Meichenbaum (1985) states that the researcher's cues and elicitations should emphasise learners' "generalizable cognitive representations" (p. 410) rather than encouraging them to imitate adult behaviour. Following the lessons learnt from my pilot study, I kept my instructions for eliciting verbalisations in the main study as

straightforward and clear as possible. I tried to ask as many open-ended questions as possible, such as "Can you explain why?" or "How do you know that?" rather than closed question. Whenever possible, I reduced my own verbalisations and reverted to silent cues such as nods and hand movements to remind my learners to keep talking. Nevertheless, with the young learners in my study, it was unrealistic to conduct the TAM sessions without any intervention, and I would argue that some intervention or scaffolding was helpful rather than harmful.

6.3.3   Data Transcription

I collected a total of 5 hours, 47 minutes and 3 seconds worth of verbal protocols from 18 learners over 18 recording sessions. All the 18 TAP recordings were transcribed into written protocol form for coding and analysis. Two full transcripts are appended at the end of this thesis. The following symbols were used in the transcription.

L	refers to the learner's verbalisations
R	refers to my verbalisations
…	short pause, generally less than one second in untimed silence
……	long pause, approximately one second or longer in untimed silence
/	denotes an overlapping turn or change of turn without pause
( )	words within parenthesis indicate background utterances
[ ]	words within square brackets refer to action protocols in the data or my observations and supplementary notes

Example 6.1 below is an extract from a transcript, showing how I have used the symbols in my transcription.

Example 6.1

L: This book is going to be about… a girl called Bernie and she is… she is the first pupil to arrive… erm I know this because I read the blurb of the book… can also guess that be that/

R: loudly [learner's name]

L: I can also goose that/

R: guess/

L: guess that because erm… it's I can see the contents page of the book/

R: mhm/

L: yes/

R: keep talking

L: I can see the contents page and the… the [points to book]

R: cover page/

L: yeah the cover page… before reading I can get information about the story from the blurb and from the contents page and sometimes also from the front cover of the book

R: How do you know this is going to be too easy, too difficult or just right for you

L: I think it's right for me because… I can see the stage and the writing is big enough

R: OK… erm… can you just read chapter 1 really quietly to yourself ok

L: Yes…… what if I don't know a word

R: That's fine, you can ask

L: OK [assumes silent reading] What's a banner

R: A banner Where do you see it [learner points to word] A banner. If you read on, what does it say/

L: Marnover School must not close down/

R: So where do you think you're going to see such a thing

L: It's maybe a piece of paper, ya/

R: Uh-huh/

L: Ya where it says Marnover School must not close

R: OK, mhm, yup…… OK I want you to turn to Chapter 2 and I want you to start reading really loudly and clearly Can you do that for me

L: Yes. The petition. So that's how I got my first unpaid job in Manner-Marnover Village Mum said it was an excellent chance to meet all interesting local people and if I was lucky enough they might give me some local cheese or home-made roo…bad and ginger jam I soolked for a few days and then I had an idea What if I I kind of you know… what if I kind of you know but people… put people of

signing the petition then with any luck and the school would close and I'd go to the nice big modern place in Bigtown afterall Well it was worth a shoot I... shot A shot I started at Old Appletree Cottage with... which had a that... hat...... hatched... what does that mean

In Example 6.1, I demonstrate how I transcribed the audio data into verbatim protocols. Whilst transcribing the verbal data, I had to bear in mind that "the transcription itself is an interpretive process" (Kvale, 1996: 160) and that "analysis of the transcribed interviews is a continuation of the conversation which started in the interview situation" (Kvale, 1996: 280). Therefore my transcriptions included pauses, repetitions, overlapping turns, mispronounced words and structural irregularities as well as my own verbalisations. Following Someren et al.'s (1994: 46) guidelines for transcribing verbal protocols, I did not punctuate the transcriptions, in order not to give my own interpretations to my learners' verbalisations. I began each perceived new turn on a new line. This example also shows how I integrated my field notes and observations into the written protocols. This is consistent with the format recommended by Miles and Huberman (1994) who argue that interpretive marginal notes should be made alongside the protocol transcriptions for later comparative analysis. No interpretations of the data were made during the transcription process, and no attempts were made to classify or describe the data.

All my transcribed protocols were organized into segments that are sometimes demarcated by punctuation marks. These segments consist of meaningful sense units that correspond to a comprehensible utterance that carries semantic content. (Someren et al., 1994; Payne, 1994; Keys, 2000; Young, 2005). At times, a word, phrase, clause, short utterance or sentence was segmented as a "grain-sized unit" (Someren et al., 1994: 122) such as the individual utterances in the segment beginning with L2 and L6. Grain-sized units are typically demarcated by question and answer sequences between the researcher and the learner in a series of quick and often overlapping turns shown in these units. Other times, longer utterances, or a string of utterances or sentences formed a coarse-grained unit (Someren et al., 1994: 126) such as in L4. In a course grain unit, the speaker

utters an uninterrupted series of thoughts that band together meaningfully for him or her. Sometimes, course-grained units tend to contain longer and more continuous verbalisations by one person at a time such as in L8.

The sense units in my transcripts were marked by pauses as suggested by research on understanding the boundaries of speech production (Ericsson and Simon, 1993). Several units or turns such as L1 and L2, may logically combine to form larger sense units called 'episodes' (Someren et al., 1994: 120). Episodes in the transcripts were separated from each other as I have shown in this example to make reading and re-reading less strenuous for the eye during data coding. Example 6.2 below shows an episode containing one long and continuous coarse-grained unit by the learner, which, if not separated from the previous or next episode, may be difficult to track during repeated close up re-readings.

Example 6.2

R: OK [learner's name] er [learner's name] I want you to tell me your opinion about this book

L: So I think this book is going to be about a girl that is the only one in the school...... I think I know it because the title of the book... because it says one girl school...... And under the title on the picture there is also in the classroom only a girl sitting there on a bench...... You can also guess that the girl who got get a lot of trouble because there's only one one student and when... the teacher ask something something that she didn't know she will... she maybe the teacher will get will get very cross onh er like that...... Before I start read the book I can get the information from the title picture... from the... title and also from the back at the text...... I think that... book must be... maybe right for me... because I'm just of reading stage 15 16 books...

A distinction between the short and long pauses during transcription was important because it assisted me in making more nuanced interpretations of the learners' cognitive processes for decoding and constructing meaning during reading. The length of the pauses after my own utterances suggest how much time was given to the learner to process the information given to them. Similarly,

overlapping turns or change of turns without pauses, which are represented as /
are important to include in the transcription because they have implications on
the mental processes of the learners during reading. Examples 6.3, 6.4 and 6.5
below show how pauses and overlapping turns are represented in my
transcriptions.

Example 6.3

R: Ok alright… erm let's take a look at er the story itself… The story is really
about a school what's it called

L: Save Marnover School

R: What's the what's the name of the school

L: Marnover School/

R: that's right and they're trying to save the school ok This girl Bernie…… She
wants to save Marnover School…… Alright/

L: yes

R: Why do you think they're going to need to save Marnover School

Example 6.4

L: ….Maybe the the… head teacher maybe… Not paying someone or like that/

R: mhm… hm ok alright so… and there are there is really a way of saving the
school… and we're going to look at how she's going to do it… Let's start reading.
Loud Jean-Felix when you're reading as you're reading when you have a
question… you need to pause and you need to think about these things/

L: can I read out loud/

R: you should read out loud yes thank you… Alright you should and if there's
something that you don't understand don't worry about it ok you need to tell
me/

L: mm/

R: ok/

L: mhm/

R: Alright……

L: The petition… erm what does petition mean

Example 6.5

R: Erm let's read on a little bit and see whether or not see whether or not we can

figure it out together ok/

L1: So that's how I got my first unpaid job in Marnover Village Mum said it was

an excellent chance to meet all the interesting local people And if I was lucky

they might give me some local cheese or home-made rhubard and ginger jam……

what does rhubarb and ginger jam means

R: What do you think/

L2: mm…… Maybe something to eat…..

R: How do you know that

L3: Erm the word jam tell tells me that may maybe something to eat

6.3.4   Validity and Reliability of the Transcription

Although the verbal protocols I collected represents real life data which adds to

the construct validity of my study (Nisbett and Wilson, 1977; Ericsson and

Simon, 1984; Robson, 1993), reactivity in the data was still a major concern for

me. Wilson (1994) argues that while TAM data taps into the content of the

learner's conscious thought, it cannot tap into mental processes that never reach

consciousness. This suggested that the conclusions I draw from the analysis of

the TAP data alone may not have had very high validity and reliability. Rankin

(1988) argues that "as an additional safeguard, it may be advisable to have

subjects do a retrospective analysis of the research passage after the thinking-

aloud session" (p. 125).

6.4   CHAPTER CONCLUSION

In this chapter, I discussed my research questions and data collection

procedures. When discussing my research questions, I referred to my arguments

in the literature review and related my research questions to the social cognitive

framework I had constructed for studying the relationship between learners'

strategic and non-strategic knowledge retrieval and reading comprehension. I

also described my data collection procedures and discussed my transcription

methods in the light of transcript examples. I highlighted the importance of separating my learners' verbalisations into grain-sized and coarse-grain units to facilitate easier coding and analysis. I also explained the importance of including researcher's observations and notes into the transcription and discussed the significance of marking the verbalisations in the protocols for pauses and overlapping turns. In the next chapter, I discuss my data coding and classification procedures.

Chapter 7

DATA CODING

INTRODUCTION

In this chapter, I describe the steps I took for coding and classifying my learners' verbal data in order to investigate and analyse the knowledge sources and mental processes associated with vocabulary decoding and contextual inferencing during reading (discussed in Chapter 3). My data coding and classification procedures were chosen in the light of the Global and Linguistic Approach (Coady, 1993; Hacker, 2004). Hacker argues that the schematic knowledge and mental processes of the learner are the building blocks of comprehension and vocabulary learning during reading and claims that any study aiming to understand reading comprehension and vocabulary learning should begin with a close study of these correlates. My classifications of my learners' knowledge sources are based on classifications from previous empirical research which I discussed in Chapters 3 and 4. At the end of this chapter, I discuss the challenges I faced during data coding.

7.1 General Inductive Approach

7.1.1 Open Coding

The first procedure I used for coding my data was open coding (Strauss and Corbin, 1998). Open coding involves the careful reading of the transcribed data to identify general but recurring patterns. This is a general inductive procedure that is associated with the qualitative approaches in grounded theory (Strauss and Corbin, 1998), discourse analysis (Potter and Wetherell, 1994) and narrative analysis (Lieblich et al., 1998); and involves many rounds of repeated reading and re-reading of the transcripts. I began by scrutinising the transcripts, first line-by-line, then paragraph-by-paragraph, in order to identify verbalisations that could be associated with knowledge source retrieval and strategy activation.

Through this process, I identified three types of knowledge sources in the data. They are Linguistic Knowledge, External Knowledge and Strategic Knowledge. These knowledge sources became the three main categories for classifying the learners' verbalisations.

These main categories developed through open coding, however, were too broad to take into account the nuances in the learners' verbalisations. Miles and Huberman (1994) claim that breaking down previously coded data into more specific components is an important step in data analysis. They argue that the broadly coded data has to undergo more selective coding, or in fact reduction, so that more insightful conclusions can later be drawn. In order to capture the details and nuances in the TAP data, the coded data had to be re-coded.

7.1.2 Selective Coding

My second round of data coding aimed to be more insightful. Through many rounds of close re-reading of the raw data, I reduced some coarse-grain units in my transcripts into smaller grain-sized units (Someren et al., 1994) that could be interpreted to represent the retrieval of different types of linguistic knowledge, external knowledge and mental strategies found in my data (discussed in section 6.3.3). Table 13 below summarises the subcategories after selective coding.

Table 14 - Categories of Knowledge Sources in the Main Study Data

Linguistic Knowledge	External Knowledge	Strategic Knowledge
Syntactic knowledge Lexical knowledge L1 knowledge	Discourse knowledge Genre knowledge World knowledge	Identifying Inferencing Signaling Understanding Judging Asking for Help Evaluating Monitoring Elaborating

In Table 13, we see that selective coding resulted in the formation of 14 subordinate categories to describe the main categories in greater detail. The learners' verbalisations, which I had broadly coded as 'linguistic knowledge' could be more specifically categorized under syntactic knowledge, semantic

knowledge and L1 knowledge retrievals in the data. The utterances that I had previously coded as 'external knowledge' could be more narrowly coded to reflect my learners' discourse knowledge, genre knowledge and world knowledge retrievals. Finally, the verbal data that I had broadly coded as 'strategic knowledge' could be re-coded to reflect eight individual mental strategies.

The advantage of developing these subordinate categories is that they took the complexities in my learners' actual verbalisations into account (Thomas, 2006: 239), which was a more detailed and accurate method of coding the data. The procedure I used to identify the subordinate categories in the transcripts is known as In Vivo Coding (Glaser and Strauss, 1976).

7.1.3   In Vivo Coding

Glaser and Strauss define In Vivo coding as a process by which the researchers identifies key words in the data that provide meaningful descriptions of the main categories. This procedure was very useful for developing the sub-categories in my study. I carried out In Vivo coding by scrutinizing the grain-sized units in my transcripts for recurring words and expressions. I matched these frequently uttered words and phrases with similar words and phrases found in the coarse-grained units and formed key words that matched the main categories in a meaningful way. For instance, key words and phrases such as 'a verb', 'adjective', 'sounds like' and 'it means' in the transcripts could signal the presence of linguistic knowledge, and may be meaningfully interpreted as the learners' attempts to retrieve syntactic knowledge. Other frequently occurring phrases such as 'in front of', 'before this sentence', 'the front cover', 'in the pictures' or 'in the blurb' may be interpreted as external knowledge retrievals and associated with the learners' attempts to retrieve discourse knowledge, genre knowledge or world knowledge. Verbalisations in the transcripts that tend to begin with 'maybe', 'I think' or 'I can guess that' could suggest that the learner was attempting to apply mental strategies such as inferencing or judging to process the reading text.

During In Vivo coding, I noticed that more verbalisations in the data could be coded for strategic knowledge retrieval than linguistic and external knowledge retrieval. This suggested to me that strategic knowledge retrieval was an important category, and motivated me to re-evaluate my coding of strategic knowledge. I carried out another round of close-up re-reading of the verbalisations that were already sub-coded for types of strategic knowledge and applied more selective coding procedures. This second round of coding allowed me to develop sub-categories of individual mental strategies that further described each of the eight types of strategic knowledge already found in my dataset. These individual strategies are listed in Table 15 below.

Table 15 - List of Mental Strategies in the Main Study Data

Type of Strategic Knowledge	Mental Strategies
Identifying	Using Analogy
	Analysing
	Parsing
	Summarising
Inferencing	Referring to title of the book
	Referring to blurb
	Referring to pictures
Signaling Understanding	Paraphrasing
	Reporting
Judging	Assessing text for effectiveness, importance, appropriateness or difficulty
Asking for Help	Asking another person
	Using the dictionary
Evaluating	Verifying information
	Self-inquiring
Monitoring	Self-correcting
	Repeating
	Showing awareness
	Pausing
Elaborating	Explaining
	Giving examples

All my data coding procedures were carried out manually, without the use of statistical software. To verify my procedures, I conducted thorough co-rating checks, which I describe in sub-section 7.1.5.

7.1.4   Multiple Coding

Close-up scrutiny of the raw data and In Vivo coding highlighted a pattern that did not show up during open coding. Whilst carefully reading and rereading the transcripts, I noticed that in most single attempts to decode and infer meaning found in the data, the learners retrieved several different types of knowledge sources and mental strategies simultaneously. Therefore, many grain-sized or coarse-grained units were coded multiple times for the retrieval of different types of knowledge sources. Example 7.1 below, where L refers to the learner and what follows after : is a verbatim transcription of the TAP, shows a learner using one type of knowledge more than once to process the same segment of incoming information as he reads. The words that are typed in italics represent the words in the text that the learner was reading out loud, and is used in the following examples for analysis purposes only. They do not appear in italics in the transcripts.

Example 7.1:

L: *vicar spraying crumbs all over me for some...* The vicar… haven't understand something and… as… said maybe said something was bread in his mouth so... the crumbs are flow fl out of his mouth

We may infer that the learner was processing on the meaning of the phrase containing the words 'spraying crumbs all over me'. Firstly, the grain-sized unit 'flow fl out of his mouth' signaled the learner's attempt to explain the semantic meaning of the word 'spraying'. Therefore it was coded for one count of linguistic knowledge retrieval, specifically lexical knowledge. Secondly, the reference to 'bread' suggests that the learner had decoded the associative meaning of the word 'crumbs', which also suggests lexical knowledge retrieval. Therefore this grain-sized unit was also coded for a second count of linguistic knowledge retrieval. Finally, the learner seemed to be processing the contextual meaning of the whole phrase 'vicar spraying crumbs all over me'. His/Her explanation that the vicar 'haven't understand something' suggests that an

inferencing strategy was applied. As a result, I coded this grain-sized unit for one application of inferencing strategy as well.

Many grain-sized units in my dataset were coded multiple times either for multiple retrievals of the same type of knowledge source or simultaneous retrievals of different types of knowledge sources.

7.1.5   Reliability of the Transcription and Coding Procedures

To verify the viability of my transcription conventions and the reliability of codes and categories, I carried out co-rater checks. I approached a colleague who is a primary English teacher in my department and asked him to be my co-rater. With his 12 years of experience as an EFL teacher of young learners, I believed he would be a suitable co-rater. Additionally, he had been teaching at the German School for 10 years and is an active user of the ORT reading materials.

Co-rating took place over 3 sessions. In the first session, I presented my co-rater with a sample of my transcripts and a set of the transcription conventions I had used in the transcription. His tasks were to check the accuracy of my transcriptions and the suitability of the transcription conventions I had used. My co-rater spent 1 hour listening and re-listening to segments of the audio recording to check the accuracy of my transcripts. We discussed the accuracy of my transcriptions and agreed on a set of symbols and transcription conventions (in Appendix 7) which I subsequently applied to all my 18 TAP transcriptions.

In the second session, which lasted approximately 1 hour, I familiarised my co-rater with the concept of knowledge sources and mental strategies by referring him to Nassaji's (2003) taxonomy (discussed in sub-section 3.3.4). To ensure that he understood the descriptions that Nassaji provided, we studied the taxonomy together. Next, I asked my co-rater to identify 12 audio segments of his picking from the TAPs for closer analysis. Following the suggestions of Someren et al. (1994: 128), I cut up the protocol segments and removed as much surrounding context as possible to reduce the coarse-grain units to individual

grain-sized units. Someren argues that removing surrounding text minimises bias and increases objectivity of the co-rating procedure. This procedure produced 60 grain-sized units for co-rater checking. I then shuffled the 60 cut-up segments of transcript text and presented them to my co-rater for independent coding.

In the third 1.5-hour session, my co-rater and I discussed the results of our individual coding. Out of the 60 protocol segments, I coded 36 grain-sized units for strategic knowledge, 12 units for external knowledge and 12 units for linguistic knowledge. My co-rater coded the same protocol segments for 12 identical codes corresponding to external knowledge (100% agreement), 11 identical codes corresponding to linguistic knowledge (91% agreement) and 29 identical codes corresponding to strategic knowledge (81% agreement). The average rate of agreement was 87%. Since the outcomes of co-rating showed that the highest rate of disagreement was for strategic knowledge, I rechecked my codes for these categories in all the 18 transcripts. I identified several protocol units for re-evaluation and presented them to my co-rater for further discussion and analysis. In the few instances when our codes disagreed, we referred back to Nassaji's definitions and had a closer look at previously coded data. When necessary, I made adjustments to my original codes in the light of our joint analysis and interpretations.

The coding system that I developed for my study is justifiable according to Thomas (2006), who suggests that the target number of categories and sub-categories should be between 3 and 8. Thomas claims that a range of up to 8 categories and sub-categories is beneficial for two reasons. Firstly, it ensures the data has been well described and represented. Secondly, it tends to keep the data analysis procedures and discussion focused on the main concepts and evaluation objectives of the study. The next phase of the general inductive approach after transcription and coding is to provide detailed definitions of the categories and sub-categories. To ensure that my definitions were viable, I studied the definitions and taxonomies in Nassaji's (2003; 2006), Dubin and Olshtain's (1993) and Meyers et al.'s (1990) studies which I discussed in Chapters 3 and 4.

7.2   Description of Knowledge Source Categories in the Study

For each category and sub-category in my classification schemes, I provide a short definition and quote transcript examples to illustrate the meaning behind the definition. When examples from the transcripts are used, the words typed in italics are the parts of the story which the learners were reading aloud.

I begin with a classification of Linguistic Knowledge in my data.

7.2.1   Categories of Linguistic Knowledge

Linguistic Knowledge comprises the sub-categories of Syntactic, Morphological, Semantic and L1 Knowledge. The sub-categories of linguistic knowledge in my data and their definitions are summarized in Table 15 below.

Table 16 – Categories of Linguistic Knowledge in the Main Study Data

Knowledge Source	Type of Knowledge	Sub-Categories
Linguistic Knowledge	Syntactic Knowledge	- Knowledge of Word Class - Knowledge of Functional Categories
	Lexical Knowledge	- Phonetic Knowledge - Orthographic Knowledge - Semantic Knowledge
	L1 Knowledge	Syntactic and Lexical Knowledge

I now discuss each type of linguistic knowledge in my data with reference to some transcript examples.

7.2.1.1 Syntactic Knowledge

Syntactic knowledge refers to the learner's knowledge of the role of words within sentences. There are three sub-categories of syntactic knowledge found in my data. They are knowledge of word class and knowledge of functional categories.

Knowledge of Word Class

My definition of word class knowledge is similar to Nassaji's (2003) definition. Word class knowledge refers to the learner's knowledge of parts of speech. I provide 2 examples from the transcripts to illustrate word class knowledge. I have used the same transcription conventions provided in sub-section 6.3.3 on page 168.

Example 7.2:

L: *Mr Fuggles the vicar invited me for tea and scones. I wasn't* too *keen on* what is keen what is keen....

R: I wasn't too keen on Marnover School.... At /

L: at first ok I wasn't too.... What kind of a word could this be/

R: maybe I want to wish I do/

L: yeah I wasn't too....

R: what kind of word comes after too/

L: like like I don't like to...

R: bigger smaller smarter what kind of word comes after too/

L: big small/

R: so what kind of words are those

L: adjectives

R: that's right So So this must be what/

L: an adjective

R: yah

L: ok so what is keen

R: so keen means really really excited about something/

L: ok oh so is it an adjective.... I'm very excited about.... Marnover School/

L: mmm yes

Example 7.3:

L: *I started at Old Apple Applee Appletree Cottage which which had a that cheed roof*... that chade roof... yes because it describes the place... so its an

adjective…how the roof is… because there's also the word roof and then I know it's some kind of roof…

In Example 7.2, the learner seemed to be focusing on the word class of the unfamiliar word 'keen'. With some scaffolding from me, the learner attempted to use his knowledge of other adjectives (big, small) to decode the surface meaning of the word 'keen'. Example 7.3 is a shorter example showing another learner using word class knowledge to decode the phrase 'thatched roof'. The learner in Example 7.3 seemed to demonstrate more independence in applying this type of linguistic knowledge to decode unfamiliar word meanings than the learner in Example 7.2.

Knowledge of Functional Categories

My definition of knowledge of functional categories is similar to Nassaji's (2003) definition. It refers to the learner's ability to understand individual words in a text in terms of whether they function as part of a declarative sentence, question or exclamation. I provide three examples showing different learners reading the same part of the story and decoding the meaning of the word 'chime' with their knowledge of functional categories.

Example 7.4:

L: *Why should we go to Bigtown Monster Primary I said…. Yes why should you chimed…. The woman….* What does chimed mean

R: what do you think it means Look at the sentence

L: …. Maybe a quek a question that asks a questions/

R: mm what makes you say that

L: …. Because the .. two sentence both got a question make behind the sentence

Example 7.5:

L: erm… voice in a kind of voice… in asking voice like I think because erm there is also a fragezeichen…. Yah questions mark *yes why should you chimed the woman* and then I think it should be yah asking voice

Example 7.6:

L: *Yes why should you chimed the woman*…. Maybe it's asked…. Because why should you is a question…. Yes.. yes.. yes

In all three examples, the learners were attending to the unfamiliar word 'chime' by identifying its role in the sentence. All the learners referred to the question mark in that part of the text to help them guess the meaning of the new word. In Example 7.5, the learner used the German word 'fragezeichen' meaning 'question mark' to guess its meaning. All three learners concluded that 'chimed' functioned as some kind of a speech verb.

The next sub-category of linguistic knowledge is lexical knowledge.

7.2.1.2 Lexical Knowledge

I identified four types of lexical knowledge in my data. They are phonetic knowledge, orthographic knowledge and semantic knowledge. According to Nassaji (2003) and Dubin and Olshtain (1993), lexical knowledge is usually involved for decoding surface and deep meanings of individual words in a text.

Phonetic Knowledge

The examples below show two learners retrieving phonetic knowledge, which is commonly known as "sounding out words" to decode the unfamiliar words in terms of their sound components.

Example 7.7:
L: *He had a chocolate futge fug fudgree…*

Example 7.8:
L: *…you'd be as clever as Prince s s Cecil…*

Examples 7.7 and 7.8 show the learners using their knowledge of phonics to match up the sound-letter relationships in the unfamiliar words so that they could read out the sentence.

Orthographic Knowledge

Orthographic knowledge refers to the learner's attempts to analyse a word in terms of its derivations or inflections. There are two examples below that illustrate the different aspects of word form knowledge involved.

Example 7.9:

L: *Everyone in the class wrote*… it's in the past tense… oh maybe it's write in the past tense

Example 7.10:

L: *I sulk sulked for a few days*… erm it means it erm it it was in the past…the word it is in the past…it was was… it was erm the that she if the school would close that she could go to another school if sh if people if people… if she didn't ask people to sign the petition.

In the first two examples, the learner focused on the past tense inflection. In Example 7.9, the learner used knowledge of the irregular past tense form of 'write' to decode the word 'wrote'. In Example 7.10, the learner recognized the regular past tense inflection of the word 'sulk'.

Orthographic knowledge also refers to the learner's knowledge of spelling. In Example 7.11 below, the learner retrieved his/her knowledge of spelling to help him work the pronunciation of the word 'sign'.

Example 7.11:

L: *What if I kind of you know put people off singing…. signing signing the petition Then….* What is signing Singing Signing because you don't sing a petition g n g g singing singing erm in signing you don't have a g after the i….

Semantic Knowledge

Semantic knowledge refers to the learner's knowledge of the sense or meaning of a word. I provide five examples of learners retrieving semantic knowledge below, taken from my transcripts. In these examples, the learners seemed to be focusing on the deeper semantic meaning of the words for constructing the overall meaning of the sentences they were reading.

Example 7.12:

L: *Yes I was well-pleased with my work on the petition*… maybe she… maybe she… wanted to let the paper blank or something like that… mm… maybe… she didn't want to go to the school anymore

Example 7.13:

L: *What if I kind of you know put people off signing the peti petition petiti petition petition petition*…. Maybe something to do… you can sign it Erm that the school goes down Like close it Oh to sign a petition to close the school

Example 7.14:

L: *He's seen Wick Wicks pick on younger kids in the playground... he made them hand hand over their sweets or drinks*… pick on… yes, and hand over their sweets or drinks is.. like erm taking their sweets or yummy juice

Example 7.15:

L: What does rhubard and ginger jam means Erm the word jam tells me that may maybe something to eat

Although the actual meanings of the unfamiliar words or expressions in the above examples were not always accurately reconstructed, the learners' verbalisations suggest that they were attempting to use their partial knowledge of word senses to work out unfamiliar word meanings in the text.

7.2.1.3 L1 knowledge

According to Nassaji (2003), L1 knowledge is involved when learners attempt to finding a similar word in their L1 to decode an unfamiliar L2 word, or when they translate the L2 word into L1 to describe its meaning (discussed in section 7.2.1). In the three examples below, my learners searched for equivalent L1 words to replace unfamiliar L2 words they encountered in the text.

Example 7.16:
L: *Bertie was no good at sums*… summen (German word for verb 'to hum')… die summe (German word for the noun 'the sum of' in maths)… I think it's OK when I only know that it's something with maths

Example 7.17:
L: *There's a seat here Specs*… mm… I don't know that word…like er… from a pig the speck (German word for 'piglet' being the young of a pig) I think

Example 7.18:
L: What is <u>sums</u>… Matheaufgaben… because there are matheaufgaben on his paper… *<u>no matter how hard he tried</u>, he couldn't remember past his three times table*… his three sums… that he tried to work out but he couldn't

Examples 7.16, 7.17 and 7.18 illustrate Dubin and Olshtain's (1994) argument that L1 knowledge is often triggered off by phonetic or orthographical similarities between the unfamiliar L2 word and a familiar L1 word in the learner's schema. Dubin and Olshtain suggest that the similarities serve as "graphemic signals" (p. 182) that encourage the learner to access the appropriate schematic information in his/her L1. As Nassaji's and Dubin and Olshtain's show, learners' retrieval of L1 knowledge during reading do not always result in successful outcomes for decoding vocabulary meaning and inferring contextual meaning, as Examples 7.16 and 7.17 illustrate.

Some of the examples of linguistic knowledge I have provided in this sub-section show that linguistic knowledge may not be the only type of non-strategic knowledge the learner uses in a move to decode meaning. Often, other types of non-strategic knowledge sources are simultaneously used to support comprehension, as I explained in sub-section 7.1.4. As I have used these examples to highlight individual types of knowledge sources in my dataset, I have only dealt with the relevant knowledge sources in these examples and not all the potential knowledge sources that they may be coded for.

I now move on to define the types of external knowledge found in my data.

7.2.2   Categories of External Knowledge

The sub-categories of external knowledge in my data are summarized in Table 16 below.

Table 17 – Categories of External Knowledge in the Main Study Data

Knowledge Source	Type of Knowledge	Sub-Categories
External Knowledge	Discourse Knowledge	- Knowledge of beginning, middle and end of written texts - Knowledge of role of pictures
	Genre Knowledge	- Knowledge of internal structure of stories, including problem-solution in stories - knowledge of happy endings in children's stories
	World Knowledge	- General knowledge of the world

My definitions of External Knowledge are based on Nassaji's (2003) and Dubin and Olshtain's (1993) definitions. External knowledge refers to Discourse Knowledge, Genre Knowledge and World Knowledge.

7.2.2.1 Discourse Knowledge

Discourse knowledge refers to the learner's knowledge of the narrative genre. A learner with discourse knowledge knows how different parts of a text connect with each other to form the bigger picture. Usually, the learner tends to refer to the beginning, middle and end of the text to construct the meaning of various parts of the story or even the gist of the whole story. Example 7.19 below show two learners using discourse knowledge to understand parts of the stories they were reading.

Example 7.19:

L: *I called on a nice old couple in a chalet bungalow*…. Erm…. a bungalow.. like a street or…. [learner scans for information in previous paragraphs by finger tracking] so the first she visited is a old lady a woman…. in a cottage…. a small huette…. um a vicar…. vicarage…. (still scanning) it's an old couple… a kind of um… in a chalet bungalow erm… wohnwagen… yeah a place… like a car you can like… live… you know that is where they live… it's not about the story

In this example, we notice the learner attempting to construct an overall picture of the village which was the setting of the story. He/She searched for information from previous paragraphs of the story to work out the meaning of the word 'bungalow'. He/She referred to words in previous paragraphs such as 'cottage' and 'chalet' and suggested that the meaning of the word 'bungalow' was not important for understanding the story.

7.2.2.2 Genre Knowledge

Genre knowledge is the knowledge of the internal structure of stories such schematic knowledge of common problem and solution structures, happy endings or how characters develop in children's stories. While discourse knowledge involves referencing to previous parts of the text, genre knowledge is not associated with how different paragraphs or parts of a book connect meaningfully with each other. It involves the learners' knowledge of the

narrative genre, and more specifically children's stories, which may be narrated differently from adult fiction. The following examples show how several utterances by different learners indicate use of genre knowledge to understand the story.

Example 7.20:
L: There's one girl she's alone in the whole school and [flips book to look at the picture on the cover page] erm she's the only student yeah she's the only student in the whole school and there are no teachers or… she was the only kid who signed the petition… because nobody wanted to sign… maybe she said something wrong… because she's one girl school… she's the only one in the whole school erm… yeah nobody signed

In this example, the learner was reading a story entitled 'One Girl School', where a girl went round her town trying to obtain as many signatures as possible for a petition to save her school, which was about to be closed down. Not only did the learner use sentences from previous pages such as "because nobody wanted to sign" and "maybe she said something wrong" to work out the events in this particular part of the story, he/she used her knowledge of the role which titles and pictures play in narrative genres to predict future events of the story.

Example 7.21 below shows a learner using his/her knowledge of children's narrative genre to predict the ending of the story.

Example 7.21:
L: That erm he will get better in maths. Also that he don't have anymore so… something like that [points to ears]… good ending… this is this is a kids book and not er big books…and a kids story most times it is a good ending

Based on this learner's knowledge of happy endings in children's stories, he/she predicted that the main character would improve his mathematical skills. This was done after reading just two pages of the story.

Example 7.22 below is a longer extract illustrating other aspects of narrative genre knowledge in my data. In this example, the learner was reading a story entitled 'Personality Potion', which is about a boy who had a crush on a female classmate and attempted to influence this girl's emotions by concocting a personality potion that would make him more interesting to others. Whilst reading, the learner referred to his/her earlier observations of a picture on the page, showing a boy reading a book under his covers with a torch light and an unfortunately encounter with a bully on the school bus. The learner remarked that the story was likely to end in the main character's favour because children's stories tend to have happy endings.

Example 7.22:

L: He Danny is a person that doesn't like to erm go outside and play with other kids... He just likes more.. to read erm books or about erm that about.... Potions

R: ok.. what does his encounter with this Wicks boy on the school bus tell you about Danny/

L: It tell me that.. it tells me that Danny.... Is a bit scared at er from him and the... that Wicks boy erm...... So er... yah

R: is a bully/

L: yah

R: ok. How do you think the story ends

L: Erm I think.... The.. book the.. danny gets that girl he so liked and he.. erm.. he had erm.. made a personality potion

R: mm.. is that going ot be a happy ending/

L: yah/

R: why are you so sure/

L: Because well.... Erm.... I'm always sure that it's a happy ending Just when when the title picture isn't so happy its not so good and have a happy ending

The next example also contains reference to genre knowledge and showed the learner expected a problem before that part of the story was read. Example 7.23a is taken from the first 10 seconds of the transcript and Example 7.23b is taken from the last 30 seconds of the transcript.

Example 7.23a:

L: You can guess that the girl who got get a lot of trouble because there's only one student and when.. the teacher ask something something that she didn't know, she will.. she maybe the teacher will get will get very cross or er like that

In this example, we see that in addition to the knowledge of the happy endings in children's stories, this learner also used his/her knowledge of the typical problem-solution structure in narrative genres to work out the overall meaning of the story.

Example 7.23b:

L: maybe she…. Will want one or two signs like that… Maybe she didn't want to…. Maybe she didn't want to go to the new school that much… Maybe she liked the old school more… Maybe she like the best like that... exam results more… Maybe she didn't have…. Maybe she had…. Done the petition and the Marnover School was saved… Maybe happy…. Or nice

In the last half minute of the same transcript, the learner made an implicit reference to 'happy or nice' to describe the ending of the story.

7.3.2.3 World Knowledge

World knowledge is the last sub-category of External Knowledge in my study. It refers to the learner's knowledge of general knowledge and themes associated with the story. Similar to genre knowledge, world knowledge is extra-textual knowledge that the learner brings to the reading context in order to develop a better understanding of the story. I illustrate my definition of world knowledge with 3 examples below.

Example 7.24:

L: I think it's maybe erm… there's someone who is… going through houses and ask of people can sign something… maybe give money to make build it up to make to build the school if there was something broken at the school again

In example 7.24, the learner was reading a part of 'One Girl School' where the main character was trying to secure signatures for her petition. We see the learner attempting to use his/her general knowledge of fund raising activities to work out the events and sequences in the story. For example, the learner provided examples of what money that was raised from fund raising activities would usually be used for, suggesting that the learner was retrieving world knowledge that was contextually relevant to the story he/she was reading.

In Example 7.25 below, the learner was reading a part of 'Bertie Wiggins' Amazing Ears' where the main character's, Bertie's ears grew extraordinarily large for the first time in the story.

Example 7.25:

L: *They wiggled and wo waggled… as if they were waving at you*… that they not only wiggle they… [demonstrates wild flapping on own ears] like the broom… not a normal person… not the most people have ears that are flying away

In this example, we observe the learner referring to his/her general knowledge to explain that Bertie was experiencing something unusual. Firstly, the learner stopped to highlight the appearance of an amazing looking ear as important information to focus on during reading. Secondly, he/she used his/her understanding that a normal person does not usually have enormous flapping ears, to infer that the main character, Bertie was showing unusual signs.

In Example 7.26 below, taken from a reading of 'One Girl School', we see the learner attempting to guess the meaning of the unfamiliar word 'petition'.

Example 7.26:

L: *The petition*… erm what does petition mean... maybe a school… because a lot of school the some the people have to sign the school work the children have done…

This example shows the learner using his/her personal knowledge that children's schoolwork is often signed by their parents to guess the meaning of the word 'petition'. Although this move did not result in an accurate decoding of the word, it reflects the learner's use of world knowledge for decoding meaning.

In all the examples given to illustrate the sub-categories of External Knowledge, the learners attempted to understand the stories with their knowledge sources that were accumulated through their social cognitive experiences (discussed in Chapter 4, section 4.1). Therefore a learner's external knowledge is different from his linguistic knowledge which is associated with the learner's word knowledge components of the vocabulary in the text (discussed in Chapter 2, section 2.1).

In the next sub-section, I deal with the definitions of the different types of strategic knowledge in my data.

7.2.3   Categories of Strategic Knowledge

I consulted Nassaji's (2003; 2006) and Meyers et al.'s (1990) detailed taxonomies of the mental strategies to assist in the development of my own classifications and definitions. Meyers et al.'s work provided me with the most relevant references because their classifications and definitions were derived from TAP data collected from young learners. Nevertheless, my classifications and definitions derive from my TAP data and reflect the thinking of the learners in my study.

Since the use of strategic knowledge is an important topic in my study, I coded my data at a level of detail that is similar to the work of Nassaji and Meyers et al. In this section, I present a list of my learners' strategic knowledge in the form of taxonomies. I identified a total of 6 cognitive strategies and 9 sub-categories of cognitive strategies in my data. My classifications and definitions of cognitive and metacognitive strategies are presented in two separate taxonomies below. At the end of each taxonomy, I discuss some similarities and differences between

my own classifications and definitions and those in the previous studies I reviewed in section 7.2.

7.2.3.1 Taxonomy of Cognitive Strategies

The transcript examples in this taxonomy are taken from verbalisations made by the learners only. They are verbatim transcriptions of the TAP recordings. The phrases that appear in italics are parts of the story that was being read aloud by the learner. The other phrases that are not italicized are the learners' own verbalisations. The words that are underlined in the examples are highlighted because the learners varied their voice volume or tone when they uttered those words. The words that appear between brackets [   ] are taken from my margin notes, which contain my observations during the TAM sessions. When necessary, I provide loose translations of German words used by the learners, also between brackets [   ]. The words that are spelt incorrectly are not typographical errors. They are loose phonemic representations of the verbatim transcriptions of my learners' verbalisations from the audio recordings.

Table 18 - Taxonomy of Cognitive Strategies Learners Used during Reading

Strategy	Definition	Example
Identifying		
(a) Using Analogy	(i) The learner decodes the meaning of a word based on its sound or how its meaning is similar to other words	*If they arg argue Wicks give them a wrist burn*… it's like when… it's like when someone takes your drink or something and you argue then he will er slap you or something
	(ii) The learner decodes an idea in the story by comparing it to something external to the text	So she like working or erm *sulked for a few days then I had an idea*… like or like same that the work is doing fun but really it's not funny or something like that… sulking like groaning
(b) Analysing	(i) The learner breaks down a word into its component parts or syllables	*My next stop was the vicar… vicarage… where Mr. Fuggles the… vicar invited me for in for tea and son*… what does vicarage, vicar and scones mean?… vicarage and vicar… mhm so a vicarage may be a sort of church…
	(ii) The learner breaks down an idea in the story into smaller sub-categories	Then she just erm she don't want to do the petition sign so she erm maked like said the wrong thing extra… and erm then she think this was successful because nobody signed and she…erm…she is don't say she so she

		don't saves the Marnover School
(c) Parsing	The learner attempts to decode lexical or syntactic meaning of words by applying his or her knowledge of the syntactic rules of the English language	*For some reason he didn't wanted…* no didn't want to sign the petition either [learner self-corrects by applying knowledge of 'use the infinitive form after the auxiliary did' rule] *yes why should you chimed the woman* Just Chimed chimed… chimed the woman erm she asked why should we go there and like… how do you go there yah so wie fragen… erm… chimed… explained no something like this… because asked in ask comes after a question and this is a question [learner uses knowledge of punctuation to explain that the sentence is a question]
	The learner identifies the main events and ideas in the story and summarises a segment or the whole story	So I think this book is going to be about a girl that goes to a school that maybe that's just for a girls… to the new modern school to the one girl school… so the mum has a plan to meet interesting local people and things like that to erm to give another chance for the Marnover School… The Bigtown Primary the modern school will get the sign and then it would then the Marnover School would close
(d) Summarising		

Inferencing	(i) The learner decodes the meaning of a word with reference to the title, blurb or illustrations	*Everyone in the class <u>wrote</u> something down except Bertie…* in the class wrote… <u>Pencil</u>… chev… <u>chewed</u>… [points to pencil in the picture]… the <u>pictures</u>… draufrumchauen
	(ii) The learner infers ideas in the story from the title, blurb or illustrations	The person in the book…mm…going to be better in the end than before…mm…because he have five cross there [points to picture] and he's not so good [flips through pages and points to pictures] from there…from the pictures…mm from here and the pictures
Signaling Understanding		
(a) Paraphrasing	(i) The learner paraphrases the meaning of a sequence or idea in the story in English.	*But the houses are full of retired people which means they're at least ninety…* the retired people are the old people that haven't done work and are and are too tired or too weak to do work now
	(ii) The learner paraphrases the meaning of a word, sequence or idea in the story in German	*She's she had a way of saying things softly that sounded as if she was shoo shouting at you…* mm… softly… langsam [German word for the adverb 'slowly']

(b) Reporting	The learner reports understanding of words and ideas without paraphrasing	I erm… read it loudly because when when I speak read it loudly sometimes I will understand the er word
Judging	(i) The learner judges conflicting words in the story by measuring them against his or her own knowledge and beliefs.	Maybe it's er it's 2 words… because the story is about math not about summen… I think it's OK when I only know that it's something with maths… maybe if it's addition or subtraction or multiplication or division… my summe…
	(ii) The learner judges ideas in the story by measuring them against his or her own knowledge and beliefs	Good [ending]… when you read Romeo and Juliet you can say also bad ending… but this is this is a kids book… and a kids story most times it is a good ending
	(iii) The learner judges a word or idea in the story in terms of its suitability, effectiveness, significance and reality value	don't know… I don't know what I'm thinking… it is important to know maybe for the ending… something like if it's correct or that
	(iv) The learner judges the qualitative outcomes of the story in terms of opposites (good/bad, likely/unlikely, successful/unsuccessful)	That he will get better in maths… also that he don't have anymore so…something like that… good ending
	(v) The learner judges for himself or herself if it is necessary to pursue the decoding process	*Fudge bars were his favourite*… erm I don't know what… oh fudge is like what he like at most… yes yes… mm chocolate… because he had <u>chocolate</u> fudge that he liked chocolate very very much at most… ba but I I do not need to know no not really… no not really not to be so important
Asking for Help	The learner asks another person or consults the dictionary to explain a word or idea in the story	What does it mean I can ask you How can I guess… then maybe I look at when there's a glossary then I look in the glossary…
Evaluating		
(a) Verifying Information	(i) The learner checks the inferred meaning of a word or idea against the wider external context	What does chimed mean… Maybe a quek question that ask a question… the two sentences both got a question mark behind the sentence
	(ii) The learner indicates a personal satisfaction for the viability of an inferred meaning	*Fudge bars were his favourite*… erm I don't know what… oh fudge is like what he like at most… yes yes
(b) Reasoning	(i) The learner searches for or uses evidence in the story to deepen on the meaning of a word or idea in the story	*Only thing was I was a bit too successful*… she wanted to let the paper blank… she didn't want to go to school anymore… the new disco in the school… because it's got the best exam results in the country…
	(ii) The learner uses evidence from the text to predict sequences and	I think… the book… Danny gets the girl he so liked and he… made a personality potion… [flips pages to part when the potion is being

	hypothesise developments in the story	manufactured]
(c) Elaborating	(i) The learner uses sensory imagery (audio, visual or kinesthetic) to explore or expand on the meaning of a word or idea in the story	*springy hair* [gesticulates with hands over head] 'Drumraufchauen' [learner demonstrates chewing action at the top of a pencil] [Drumraufchauen is the German expression for 'chewing around at the top of'] <u>*500 watts of WHAT*</u> [emphasizes word by shouting] because he have five cross there [jabs around randomly in the air] and he tries to make it with tables [raps on the tables around] *But Mrs. Lines could see for herself that Ber Bertie ears were wiggling.. his ears are flying* [makes flapping action at ears with hands]
	(ii) The learner connects prior knowledge (external knowledge or something previously mentioned in the text) with a word or idea in the story to deepen contextual or textual understanding	You can also guess that the girl who got get a lot of trouble because there's only one student and when the teacher ask something something that she didn't know she will she maybe the teacher will get will get very cross oh er like that
	(iii) learner uses personal response such as interest, emotions and affect to explore the meaning of a word or idea in the story	*She had a way of saying things softly that sounds as if it she was shouting at you*… er she's a teacher when she say softly a word then it's may it's like when she's shouting… sometimes my father… that she sometimes may be angry… maybe I'm a little bit more afraid

The categories of Signaling Understanding, Identifying, Judgement and Evaluating are defined slightly differently in my study than in Nassaji's and Meyers et al.'s studies.

Under Signaling Understanding, my definition of Paraphrasing and Reporting is similar to Meyers et al.'s definitions. In both their and my classifications, the learners signaled understanding either by paraphrasing words, sentences or meanings in a text or simply stating their understanding. In my data however, the learners not only reported or declared knowledge or understanding during reading, they often paraphrased words and content in the story to demonstrate

knowledge or understanding. As my learners sometimes reverted to German, I included two sub-categories of paraphrasing – one for L1 and another for L2.

In terms of Identifying, my definition of Analogy and Analysing are similar to Nassaji's and Meyers et al.'s definitions. Nevertheless, Nassaji's states that his learners used these strategies mainly for vocabulary decoding. This may be because Nassaji's study is more focused on the strategies that his learners used for decoding lexical meaning. In my study, the learners used these strategies for both lexical and syntactic decoding as well as more global contextual inferencing, which is more consistent with Meyers et al.'s classification. I have also categorised 'Parsing' as one of the sub-categories of 'Identifying', which does not appear in Nassaji's and Meyers et al.'s taxonomies. However I identified this strategy in several transcripts and my co-rater and I agreed that it would be useful to include this strategy.

The category of Judging is present in my and Meyers et al.'s taxonomies. In both taxonomies, this strategy is defined in terms of the appropriateness, effectiveness, difficulty and importance of the ideas and words in the text. In addition to this definition, I have also included my learners' judgement of the contents in the story in terms of polar ideas such as good/bad, likely/unlikely, successful/unsuccessful that could be inferred from the TAP data. The examples I have provided in my table suggest that judging strategies were sometimes activated to assess the necessity of strategy application. This is associated with retrospective thinking and metacognitive processing. For this reason, Judging also appears in my taxonomy of metacognitive strategies, which I discuss in the next sub-section.

The strategy of Elaborating is present in my and Meyer et al.'s classifications. In both taxonomies, it is defined in terms of the learners activate audio, visual and kinesthetic images, world knowledge and discourse knowledge to explore vocabulary and contextual meanings. However, while Meyers et al.'s definitions of 'Elaborating' seem to be based on images and ideas, I have also defined 'Elaborating' in terms of how some learners provide personal responses

reflecting the own interests and emotions in order to expand on and explore the words and ideas in the story.

Two cognitive strategies in my study have not been classified in any of the previous studies that I have consulted. They are Inferencing and Asking for Help. Although these two strategies were not amongst the most frequently retrieved strategies in my study, they occurred in almost all my transcripts. This prompted me to include these two strategies in my taxonomy. Since these strategies reflect the learners' introspective reasoning rather than their retrospective thinking, I classified them as cognitive strategies.

So far, I have shown that while my classification and definitions of cognitive strategies were developed from the taxonomies of Nassaji and Meyers et al., several categories and sub-categories are different because they derive primarily from my dataset and reflect the thinking of my learners. I now move on to discuss the metacognitive strategies found in my data.

7.2.3.2 Taxonomy of Metacognitive Strategies

Nassaji and Meyers et al. did not make distinctions between cognitive and metacognitive strategy retrievals in their studies. In my classification method, I form separate taxonomies for my learners' cognitive and metacognitive strategies. While the distinction between the two types of mental strategies is not a focal point in these to previous studies, many utterances in my data could be interpreted for metacognitive strategy retrieval. Moreover, Meyers et al. (1990) suggest that the "individual's knowledge of his or her own cognitive processes may be a significant component of the learning process" (p. 113). By analysing the thoughts which the learner was asked to report during reading, we may come to better understand some of the knowledge sources and problem-solving strategies that are most important for decoding vocabulary and inferring contextual meaning during reading.

I discussed the distinction between cognitive and metacognitive strategies (in Chapter 3) and argued (in Chapter 4) that young learners are less likely to rely on metacognitive strategies for decoding unknown vocabulary and understanding contextual meanings whilst reading (Afflerbach et al., 2008; Hacker, 2004). According to my discussion, cognitive strategies are primarily associated with introspective processes whereas metacognitive strategies are associated with retrospective processes. I also stated that it is often difficult to discern between cognitive and metacognitive strategy retrieval when young learners apply strategies during reading (Bruner, 1986), though these strategies have different uses and are activated by different underlying mental processes. The distinction I make between metacognitive and cognitive processes would allow me to discuss the amount of awareness and control my learners had over their own strategy application during reading. I identified two main categories and four sub-categories of metacognitive strategies in my dataset, which I summarise in Table 18 below.

Table 19 - Taxonomy of Metacognitive Strategies Learners Used during Reading

Strategy	Definition	Example
Evaluating		
Self-Inquiring	The learner asks himself or herself questions about the new or inferred meaning of a word or idea in the story.	*He was about to put her in the minking machine… my-king machine… oh mincing machine… what's a mincing machine… a machine where you then where you make meat… like for spaghetti or… because he went to a meat factory*
Monitoring		
Repeating	The learner repeats a word, phrase or sentence whilst reading.	"*…and if I was lucky they might give me some local cheese or homemade rebard and ginger jam… if rebard and ginger jam… Robert… reburb and ginger jam*
Self-Correcting	The learner self-corrects a word, phrase or sentence whilst reading.	*I'd like to sign a petition to save Marnover School I announced… yah I'd like to sign a petition to save Marnover School I announced… I would like to sign you maybe… I'd like YOU to sign a petition to save Marnover School I announced*
Showing Awareness	The learner reflects on the difficulty or ease of reading to show an awareness of the existence or	*As clever as Prince Ce…* [laughs]… I don't know… it can be also it's a name or something like that… maybe a name… difficult name…

absence of a problem during reading.	*Mrs. Lines looked up and said sh sh sharp ly... [repeats sentence]... before I don't erm see this one but it's with this one too and that is why I'm stuck here... and it's a little bit difficult to reading...*

Many of my categories of metacognitive strategies were developed from Nassaji's (2003; 2006) and Meyers et al.'s (1990) classifications. Nassaji (2003) classifies Monitoring as a cognitive strategy, whereas in his 2006 study, he provides a metacognitive sub-classification for Monitoring, which gives a fuller description of the strategy. I classified Monitoring as a cognitive and metacognitive strategy in my study. In Nassaji's and Meyers et al.'s taxonomies, Monitoring is defined in terms of the learner's awareness of a problem involving previous understanding of a part of the text. Meyers et al. define Monitoring specifically as "monitor doubts reflecting awareness of poor understanding" (p. 117). In my taxonomy, I sub-categorised Monitoring into the three individual strategies of Repeating, Self-Correcting and Showing Awareness. Self-correction is a monitoring strategy that occurs in my data, whereby my learners repeat segments of the text with the intention of improving or correctly understanding.

According to my classification, Showing Awareness is an important metacognitive strategy which seemed to suggest that my learners may have been aware that not all parts of a text deserve the same amount of processing attention. Usually, my learners slowed down their reading to focus or refocus on particular parts of the text. This is consistent with Liu's (2010: 155) argument that careful and monitored reading processes such as 'intensive reading' causes the learner's reading speed to generally become slower so that more deliberate attempts can be made to acquire a deeper understanding of the words and ideas in the text.

My classification of Evaluating is similar to Nassaji's classification of Evaluating as a metacognitive strategy, which includes self-inquiry. Nassaji provides a classification of Evaluating as a metacognitive strategy only in a later study (Nassaji, 2006) and defines Self-Inquiry as "asking oneself questions about the text, words, or the meaning already inferred" (p. 657), which is similar to the

definition I provide in my taxonomy. I have also classified Evaluating as a cognitive strategy that includes the sub-categories of Verifying, Reasoning and Elaborating in Table 18. This classification is more consistent with Meyer et al.'s (1990) description of Elaborative Reasoning strategies as cognitive strategies in their data.

There is some suggestion that introspective and retrospective thinking in my data may be linked with the occurrence of short and long pauses in the learners' verbalisations. Although pauses are neither found in Nassaji's (2003, 2006) nor Meyers et al.'s (1990) taxonomies, my definitions are consistent with their broader definitions of Monitoring. Both Nassaji and Meyers et al. argue that during reading, pauses serve the purpose of retrospective reflection, which is an important and common metacognitive strategy. In the next section, I discuss some of the challenges I faced in coding and classifying my data.

7.3   Challenges of Data Coding

Of the three categories, data associated with linguistic knowledge was the easiest to code, classify and define. Nassaji (2003; 2006) states that linguistic knowledge may usually be recognized by the learners' attention to specific words and phrases in the text during reading. By referring to this guideline, it was relatively easy for me to identify the linguistic knowledge retrievals in my data. It was more difficult to identify external and strategic knowledge retrievals in my TAPs and decide how they should be classified. Careful re-reading of the raw data and In Vivo coding did not highlight as many words and phrases in the learners' verbalisations that signaled the retrieval of external and strategic knowledge sources as it seemed to have for linguistic knowledge. Since my learners did not often verbalise their problem-solving processes explicitly, the presence of strategic knowledge in my data had to be inferred or interpreted. In fact, Afflerbach and Johnston (1984) and Ericsson and Simon (1980) point out that TAM researchers must be prepared to interpret the verbal data in the light of the coding system (discussed in Chapter 5).

To interpret the intentions of my learners realistically, I had to be very alert to the subtle nuances underlying my learners' verbalisations. Many utterances were subject to numerous possible interpretations. In my discussion of Schema Theory (in Section 3.1), I argued that a learner's schematic knowledge is often dependent on his or her cultural, environmental and interpersonal experiences, which could result in many individual variations within the data. As a result, while reading and re-reading the transcripts, I had to be sensitive and open to knowledge sources that may not correspond with my own ideas. Nevertheless, coding the data in the light of the nuances found in the learners' verbalisations was a difficult procedure and cannot be regarded as watertight.

The line separating non-strategic (linguistic and external) and strategic knowledge retrievals in my data is not always precise. First of all, strategic knowledge could be interpreted as part of external knowledge in the sense that neither is related to linguistic knowledge. Yet strategic knowledge is distinct from external knowledge. While strategic knowledge retrieval is directly regulated by the learner's introspective and retrospective mental processes, external knowledge is only indirectly associated with the learner's cognitive or metacognitive processes. My TAP data shows that external knowledge retrieval was usually the resultant effect of cognitive or metacognitive processing and strategy application. As a result, the coding of external knowledge and strategic knowledge resulted in the highest proportion of disagreement during co-rating. In spite of very careful and repeated re-reading of several utterances in the transcripts, it was difficult to fix an interpretation because of ambiguity of the learners' verbalisations or the lack of evidence.

The complexities surrounding the coding of external knowledge and strategic knowledge were further complicated by the fact that many utterances could be double coded for simultaneous knowledge source retrievals (discussed in sub-section 7.2). For instance, an utterance that was coded as strategic knowledge retrieval could also be coded as linguistic or external knowledge retrieval (discussed in Section 3.4). As this information was not usually verbalised by the learners themselves, and had to be interpreted.

The challenges and problems discussed here were not necessarily the result of faulty interpretation of the data, inaccurate coding procedures or weak definitions of the mental strategies. Rather, they reflect the complexities of the underlying mental processes regulating knowledge source retrieval and mental strategy application during reading; and suggest that the reading task itself is a highly complex and cognitively demanding process. Sarig (1987) argues that learners' reading strategies are so overwhelming in number and complexity because they are frequently utilized in many different combinations with each other and overlap in so many different ways. This is so much so that Sarig claims it is sometimes impossible for researchers to come to certain conclusions about which strategies have been applied. Afflerbach and Johnston (1984) and Ericsson and Simon (1980) argue that even in the most carefully designed TAM studies, the researchers must expect to find challenges in data coding and be prepared to interpret most of the learners' verbalisations in the light of the classification systems and theoretical frameworks of the studies.

7.4   Chapter Conclusion

In this chapter, I discussed the rationale for using the General Inductive Approach and described the steps involved in coding the verbal protocols of my learners. Through Open Coding, I identified the three broad analytical categories for my study – Linguistic Knowledge, External Knowledge and Strategic Knowledge. Through Selective Coding and In Vivo coding, 14 sub-categories for each of the three main categories were developed. These sub-categories described each knowledge source in terms of its individual knowledge types. To check the internal reliability of my coding system, I carried out thorough co-rather checks, which I described in sub-section 7.1.5.

In section 7.2, I described the individual knowledge sources and mental strategies in my data. I referred to the classification systems and taxonomies of Nassaji (2003; 2006), Dubin and Olshtain (1994) and Meyers et al. (1990) which I presented in Chapters 3 and 4 and stated that they were important for helping

me to reflect on the suitability of my own classifications and definitions of the knowledge sources in my data. I stated that Nassaji's and Dubin and Olshtain's classifications provided me with the most complete overview of linguistic, external and strategic knowledge sources to refer to when I was developing my own classification system. However, I explained that the classification system and definitions used by Meyers et al. are especially relevant to my study because it was derived from TAP data collected from young learners during reading. Nevertheless, I argued that my classifications and definitions derived from the TAP data I collected from my learners. I provided two separate taxonomies for cognitive strategies and metacognitive strategies, which was a different approach from Nassaji's and Meyers et al.'s classification schemes, but interesting and appropriate to my own study.

I also briefly discussed the challenges I faced in coding and classifying the data. I discussed two main reasons for the difficulties we faced during data coding. Firstly, identifying external and strategic knowledge sources in the raw data was not always a straightforward task for my co-rater and me. While linguistic knowledge in the transcripts was relatively easy to identify, external and strategic knowledge in the data was less obvious and open to interpretation. Secondly, it was often difficult to distinguish between cognitive and metacognitive strategies in the data. I suggested that these challenges are not necessarily due to faulty procedures but are part of the challenges associated with TAM research. In the next chapter, I describe my data analysis procedures and report on the results of my analyses.

Chapter 8

ANALYSIS AND RESULTS

Introduction

In this chapter, I describe my data analysis methods and report my findings. My data was analysed in several ways that are similar to the methods in Nassaji's (2003, 2006) and Meyers et al.'s (1990) studies (discussed in Section 5.4). To identify the most common strategic and non-strategic knowledge sources retrieved by my learners' during reading, I replicated Meyers et al.'s (1990) and Nassaji's (2003, 2006) method of counting the number of times linguistic knowledge, external knowledge and strategic knowledge were referred to in the data (discussed in 5.4.1). In order to study the reading comprehension results associated with the application of individual strategies in my study, I used Nassaji's (2003, 2006) mean of success analysis (discussed in 5.4.2). To study the role that my learners' vocabulary knowledge played for vocabulary decoding and contextual inferencing, I applied Nassaji's mean of success analysis to investigate the comprehension outcomes of different learners in my study and replicated his two-way chi-square test to test if their reading comprehension results were significantly different from each other. To carry out these different types of analyses, I read and re-read the transcripts closely to interpret and analyse my learners' utterances in the light of the different components of vocabulary decoding and contextual inferencing I have discussed.

8.1 Knowledge Source Retrieval During Reading

My raw count of individual knowledge source retrieval is based on the concept of 'moves'. In sub-section 4.2.3.1, I explained that though similar in sense, the use of the word 'move' in my study has a different meaning from the term introduced by Sinclair and Coulthard (1975) to refer to the smallest unit of speech used to describe a pragmatic function in discourse analysis. In my study, a 'move' refers to an utterance or string of utterances whereby the learner performs the act of

working out vocabulary meaning or contextual meaning whilst reading. A move may stem from the learner's declarative knowledge or procedural knowledge (Baker and Brown, 1984). According to Baker and Brown, a learner states declarative knowledge when he/she verbalises familiarity of a particular knowledge source without retrieving or applying it during task completion. On the other hand, a learner may appear to have procedural knowledge when he retrieves a particular knowledge source for the purpose of working out meaning or solving problems whist completing a task. This approach is similar to Lytle's (1982; 1985) method of analysing her learners' verbal protocols for the knowledge sources that they retrieve to understand a text. According to my analysis, a learner's move to decode and construct meaning during reading may or may not result in successful comprehension results in my study.

Although Lytle's method was initially developed for analysing the verbal protocols of secondary school learners, it was extended to elementary school students in later studies (Meyers, 1985; 1988; Meyers and Kundert, 1988; Meyers and Lytle, 1986; Meyers et al., 1990) and its utility as a clinical technique has been tested and proven effective with learners as young as grade 2. I have chosen this method because these previous studies have demonstrated its effectiveness for analysing the verbalisations of young learners. Following Lytle's method of counting up the number of moves corresponding to each knowledge source category found in the data, I identified a total of 1430 moves associated with the retrieval of strategic and non-strategic knowledge. I coded the dataset in terms of individual types of knowledge. My learners' utterances were coded for 114 moves to retrieve linguistic knowledge, 128 moves to retrieve external knowledge and 1188 moves to retrieve strategic knowledge. Table 19 below suggests the raw counts representing each type of knowledge source my learners appeared to retrieve.

Table 20 – Knowledge Source Retrievals in the Main Study

Knowledge Source	Number of Moves
Linguistic Knowledge	114
External Knowledge	128
Strategic Knowledge	1188
	Total - 1430

The raw counts in Table 19 suggest that my learners tended to retrieve significantly more strategic knowledge than non-strategic knowledge whilst reading. In percentages, strategic knowledge retrievals seemed to comprise 83% of all the knowledge sources retrieved in my study, suggesting that it was the most important knowledge source for my learners to decode vocabulary and infer contextual meaning. In terms of non-strategic knowledge, the table seems to suggest that my learners retrieved almost the same amount of linguistic knowledge an external knowledge during reading, though the results suggest that linguistic knowledge seemed to be the least important knowledge source for vocabulary decoding and contextual inferencing amongst my learners.

Next, I counted up the number of retrievals for each individual type of knowledge. The subcategories of knowledge sources were identified with the help of In Vivo coding procedures (discussed in sub-section 7.1.3). That is, by carefully re-reading all the moves that were associated with retrieval of the different knowledge sources in the dataset and highlighting key words in the learners' verbalisations, I was able to re-code the learners' verbalisations in a more descriptive way. Table 20 below shows the raw counts of the sub-categories of knowledge source retrievals resulting from In Vivo coding.

Table 21 – Individual Knowledge Retrievals in the Dataset

Knowledge Source	Type of Knowledge	Number of Moves
Linguistic Knowledge	L2 Syntactic & Lexical Knowledge	102
	L1 Syntactic & Lexical Knowledge	12
External Knowledge	Discourse Knowledge	87
	Genre & World Knowledge	41
Strategic Knowledge	Cognitive Strategies	964
	Metacognitive Strategies	224

Out of the 114 moves in the dataset that were interpreted to represent linguistic knowledge retrieval, I identified 102 moves that seemed to be associated with the learners' syntactic and morphological knowledge and 12 moves that seemed to be associated with their L1 knowledge. This suggests that my learners tended to rely more on their L2 linguistic knowledge than their L1 linguistic knowledge

during reading. Out of the 128 moves associated with external knowledge retrieval in my dataset, 87 moves appeared to be associated with discourse knowledge whereas only 41 moves seemed to be related to genre and world knowledge. This implies that my learners tended to retrieve twice as much discourse knowledge as genre and world knowledge for understanding the texts. In terms of strategic knowledge retrieval in my study, Table 20 suggests that my learners appeared to have applied four times as many cognitive strategies than metacognitive strategies in my study.

8.2   Retrieval of Strategic Knowledge During Reading

While the results in Table 20 suggest that my learners appeared to have devoted the most attention to the retrieval of strategic knowledge during reading, the raw counts of the individual strategies associated with In Vivo coding suggests that the different strategies did not seem to be retrieved with equal frequency. Table 21 below summarises the number of times each strategy was retrieved by the learners in ascending order.

Table 22 - Frequency of Strategies Used in Descending Order

Strategic Knowledge	Type of Knowledge	Number of Moves
Evaluating I Verifying Reasoning Elaborating	Cognitive	399
Identifying Using Analogy Analysing Parsing Summarising	Cognitive	315
Monitoring I Repeating & Self-Correcting	Metacognitive	117
Inferencing Title Blurb Pictures	Cognitive	74
Judging Suitability of Words Own Beliefs Opposites Follow-up Procedures	Cognitive	71
Signaling Understanding Accurate Paraphrasing Inaccurate Paraphrasing L1 Replacements	Cognitive	63
Evaluating II Self-Inquiring	Metacognitive	54
Monitoring II Showing Awareness	Metacognitive	53
Asking for Help Asking another person Using a Dictionary	Cognitive	42

The labels I used in this table are taken from the taxonomies of cognitive and metacognitive strategies I developed for my study (discussed in sub-section 7.3.3). I provided a detailed description of the main categories and individual sub-categories in Tables 17 and 18.

Although my analysis suggests that my learners tended to retrieve much more strategic knowledge than any other knowledge sources during reading, close-up reading of the transcripts suggests that many utterances which were associated with strategic knowledge retrieval also appeared to be associated with linguistic and external knowledge retrievals. For instance, many utterances were coded for simultaneous retrievals of 'linguistic knowledge/strategic knowledge', 'external knowledge/strategic knowledge' or 'linguistic knowledge/external knowledge/strategic knowledge'. In sub-section 7.1.4, I discussed some

transcript examples which were coded for different knowledge source retrievals. This finding is similar to Meyers' (1988) finding that his learners tended to apply multiple strategies for each attempt they made to decode and infer meaning during reading.

8.3   Reading Comprehension Results

8.3.1   Results of Strategy Application

To analyse the effectiveness of my learners' vocabulary decoding and contextual inferencing attempts associated with the strategies they retrieved, I replicated Nassaji's (2003) mean of success analysis (discussed in 5.4.2). For this, I re-read the transcripts and identified the strategies that were interpreted to be directly associated with actual attempts made by the learners to strategically decode vocabulary and infer contextual meaning. This was regardless of the vocabulary decoding and contextual inferencing results.

Among the 7 types of strategic knowledge used for decoding and inferring meaning in my dataset, moves associated with 'Asking for Help', 'Repeating' and 'Showing Awareness' could not be counted as the learner's own attempts to decode and infer meaning. Although 'Asking for Help' usually led to successful comprehension in the transcripts, the comprehension results associated with the application of this strategy could not be attributed to the learners' own vocabulary decoding and contextual inferencing efforts. Close-up re-reading and interpretation of the learners' verbalisations also suggest that moves coded for 'Repeating' and 'Showing Awareness' did not suggest any gains in comprehension. Example 8.1 below, where L refers to the learner, illustrates this point.

Example 8.1
L: I call someone.... Erm well I'm not quite sure....

I interpreted the learner's utterance in this example as an expression of some introspective awareness regarding his understanding of the phrase "I call someone". Therefore, in the open coding, I coded this utterance as 'Showing Awareness' and 'Asking for Help'. Nonetheless, the move itself was unlikely to have been associated with any explicit attempts to decode meaning. It was possible that the learner used this strategy to buy time during reading so that other more cognitively demanding processes for decoding vocabulary whilst reading could be activated. Ellis and Beaton (1993, cited in Nassaji, 2003) argue that though repetition is not responsible for direct comprehension, it is useful in assisting learners to attend to other mental processes during reading.

Out of the 1188 strategic moves counted in the data (shown in Table 20), I identified 4 strategies (Inferencing, Identifying, Evaluating and Judging) and 552 moves that were directly associated with the learners' explicit attempts to decode vocabulary and infer contextual meaning. These moves seemed to make up only 46% of all the 1188 retrievals of strategic knowledge initially coded during the open coding procedure, suggesting that my learners needed to apply an average of at least two strategic moves in order to attain meaningful reading comprehension results. This may be because not all of the strategic knowledge retrievals in the data were interpreted as explicit attempts by the learner to decode and infer meaning. Example 8.2 below illustrates how certain utterances could not be described as successful, partially successful or unsuccessful attempts to decode and infer meaning. L refers to the learner.

Example 8.2:
L: Before reading I can get information about the story from the blurb and from the contents page and sometimes also from the front cover of the book

The utterance in Example 8.2 was coded as 'inferencing' because the learner explicitly verbalises the use of this strategy, but the move itself could not be assigned any points for the mean of success analysis because it was not associated with any particular reading comprehension results.

Several episodes in the transcripts show that that several mental strategies may be involved for a single attempt to decode or construct meaning during reading (discussed in sub-section 8.2.1); and several separate moves may string naturally together to indicate the presence of one particular mental strategy. Example 8.3a below, where L refers to the learner, is one such example.

Example 8.3a:

L: This book is going to be about…. a girl called Bernie and she is…. she is the first pupil to arrive…. erm I know this because I read the blurb of the book…. Can also guess that be that…. I can also guess that because werm… it's I can see the contents page of the book…. I can see the contents page and the…. The…. Yeah the cover page

This episode in Example 8.3a was initially coded for 3 inferencing moves in the data corresponding to the learner's reference to 'blurb', 'contents page' and 'cover page'. In a later move within the same transcript, shown below in Example 8.3b, the same learner referred back to the title of the book 'One Girl School' and the picture on the front cover of the book, in realisation that the main character, Bernie, was the only remaining pupil left at the old school.

Example 8.3b:

L: She stays in the school and only one girl one only she is in this school.

The learner then predicted several moves later, shown in Example 8.4c, that Bernie's petitioning would be unsuccessful.

Example 8.3c:

L: To ask them if they can sign the petition yah and but nobody signed

In Example 8.3c, we infer that the learner had managed to predict an outcome to the petition-signing event in the story after referring back to the cover page. On account of this series of verbalisations that link up with the learner's reference to

the title and picture on the cover page, Example 8.3a was also coded for the strategy Predicting, which is a sub-category of Reasoning.

To investigate the effectiveness of these strategies, I replicated Nassaji's (2006) method of calculating the mean of success for each move. For this analysis, I assigned numerical values from 0 to 2 to all my learners' attempts to decode meaning during reading. These values denote three possible comprehension results, as I explain in Table 22 below.

Table 23 – Point System Denoting Comprehension Outcomes

Number of Points	Comprehension Outcome	Description
2	Successful attempt	Learner's attempt to decode vocabulary meaning or infer contextual meaning that resulted in semantically, syntactically and contextually suitable guesses or inferences
1	Partially successful attempt	Learner's attempt to decode vocabulary meaning or infer contextual meaning deviated in one or two areas of suitability
0	Unsuccessful attempt	Learner's attempt to decode vocabulary meaning or infer contextual meaning did not meet any of the suitability criteria mentioned

For attempts to decode and infer meaning that made contextual sense although the actual decoded meanings were wrong when judged out of context, I assigned 1 point. Example 8.4 below, where L refers to the learner and R the researcher, illustrates this. A short pause is represented by 2 dots, a longer pause by 3 dots.

Example 8.4

L: Ah.. Bertie sh sigged up… I don't know this word

R: ok Bertie… sighed

L: sighed…

R: have you heard this word before

L: uh uh

R: ok so what do you do

L: … think Bertie was angry or erm… eingeschnappt…

R: mhm… why do you say that

L: because they all la yah grinned and that means die grinsen and if Bertie don't like that other people said erm he looks like a prince then he is... sauer...

R: uh huh uh huh...

L: erm... he was feed up with jokes about looking like a prince

The learner's utterances in Example 8.4 suggest that he was making an attempt to decode the meaning of the word 'sighed'. The learner referred to some contextual information associated with the main character in the story, Bertie, and how he may be feeling. Although this move resulted in an incorrect decoding of the meaning of 'sighed' (decoded as 'angry' or 'eingeschnappt', which is the German word with a similar meaning), I assigned 1 point to this move because the learner arrived at a viable contextual interpretation of the story.

A 3-point award system is important because it does not underestimate the learners' actual abilities. A 2-point system that categorises my learners' moves as 'correct' or 'incorrect' may not fully capture the range of abilities I am studying. In addition, the learners in my study are young and inexperienced. A two-way point award system may not only be unnecessarily harsh, it could misrepresent their actual comprehension skills (Nassaji, 2003; 2006). A 3-point system considers that possibility that some learners may have decoded and constructed meaning accurately but not verbalised their thoughts effectively during the think-aloud sessions. The results of the mean of success analysis for all the attempts are shown in Table 23 below.

Table 24 – Mean of Success Results in Descending Order

Strategy	Number of successful attempts	Number of partially successful attempts	Number of unsuccessful attempts	*Mean of success*
Inferencing	45	14	3	*1.68*
Identifying	105	21	28	*1.50*
Evaluating	146	82	28	*1.46*
Judging	9	11	20	*0.725*

Following Nassaji's (2003, 2006) analysis, I calculated the mean of success for each type of strategic knowledge used to decode vocabulary meaning and infer contextual meaning by summing up the scores for all the successful inferences

and dividing the result by the total frequency of each strategy to obtain individual mean scores. The mean of success values for the 4 different strategies in Table 23 suggest that the success associated with strategy application did not vary significantly from strategy to strategy.

My results suggest that inferencing was the strategy that was most likely to lead to the highest proportion of successful comprehension, with about a 73% chance of success when applied. This is followed by signaling understanding (about 70% chance of success) and identifying (about 68% chance of success). The two strategies that appeared least likely to lead to successful comprehension when applied were evaluating (about 57% chance of success) and judging (about 23% chance of success). The move-by-move analysis of the individual attempts suggest that the degree of successful inferencing was relatively high, ranging from 23% to 73%. This result suggests that the most frequently applied strategies may not necessarily have the highest mean of success results. For example, Table 23 shows that the most frequently used strategy, which was Evaluating (in Table 21), had the second lowest mean of success result.

The mean of success for Inferencing in my study was different from Nassaji's (2003) study. While my results suggest success rates ranging from 45% to 73%, Nassaji's results showed success rates of 9.5% to 38.1%. Nassaji attributed his results to the extremely high density of unfamiliar words in the texts he used for his study. He states that the ratio of known to unknown words in the context, is important for successful decoding and inferencing. Nassaji suggests that even for texts with a large proportion of familiar vocabulary in them (at least 95%), "fine tuned knowledge of the remaining words in the context is still a crucial factor in the successful inferring of unknown words" (p. 653). Since I have used a graded reading series in my study and selected threshold reading levels for my learners, the balance in the ratio of known to unknown words in the texts I used may have been much lower in my study than in Nassaji's study. This may have resulted in higher mean of success values for Inferencing in my study than Nassaji's study.

The mean of success results suggest that frequency of strategy application alone may not be the best indicator for vocabulary decoding and contextual inferencing success. Rather, my learners' comprehension results also depended on the type of strategies they applied during reading.

8.3.2   Role of Vocabulary Knowledge

While the banding of learners into their level appropriate reading stages in my study (discussed in sub-section 6.2.2) suggests that lexical difficulty was not an issue in my study, the prior vocabulary knowledge of the different learners apparently seemed to differ in breath and depth. According to the Primary English Department's banding system (also discussed in sub-section 6.2.2), the teachers assume that learners reading Stage 16 stories have more breath and depth of L2 vocabulary knowledge than the learners reading Stage 11 and Stage 13 stories. Since selecting level-appropriate texts for the learners helped to ensure that the difficulty level of the text is almost constant for all the learners, any differences in the vocabulary decoding and contextual inferencing results in my study is more likely to be associated with variations in the learners' vocabulary knowledge rather than text difficulty.

The mean of success analysis in sub-section 8.3.1 suggests that my learners' reading comprehension results (successful, partially successful and unsuccessful) tend to be associated with the different mental strategies they applied. To investigate the extent to which these results may also have been associated with the learners' vocabulary knowledge, I analysed the proportion of successful, partially successful and unsuccessful attempts to decode vocabulary and infer contextual meaning for two different groups of learners in my study. According to the Primary English Department banding system, learners reading a higher stage in the ORT series were assumed to have more breath and depth of vocabulary knowledge than learners reading a lower stage. Learners who read the longer Stage 16 stories were grouped as Group 1 Learners while the learners who read Stage 11 and Stage 13 stories were grouped as Group 2 Learners. Table 24a and Table 24b below show the separate results for the mean of success

analysis of the same four mental strategies in Table 23 for the two groups of learners.

Table 25a – Mean of Success for Group 1 Learners (Stage 16 readers)

Strategy	Number of successful attempts	Number of partially successful attempts	Number of unsuccessful attempts	*Mean of success*
Identifying	72	12	13	*1.61*
Evaluating	96	44	13	*1.54*
Inferencing	17	3	0	*1.85*
Judging	2	4	7	*0.62*

Table 25b – Mean of Success for Group 2 Learners (Stages 11 and 13 readers)

Strategy	Number of successful attempts	Number of partially successful attempts	Number of unsuccessful attempts	*Mean of success*
Inferencing	28	11	3	*1.60*
Judging	7	7	13	*0.78*
Evaluating	50	38	15	*1.34*
Identifying	33	9	15	*1.32*

The results in the tables suggest that Group 1 attained higher means of success for Inferencing and Judging while Group 2 attained higher means of success for all the two strategies measured. To investigate the extent to which learners' vocabulary knowledge may influence their reading comprehension results, I replicated Nassaji's (2006) two-way chi-square test (discussed in Section 5.4.3) on the proportions of successful, partially successful and unsuccessful comprehension attempts for the two groups of learners. The results suggest that my learners' vocabulary decoding and contextual inferencing success was significantly different across the two groups (χ^2 *= 12.221, df = 2, when p < .01)*. That is, my learners' reading comprehension success was apparently related to their group membership. This implies that in my study, a learner's reading comprehension results may be associated with his or her breath and depth of vocabulary knowledge.

I then re-read the individual transcripts closely and analysed the learners' utterances in terms of the different components of word knowledge they retrieved for decoding vocabulary and inferring contextual meaning whilst reading. I provide several transcript examples below from different learners to

illustrate that strategy application is more likely to be associated with successful reading comprehension outcomes when learners have more breath and depth of vocabulary knowledge.

Example 8.5 below is an extract taken from the transcript of a learner reading the Stage 11 story entitled "Bertie Wiggins' Amazing Ears". In this example, the learner was analysing the front and back covers of the book and verbalising his thoughts about what the information on those pages could tell him about the story.

Example 8.5:

L: This book is going to be about I think er... chil child and he is er... he is like er... mm…... Like who's very good in the school because he is here putting something... and…... Look at it... mm a child another child and a man and he looks not very nice I think he don't want that he is so good at the school or something like this

Here we see the learner referring to the pictures on the front and back covers without reference to specific vocabulary on the front and back covers was insufficient for the learner to form even an initial understanding of the story. This episode contains several word repetitions, for instance 'child' and 'school' and presents little evidence of strategic attempts to decode the vocabulary meaning of the words in the title or in the blurb. These repetitions though, tended to be random word readings that did not result in significant outcomes in meaning construction. Throughout this episode, the learner struggled to talk about the information on the front cover of the book and was unable to make any viable predictions about the storyline. There was also little evidence from the rest of the transcript that the learner had used prior word form or semantic knowledge to decode and infer meanings in the story.

Example 8.6 below is taken from the transcript of a learner reading the Stage 16 story "One Girl School". In this example, we observe the learner applying more substantial vocabulary knowledge to decode the meaning of several unfamiliar words he encountered in the story.

Example 8.6:

L: …… Rhubard what is that…… Rhubard I know what ginger is but rhubarb something like the same as ginger rhubarb something … erm… like something its not hard or something like that so yah its like drinking things… yah something to drink……

In this example, the learner repeated words in the text in a similar way that the learner in Example 8.5 did. However, the comprehension outcomes in Example 8.6 are very different from the comprehension results in Example 8.5. Firstly, the word repetitions in Example 8.6 were fewer and less random than the repetitions in Example 8.5. The learner in this example was attempting to decode the meaning of the word 'rhubarb'. To do that, the learner retrieved associative semantic knowledge of 'ginger' which he/she used to guess the meaning of 'rhubarb'. This involved the use of deep vocabulary knowledge which appeared to be lacking in Example 8.5. Finally, this learner elaborated that rhubarb is 'something its not hard' and 'its like drinking things'. Although this learner's attempt to decode the meaning of 'rhubarb' resulted in only partial understanding, this example illustrates that a learner's attempts to guess the meanings of unfamiliar words during reading seems more likely to be successful if depth of vocabulary knowledge were involved.

Example 8.7 below is an extract taken from a later part of the same learner's transcript. It shows how the learner retrieved very recently acquired vocabulary knowledge of the word 'rhubarb' whilst reading a later part of the story, to revise the meaning of that he had just decoded.

Example 8.7:

L: Sulked sulked sulked is erm… yah when I think its something that it's together with drinking or… because here was the because here there is erm told you about rhubarb and you can jam and you can drink that…… No because there is for a few days… because I couldn't drink for much days…… Mm maybe no

In this part of the transcript, the learner encountered the word 'jam' whilst reading and used his/her vocabulary knowledge of jam to conclude that the previously inferred meaning of rhubarb was in fact not something to drink. This example suggests that in my study, a learner's linguistic knowledge is important for vocabulary decoding and infer contextual inferencing during reading. Collectively, examples 8.5, 8.6 and 8.7 illustrate that the learners who had more breath and depth of L2 vocabulary knowledge tended to make more frequent and explicit attempts to decode vocabulary and infer contextual meaning whilst reading.

8.4   Summary of Analysis and Results

My think-aloud data was coded for Strategic Knowledge and Non-Strategic Knowledge. Strategic Knowledge in my data refers to linguistic knowledge and external knowledge while Non-Strategic Knowledge is made up of Linguistic Knowledge and External Knowledge. The strategic knowledge in my data was then sub-coded for 6 cognitive strategies and 2 metacognitive strategies, while there were 3 sub-categories of linguistic knowledge and 3 sub-categories of external knowledge represented in my data. The raw counts of all the three types of knowledge sources in my data suggest that strategic knowledge was the most-frequently retrieved knowledge source for my learners.

My mean of success analysis suggests that different strategies were associated with different outcomes in reading comprehension, indicating that the most successful strategies were not necessarily the most frequently applied strategies in the study. The two-way chi-square test results also suggest that a learner's vocabulary knowledge may have an influence on his or her vocabulary decoding and contextual inferencing results.

In the next chapter, I discuss the results of the findings in the light of my research questions.

Chapter 9

DISCUSSION OF RESULTS

INTRODUCTION

In this chapter, I discuss the results of my study in the light of my four research questions.

My first two research questions deal with my learners' retrieval of schematic knowledge for decoding vocabulary and inferring contextual meaning during reading. RQ 1. "What types of non-strategic knowledge do my learners retrieve during reading?" deals with the role of linguistic and external knowledge for vocabulary decoding and contextual inferencing in my study. RQ 2. "What strategies do my learners use to (a) decode unfamiliar vocabulary and (b) infer contextual meaning during reading?" deals with the role of mental strategies for understanding written texts.

My third research question RQ3. "What is the relationship between strategy application, depth of vocabulary knowledge and success in lexical inferencing and contextual guessing?" deals with the extent to which my learners' application of mental strategies and vocabulary knowledge influenced their reading comprehension results.

My fourth research question RQ 4. "To what extent is TAM an effective method for studying the knowledge source retrievals of my learners?" deals with the suitability of my research method and is the means by which I discuss the reliability of my research procedures, data and data analysis methods.

9.1 Non-Strategic Knowledge Retrievals and Reading Comprehension

9.1.1 Non-Strategic Knowledge Retrievals During Reading

The results of my raw counts of the knowledge sources retrieved by my learners in Section 8.1 suggest that my learners appeared to have retrieved almost the same amount of linguistic and external knowledge in my study. My results are similar to the results in Meyers et al.'s (1990) and Nassaji's (2003; 2006) studies. The results suggest that learners tend to rely infrequently on linguistic knowledge and external knowledge for vocabulary decoding and contextual inferencing during reading. Dubin and Olshtain (1993) argue that "for lexical meanings to be retrievable, all the components which had previously been hypothesized as constituting textual support must be present" (p. 194). These components include the learner's "general, extratextual knowledge, thematic context, semantic information beyond the sentence and paragraph levels, semantic information at the sentence level and structural information within the sentence or paragraph" (Dubin and Olshtain, 1993: 194). This implies that learners' non-strategic knowledge retrievals tend to complement each other during reading. Due to my learners' young age, they may not have the same world knowledge or linguistic knowledge as older learners and this may have affected the knowledge sources they retrieved in my study.

9.1.2 External Knowledge and Reading Comprehension

Analysis of my transcripts suggests that in my study, effective reading comprehension seems to depend on how effectively my learners used their external knowledge for decoding individual vocabulary and inferring contextual meaning whilst reading. However, the data suggests that for my learners, certain types of external knowledge seem to be associated with more effective comprehension results than others. Close up reading of the transcripts also suggests that learners who retrieved a wider range of external knowledge seemed to have better comprehension results.

Example 9.1 below shows a learner retrieving extratextual knowledge whilst reading. L refers to the learner. Three dots denote a short pause while six dots denote a long pause in the utterances. The words within brackets [   ] are my observation notes.

Example 9.1

L: er…… it's a girl…… it's a girl who's sitting in the class... on the chair... and... er learning... [points to title] one girl... and is alone in the school ya and is alone in the school…… I know this because... because I see it on the front cover of the book and…… and I can see it on the title and the class is and in the class there's only one girl... can also guess that…… hmm…… [looks at cover picture] that she's smiling…… and she's looking to me…… before reading I can get information about the story from the…… [flips through pages of book] from the…… [points to back cover] how to say this…… mm erm its not easy but it's like…… like er…… already er some difficult words and…… mm…… [turns book around and looks through the pages] oh stage 16 ok I haven't read this I haven't read till 16 I just read 14 or 15

At first, the learner seemed to be referring to different parts of the book such as the cover and back pages, title, picture and reading stage to guess the storyline and talk about the book before actual reading. My margin notes show that the learner was handling the book actively. As this course-grained unit was very near the beginning of the protocol, we may infer that the learner was apparently attempting to form an initial impression of the book. Although we may infer that this learner was able to use information found in different parts of the book to help him understand the story, he/she does not seem to be using the clues to predict events in the story or discuss the characters in them. His/Her verbalisations and interpretations seemed to touch on superficial and obvious information found on the cover page such as "she's smiling" and "she's looking at me". This suggests that although the learner had some extratextual knowledge, it was not sufficient for helping him/her to establish an understanding of the writer's techniques and to evaluate his/her own understandings (Pressley and Afflerbach, 1995).

Careful scrutiny of other transcripts suggests that some of my learners appeared to have greater awareness of story grammar than others. For example, some learners such as the learner in Example 9.1 tended to focus on information that is explicitly supplied by the words or illustrations in the text to understand the story and rely on very simple knowledge of story grammar such as plot and event sequences to discuss the stories. Example 9.2 below shows the learner referring to only pictures and the title to predict the ending of the story.

Example 9.2

L: I think this erm book go is going to be about the school... erm mathematic er because there are some erm... erm... [points to picture]

R: sum

L: sums... yes and I see erm the boy sit in the classroom.. an art classroom and.. and I think erm he had amazing ears to hear and something things that are the correct erm... sums Bertie Wiggins' Amazing Ears [reads title]

In this example, we see the learner pointing to a picture about a boy doing maths sums and attempting to predict the story. He/She picked out words in the text that corresponded to the picture such as "mathematic" yet inferred that the story took place in the art room, which could be construed as an unsuccessful inference for story setting. Other transcripts in my study seem to suggest that learners who tended to rely heavily on pictorial clues without retrieving other types of external knowledge to guess and infer meanings during reading had poorer reading comprehension results than learners who were able to retrieve knowledge of traditional macro story structures such as complication and resolution, beginning, middle and end and so on, to understand different aspects of the stories they were reading.

Example 9.3 below is an extract from a transcript where the learner appears to have used some knowledge of 'story complication' to predict the ending of the story. R refers to the researcher. Just before this segment of the protocol, the learner L decoded that the man character in the story did not want the

community to sign a petition to save her school. Here we observe the learner trying to interpret why this was so.

Example 9.3

R: why didn't she want the people to sign the petition

L: erm… mm because [finger searches the page] she got her job unpaid uh no no I mean…

R: so did she want the petition signed

L: no

R: why not

L: huh [laughs] because she thinks the school's bad… oh… then she just erm she don't want to do the petition sign so she erm maked like said the wrong thing extra [interpreted to mean 'on purpose'] and erm then she think this was successful because nobody signed and she… erm… she is don't say she so she don't saves the Marnover School

In the beginning of this example, we infer that the learner was looking for information to understand the role of the petition in the story. The learner inferred that the main character in the story "got her job unpaid" but instantly self-corrected with the utterance "uh no no I mean". The learner's laughter suggests that she may have become aware that he/she had made an erroneous interpretation. Following this, he/she appeared to be retrieving some personal knowledge of the purpose of petitions and combining that knowledge with his/her general knowledge of people's irregular behaviour in order to adjust her understanding of the previous sentence. It is likely that this learner attained good comprehension results because he/she was able to use contextual clues in the story in the light of other types of external knowledge for decoding and inferring meaning.

9.1.3   Depth of Vocabulary Knowledge and Reading Comprehension

My learners were asked to read different stages of ORT stories. 6 learners read Stage 11 stories, 4 learners read Stage 13 stories and 8 learners read Stage 16

stories (sub-section 6.2.2). Being a graded reading series, the ORT stories tend to recycle high frequency words. However, the higher reading stages in the ORT series tend to contain more low frequency vocabulary and more complex grammatical structures. The writers also seem to use more challenging language and idiomatic expressions. The stories in the higher stages are also longer, have more characters and deal with more complicated storylines. As I explained in sub-section 6.2.2, I used the Primary English Department's banding system to match all the learners in my study to their appropriate reading stages. This implies that although the Stage 11, Stage 13 and Stage 16 stories I used for data collection had varying levels of lexical difficulty, all the learners in my study were given appropriately challenging reading materials and lexical difficulty was not a main issue in my study. Nevertheless, according to the banding system, the teachers assume that learners reading Stage 16 stories have more breath and depth of L2 vocabulary knowledge than the learners reading Stage 11 and Stage 13 stories.

To investigate the relationship between my learners' vocabulary knowledge and their comprehension results, I grouped my learners into two groups. Group 1 Learners read the Stage 16 story while Group 2 Learners read Stage 11 and Stage 13 stories. The results of my analysis in sub-section 8.3.2 suggest that my learners' reading comprehension results were associated with their group membership. Since group membership was based on the learners' breath and depth of vocabulary knowledge their teachers assumed they have, there is an implication that my learners' vocabulary knowledge is important for reading comprehension.

Example 9.4 below is an extract from the transcripts showing a learner attempting to understand the meaning of the words 'vicarage', 'vicar' and 'scones' in the story. L stands for the learner. Two dots represent a short pause while three dots represent an extended pause. The phrase in brackets shows my interpretation of some utterances that may have been semantically ambiguous.

Example 9.4

L: My next stop was the vic… vicarage.. where Mrs Fuggles the.. vicar invited me for in for tea and son… what does vicarage vicar and scones mean… vicarage and vicar… mm… vicarage may be a sort of a church… maybe something to eat… [referring back to the word 'scones'] or something to drink… because the word for tea and scones may be this may be together

It would appear that this learner applied knowledge of word associations (which is associated with deep vocabulary knowledge) to decode the meaning of the word 'scones'. He/She explained that it could either be something to eat or something to drink since "the word for tea and scones may this may be together." The learner seemed to be able to quickly decode that a "vicarage may be a sort of a church". The most likely way for a reader to understand the meaning of the word 'vicarage' from its context would be to decode its meaning within the sentence "my next stop was the vicarage where Mr. Fuggles the vicar invited me in…" Yet there is no evidence that the learner in this example has worked out that the word 'vicarage' refers to the phrase 'my next stop' (therefore a place such as a church) or that 'vicar' refers to Mr. Fuggles (who is a person). Therefore we may guess that he had more likely retrieved prior vocabulary knowledge rather than worked out the meaning of the word. That is, the learner did not appear to have actually decoded or inferred the contextual meaning of the word 'vicarage'.

A similar situation may be inferred from the same learner in Example 9.5 below where the learner seemed to be attempting to decode or infer the meaning of the words 'retired people'. In this example, R stands for the researcher.

Example 9.5

L: But.. but the houses are full of retired people which means they're at least ninety… the retired people are the old people that haven't done work and are and are too tired or too weak to do work now… ninety…

R: Mhm.. and they're at least ninety. Ninety what

L: Ninety years old

In this example, we notice the same learner explaining the meanings of the words and sentences in the text apparently to deepen his understanding of the word 'retired people'. This move was coded for the retrieval of both lexical meaning and syntactic meaning (ellipsis). Although this particular learner appeared to have knowledge of ellipsis, this knowledge was verbalised only with prompting, suggesting that once again, the learner seemed to be more involved with semantic meaning or deep word meaning rather than syntactic meaning.

Close up scrutiny of the other transcripts seem to suggest that during reading, my learners were more likely to deal with semantic meanings rather than syntactic meanings and as a result. This finding is consistent with several empirical studies. For example, Service and Craik's (1993) argue that young learners tend to relate better to tangible and physical aspects of language such as word senses or semantic meaning when decoding vocabulary (discussed in sub-section 4.2.2). Similarly, Schmitt (1998) argues that a learner's depth of vocabulary knowledge influences overall reading comprehension more than his or her breath of vocabulary knowledge. Other young learner studies conducted by Singleton (1995), Parry (1993), Gass (2003), Hasselgreen (2000), Brown (2001) and Dekeyser and Larson-Hall (2005) also show that children tend to have low affinity for grammatical forms. In fact, Nassaji (2006: 395) argues that the richness of a learner's vocabulary knowledge "may make (him or her) better able to make use of the potential clues available in the text and context" to understand written texts. Nassaji (2006) lists other studies conducted by Haastrup (1991), Laufer and Sim (1985) and Morrison (1996), whose studies produced similar findings.

My discussion of the relationship between learners' external knowledge, vocabulary knowledge and reading comprehension in this section is based on the analysis of several learners' verbal protocols and cannot be generalized for all the learners in my study. Nevertheless, qualitative analysis of individual learners' verbalisations in my dataset suggests that by and large, the learners who appeared to have more successful reading comprehension results in my study tended to retrieve almost as much linguistic knowledge as external

knowledge. This finding is consistent with the results in Parry's (1993) study which show that her learners achieved better comprehension results when they had more sophisticated schemata and rich vocabulary knowledge. My finding also seems to support Cameron's (2001) argument that even for information that derives from the text itself, young learners' cognitive skills in recognizing linguistic patterns in a text are often insufficient for them to understand meaning beyond word and sentence levels (discussed in sub-section 4.2.2). She asserts that it is essential for children to apply mental strategies for decoding vocabulary and inferring contextual meaning whilst reading.

9.2 Strategic Knowledge and Reading Comprehension

9.2.1 Range of Mental Strategies in the Study

The raw counts of knowledge source retrievals in my dataset shown in section 8.1 and section 8.2 suggest that strategic knowledge made up 83% of all knowledge sources retrieved by the learners in this study. This suggests that strategic knowledge was the most commonly retrieved source of knowledge for my learners. The learners' utterances show that they used a wide range of mental strategies for decoding unfamiliar vocabulary and inferring contextual meaning whilst reading. This finding is consistent with Meyers' (1988) finding that their learners applied many different strategies rather than rely on one strategy for understanding meaning whilst they read. Since the strategies retrieved by my learners tended to include both cognitive and metacognitive strategies, we may infer that the underlying mental processes regulating their vocabulary decoding and contextual inferencing attempts were associated with problem-solving as well as self-regulation and self-monitoring processes. This implies that my learners' short term and long term memories were likely to be active during reading (Sternberg, 1984; Wong, 1985; Rubin, 1987; Garner, 1987; Cohen, 1998; Hacker, 2004) (discussed in Sub-section 3.2.3). That is, during reading, the incoming information from the text may have triggered the mental processes in the learner's short-term memory to retrieve strategic knowledge

stored in the long-term memory to assist the learner in decoding vocabulary and inferring contextual meaning.

The taxonomies of strategic knowledge I reported in sub-section 7.3.3 seem to suggest that my learners' cognitive and metacognitive strategies were similar to the strategies that other young learners have retrieved in other studies (Meyers et al.'s, 1990). Close reading of the transcripts show that my learners tended to apply an average of 2 to 4 mental strategies for each attempt to decode vocabulary or infer contextual meaning (discussed in sub-section 8.2.1). This suggests that the reading task was cognitively demanding for my learners and is consistent with the results of previous empirical studies (Meyers, 1988; Meyers et al., 1990) demonstrating that it is likely for learners to apply multiple strategies for any attempt to decode and infer meaning whilst reading. The range of strategies used by my learners also appeared to be similar to the range of strategies used by the adult learners in Nassaji's (2003; 2006) studies, implying that my learners may have similar mental strategies for decoding vocabulary and inferring contextual meaning during reading as the adult learners in these previous studies.

9.2.2   *Strategy Application and Comprehension Success*

My mean of success analysis suggests that not all the strategies retrieved in my study were equally effective for reading comprehension success. Results in other TAM studies (Olson, et al., 1984; Skehan, 1998; Anderson and Lynch, 1988; Daneman, 1987) also show that certain strategies tend to be more effective than others for bringing about successful reading comprehension results. The researchers attribute this to the fact that different mental strategies present different cognitive processing loads; and argue that learners tend to attain better comprehension results when they engage in more complex cognitive processes which are associated with higher processing loads.

According to the results of my study, it appears that my learners tended to attain better comprehension results when they applied Inferencing, Reasoning or

Monitoring, which are considered higher-order mental strategies (Johnston, 1992) (discussed in Sub-section 5.2.3). This finding is consistent with the results in Meyers et al.'s (1988) study which show a positive correlation obtained between passage comprehension and application of higher-order strategies such as Reasoning and other metacognitive strategies. In fact, careful reading of individual transcripts suggests that learners who tended to use lower-order thinking strategies such as Signaling Understanding or Asking for Help seemed to have fewer successful and partially successful vocabulary decoding and contextual inferencing attempts than learners who applied more higher-order thinking strategies such as metacognitive strategies. This implies that my learners' reading comprehension success was likely to correlate with the type of strategy applied (which is related to the cognitive processing load associated with a particular strategy) as well as the frequency with which the strategy was applied.

It appears that in my study, the same strategies which seem to be effective for vocabulary decoding may not be as effective for contextual inferencing for my learners. My qualitative analysis of the learners' verbalisations suggests that the metacognitive strategy Evaluating tended to be less effective for vocabulary decoding than it might have been for contextual inferencing. Careful reading and interpretation of the learners' transcripts suggest that other metacognitive strategies such as Monitoring and Self-Enquiry tended to be more effective for helping learners to reassess their earlier attempts to understand the text so that they were able to attain a better overall understanding of the text. This finding is consistent with the results in studies by Andre and Anderson (1978), Frase and Schwartz (1975), Singer and Donlan (1982) and Wong, 1985), cited in Nassaji (2003), which have demonstrated the usefulness of Self-enquiry in understanding whole texts. In fact, close up analysis of the learners' utterances suggests that metacognitive strategies appeared to be less frequently used for the decoding of individual word meanings than they were for understanding contextual meaning. Baker (1984) and Baker and Brown (1980) argue that metacognitive processing usually results in inaccurate or unpredictable

comprehension outcomes at the micro level, which does not make it ideal for decoding individual word meanings in a text.

9.2.3   Differences in Cognitive and Metacognitive Strategy Retrieval

The raw counts of all the mental strategies retrieved in my study (in Section 8.2) suggest that my learners tended to use much more on cognitive strategies than metacognitive strategies during reading. The apparently low occurrence of metacognitive strategy retrievals in my data suggests that metacognitive strategies may be rather low down on my learners' natural order of strategies. It in turn implies that my learners did not seem to generate as many hypotheses to test whilst reading as mature learners might have done (Daalen-Kapteijns et al., 2001).

The high cognitive processing load associated with metacognitive strategy retrieval and application discussed in sub-section 9.2.2 may have caused my learners to rely on cognitive strategies for decoding vocabulary and inferring contextual meaning before they reverted to using metacognitive strategies. This suggests that cognitive strategies may have been the learners' default strategies in this study (Samuels, 1994; Van Patten, 1996; Skehan, 1998; Schmitt, 1990) (discussed in sub-section 3.4.1). My learners' cognitive strategies may have enabled them to sufficiently decode vocabulary and infer contextual meaning so that there was no need for them to retrieve many metacognitive strategies. This interpretation is consistent with Samuels' (1994) and Van Patten' (1996) argument that metacognitive strategies which often serve as learners' back-up strategies are usually activated when the default strategies appear to be insufficient for vocabulary decoding and contextual inferencing.

9.2.4   Role of Non-Strategic Strategies for Reading

Many of my learners appeared to have applied lower-order strategies such as Repeating, Pausing and Showing Awareness during reading (discussed in Section 8.3.1). In my study, I refer to these strategies as non-strategic strategies, as

opposed to higher-order strategies such as Evaluating, Inferencing, Monitoring and Self-correcting which tend to be more directly associated with the learners' explicit attempts to decode vocabulary and infer contextual meaning. Qualitative analysis of my learners' verbalisations suggests that in some utterances, repetition of words, phrases or sentences during reading seemed to assist the learners in attaining successful or partially successful comprehension results. This finding is similar to the results of Meyers et al.'s (1990) study which demonstrate that non-strategic strategies such as Repeating helped their learners to understanding meaning. Nassaji states that "the advantage of section repeating may in part relate to the role of this strategy in assisting the learner to relate the word to the phrase or sentence in which it has occurred and to use the potential cues available in those contexts" (Nassaji, 2003: 662).

Interestingly, Nassaji's (2003) study produced results demonstrating the ineffectiveness of repetition for vocabulary decoding for his learners. Nassaji posits that this may have been due to the fact that all the target words in his study were completely unknown to his learners. That is, he suggests that the extremely high density of unfamiliar lexis in the texts could have created an unrealistic cognitive processing load for his learners during reading. This was not the case in my study because the use of the ORT stories and the banding system helped to place my learners in their level-appropriate reading levels. This may have kept the lexical difficulty of the different texts at a suitable level for vocabulary decoding through Repetition to be effective.

My analysis in sub-section 8.3.1 suggests that not all word or section repetitions in my data were associated with explicit vocabulary decoding and contextual inferencing attempts that seemed to be related to any obvious comprehension results. In some of the examples I discussed, Repeating appeared to have gained time for the learners whilst they mentally processed the words and sentences they were reading out loud. This finding is consistent with Ellis and Beaton's (1993, cited in Nassaji, 2003) argument that repetitions have the advantage of gaining time for the learners to think whilst they read. It appears that for some learners in my study, non-strategic strategies served as interim strategies. For

instance, some section repetitions in my dataset seemed to be associated with explicit vocabulary decoding and contextual inferencing outcomes when they were used alongside other strategies such as Judging, Evaluating and Self-Correcting.

In my study, the non-strategic strategy of Pausing also appeared to play an important role for reading comprehension. Careful reading of the transcripts suggests that many pauses between utterances were helpful in that they also appeared to buy the learners time for introspective and retrospective thinking. In my dataset, many higher-order strategies such as Inferencing, Elaborating and Evaluating seemed to be activated after pauses; and many of the mental strategies applied subsequently after pausing apparently led to successful or partially successful comprehension results. This suggests that when learners are given time to pause, think and repeat words and sections, they may attain successful reading comprehension results.

9.3 Suitability of TAM for the Present Study

9.3.1 Quantity and Quality of Data Collected

I collected a total of 5 hours, 47 minutes and 3 seconds worth of verbal protocols from 18 learners over 18 recording sessions. The average length of each TAM was 19 minutes. The longest recording lasted 24:39 minutes while the shortest recording lasted 14:35 minutes. Not only was I able to collect plentiful data with TAM, the data I collected appeared to be rich and seemed to lend itself to the different ways of coding and classifying I discussed in Chapter 7. The richness and code-ability of the data I collected suggest that my learners seemed capable of verbalising their thoughts as much as adult learners. This implies that TAM was a good means for me to collect authentic verbal data from my learners. This seems to support the findings in previous studies (Bernhardt and Kamil, 1995; Carrell, 1991; Clarke, 1980; Cziko, 1978; Lee and Lemonnier-Schallert, 1997) which have demonstrated the effectiveness of TAM for eliciting verbal data from young learners (discussed in section 5.2).

9.3.2   Suitability of the Training and Data Collection Procedures

The results of the pilot study and the main study suggest that think-aloud training was an important aspect of my methodology. The objective of TAM training was to help my learners to familiarise my learners to the act of thinking-aloud and to provide examples of knowledge sources that tend to be verbalised by other learners. Roehler and Duffy's (1984) Direct Explanation procedure (discussed in sub-section 5.2.6) was a quick and effective method for warming the learners up to the task and training them in the act of thinking aloud.

A priority of my study was to gather data that came as close to reflecting the actual thoughts of my learners as possible. Charters (2003: 71) states that "researchers who want to use think-aloud techniques to reflect natural thought processes have to design their methodologies with great care to avoid over-influencing their participants." I used Collins and Smith's (1982) list of tried and tested fix-up strategies (discussed in sub-section 6.3.2) to introduce my learners to some strategies commonly found in TAM studies. To encourage my learners to verbalise their own thoughts and strategies, I reminded them that the strategies and thoughts I modeled during the training phase were only a few of my own examples. Two strategies were particularly useful to model. They were 'self-inquiry' and 'expressing confusion'. Collins and Smith (1982) state that these two mental processes tend to go unnoticed by learners during reading and remain largely silent even during the act of intentional thinking aloud. By verbalising these largely hidden thoughts myself during the training phase, I was able to highlight their importance and show that it was acceptable to verbalise them.

Since the outcomes of my pilot study indicated that my learners were able to become familiar with the thinking aloud process quite quickly (discussed in sub-section 5.4.4), I decided to use Meichenbaum's (1985) data collection method for my main study. The strength of Meichenbaum's method is that it is a hybrid approach combining both the training phase and the task phase into a single data-collection session (discussed in sub-section 6.3.2). This had the benefit of reducing the number of data collection sessions for every learner.

For data collection, my learners were asked to perform several tasks simultaneously: reading aloud, processing meaning from textual and contextual clues in the text, answering my questions, thinking with me, familiarizing themselves with the think-aloud method, and then actually verbalising their thoughts. This is a daunting list of tasks for any learner to deal with at a time and all the more challenging for the less confident or less proficient learners in my study. The use of the 'Interactive Thinking Aloud Procedure' (Cameron, 2003) whereby my learners and I collaborated to complete the think-aloud tasks jointly (discussed in sub-section 6.3.2) helped to encourage my learners to verbalise continuously. With the assistance of a 'thinking partner' who probed and questioned along the way, most of my learners were able to verbalise continuously whilst reading. Another advantage of this approach was that it allowed me to provide any amount of scaffolding any time my learners needed it. Jointly completing the task with my learners meant that I was able to continue demonstrating the think aloud process throughout the TAP session whilst steering the more confident learners towards independent thinking aloud and verbalisation. This supports LaBerge and Samuels' (1974) and Gu et al.'s (2005) arguments that scaffolding is essential in TAM studies for encouraging shy learners and learners who may have had difficulties in reporting their own thought processes.

9.3.3   The Issue of Reactivity

In sub-section 5.2.4, I argued that cognitive overload and automaticity of responses are common causes of reactivity which is an issue of grave concern in TAM studies (Jourdenais, 1998; 2001). Collins and Smith (1982) argue that when learners experience cognitive overload, their cognitive activities tend to shut down and their abilities to verbalise tend to be affected, at times drastically. Britton et al. (1985) refer to extreme overloading as "thrashing", which is a situation of cognitive processing system overload that results in a state of complete or near-complete breakdown of the comprehension process usually leading to silence. The amount of protocol data I collected for my study suggests that my learners were neither cognitively over challenged nor under challenged

by the tasks. Since my learners appeared capable of verbalising their thoughts, there is a suggestion that their short-term memory processes were not cognitively strained during reading.

Two reasons may have contributed to maintaining a suitable balance in the cognitive processing loads for my learners. The first reason is the use of the ORT stories for eliciting the think-aloud protocols. Being a graded reading series, these texts tend to contain a suitable balance of new and recycled vocabulary. The presence of unfamiliar vocabulary in the texts may have 'de-automated' the reading process while recycled vocabulary may have kept lexical difficulty at a realistic level for knowledge source retrieval, vocabulary decoding and contextual inferencing. This may in turn have assisted them in verbalising continuously. Secondly, I tried to avoid tasks that were not relevant to my research questions. For instance, I avoided asking summary-type questions during the TAM sessions. According to Brown and Day (1983), asking learners to summarise the text whilst thinking aloud triggers different knowledge sources and strategies than for decoding vocabulary meaning and inferring contextual meaning during reading. Avoiding irrelevant questions and tasks during the think-aloud sessions may have helped to free up cognitive space in my learners' short term memories which they require for verbalising their thoughts (Johnston and Afflerbach, 1983).

Another concern related to reactivity in my study is the effect of strategy demonstration during the training phase. There remains a possibility that introducing learners to strategies may have influenced them to memorise strategies that were not known to them before. However, I believe that there is not much reactivity related to strategy demonstration in my study because it is rather unlikely for my learners to remember unfamiliar strategies and be able to verbalise them after only an initial and brief introduction.

9.4 Summary of Findings

In this chapter, I discussed the results of my study in terms of my learners' retrieval of strategic and non-strategic knowledge sources for vocabulary guessing and contextual inferencing during reading and the effectiveness of my think-aloud procedures in the current study. The main findings of my study are as follows:

1. My learners seemed to apply a wide range of mental strategies and activated both cognitive and metacognitive processes for decoding vocabulary and inferring contextual meanings during reading. The types of strategies they applied appeared to be similar to the strategies that adult learners and young learners have applied in previous empirical studies. Although the range of cognitive and metacognitive strategies in my study was not as wide as those found in these studies, they tended to be similar, and may be interpreted as a sub-set of the strategies they may develop as they mature.

2. The learners in my study seemed to have applied more cognitive strategies than metacognitive strategies during reading. The first possible reason for this is that their cognitive strategies, which may be their default strategies, may not have failed them often. Rather, their cognitive strategies may have been effective enough for vocabulary decoding and contextual inferencing such that there was no need for metacognitive strategies to be involved. Another possible reason for the lower occurrence of metacognitive strategies than cognitive strategies in my data is that the young learners in my study are not as likely to generate as many hypotheses as adult learners to test their understanding of the text.

3. The results of my study suggest that for my learners, strategy application seemed most effective for comprehension success when they were combined with other strategies or different knowledge sources such as linguistic knowledge and external knowledge. Apparently in my study, depth of vocabulary knowledge is important for reading comprehension. The transcripts suggest that learners who had more depth of L2 vocabulary knowledge in my study appeared

to make more explicit attempts to decode unfamiliar vocabulary and infer contextual meaning during reading than the learners who had less L2 vocabulary knowledge.

4. It appears that some strategies which were interpreted as lower-order non-strategic strategies may have directly or indirectly assisted my learners in understanding the text they were reading. When used alone for vocabulary decoding and contextual inferencing, non-strategic strategies tended to gain the learners time for mentally processing the text. When used together with other higher-order strategies such as metacognitive strategies, they often seemed to result in successful or partially successful comprehension results (discussed in sub-section 9.2.3). My analyses appear to suggest that my learners' reading comprehension success was likely to correlate with the type of strategy applied (which is related to the cognitive processing load associated with a particular strategy) as well as the frequency with which the strategy was applied.

5. TAM appears to be an effective method for me to study the knowledge sources my learners retrieved for decoding vocabulary and inferring contextual meaning during reading. This finding is consistent with the findings of previous empirical studies that have relied on TAM to study reading comprehension and vocabulary inferencing processes of both young and adult L2 learners. The results of my study also seem to support Chamot and El-Dinary's (1999: 331) argument that children as young as grade 1 are able to describe their thoughts in rich detail.

6. In terms of the research instruments in my study, my results suggest that procedures which have been developed for adult studies were suitable for my young learners, albeit with some adaptations. The opportunities for scaffolding in my study appeared to assist my learners in verbalising their thoughts continuously during the reading task. My study also suggests that the selection of appropriate reading material was important for maintaining a balanced cognitive processing load for my learners. This in turned seemed to help them to verbalise freely and continuously.

Chapter 10

CONCLUSION

INTRODUCTION

In Chapter 1, I explained that the overall objective of my study was to understand how my learners acquire vocabulary and literacy skills. My literature review provided me with a deeper understanding of vocabulary knowledge, incidental vocabulary acquisition and reading comprehension processes. This inquiry helped me to become more informed about the role of schematic knowledge and strategy application for decoding vocabulary and inferring contextual meaning during reading. My study of TAM helped me to understand the rationale of using the method for my study while my pilot study gave me the opportunity to put my theoretical knowledge into practice and evaluate the practicality of TAM for my study. In this chapter, I discuss the strengths and limitations of my study and highlight ways to improve my methodology. I then go on to list several pedagogical implications of my study and suggest areas for further research.

10.1 Strengths of the Study

Although my theoretical knowledge of the topics of this study developed through my literature research and my analysis of previous empirical studies, I was able to develop my own investigative and analytical procedures for my study. This enabled me to form my own conclusions about my learners' vocabulary decoding processes and reading strategies. The strengths of my study may be associated with several aspects which I discuss below.

10.1.1 Replicating Analysis Methods found in Previous Studies

Replicating the analysis methods found in previous studies helped to improve the reliability of my analysis methods and findings. For example, Nassaji's (2003,

2006) and Meyers et al.'s (1990) studies show that their learners used a wide rang of knowledge sources for decoding vocabulary and inferring contextual meaning during reading. Following the same method that the researchers used to count the number of retrievals for each knowledge source found in my data, I was able to develop a reliable method to interpret the knowledge sources my learners retrieved during reading and infer the frequency with which they tended to retrieve the different types of knowledge sources. Replicating Nassaji's mean of success analysis enabled me to study the relationship between my learners' reading comprehension results and the effectiveness of the individual strategies that occurred in the data.

Previous young learner empirical research (Myers and Paris, 1978; Canney and Winograd, 1979; Gambrell and Heathington, 1981; Garner and Kraus, 1981; Paris and Myers, 1983) have distinguished the subtle differences between the mental processes regulating decoding, inferencing and guessing in terms of the differences in learners' vocabulary knowledge. Replicating Nassaji's (2003; 2006) method of separating the learners into different groups enabled me to explore the relationship between my learners' reading comprehension results and their vocabulary knowledge. Using Nassaji's two-way chi-square test enabled me to analyse the relationship between three different variables in my study – my learners' reading comprehension results, the effects of individual strategy application on vocabulary decoding and contextual inferencing, and the role of the learners' depth of vocabulary knowledge for reading comprehension. The results of this analysis seemed to strengthen the validity of my study because they support the findings in other empirical studies by Haastrup (1991), Laufer and Sim (1985), Morrison (1996) and Nassaji (2006) demonstrating that the richness of a learner's vocabulary knowledge "may make them better able to make use of the potential clues available in the text and context" to understand written texts (Nassaji, 2006: 395).

10.1.2 Selection of Learners

There were several advantages to selecting learners from the same year group. Firstly, sampling from one single year group meant I had to deal with the same class test schedule. By scheduling the TAM sessions during a less-busy period, I was able to collect all my data within three weeks. Secondly, working with learners from a single year group helped to reduce age-related factors that may have influenced the data I collected. As a first-time TAM researcher, it was helpful for me to deal with fewer intervening factors. For a similar investigation in the future, I would sample from learners of different age groups including kindergarten children, secondary students. Young (2005) argues that as long as TAM researchers remain clear on what the verbal data is capable of measuring, learner age should not be a primary concern for selecting learners.

10.1.3 Using Verbal Data

The use of verbal data in the present study provided me with a large amount of rich data for analysing the inaudible thoughts in learners' minds. An alternative source of data for my study would have been learners' responses in vocabulary tests and reading comprehension tests, which commonly serve as data for studies investigating vocabulary knowledge and reading comprehension (discussed in sub-section 5.1.1). However, vocabulary and comprehension test responses may have provided me with snap-shot evidence of my learners' knowledge that would have told me quite little about their interaction with the reading material or their vocabulary decoding and contextual inferencing processes.

10.1.4 Benefits of the General Inductive Approach

According to Thomas (2006), the general inductive approach "provides an easily used and systematic set of procedures for analysing qualitative data that can produce reliable and valid findings" (p. 237). By using open coding, selective coding and In Vivo coding procedures, I was able to flesh out the fullness of the

contents in my TAP transcripts as naturally as possible. Selective coding of the raw data was particularly helpful for identifying overlapping categories in the data, which did not emerge during open coding while In Vivo coding allowed me to identify patterns in the data that derived from the learners' actual utterances themselves. By repeatedly reading and scrutinsing the data, I was able to highlight the naturally occurring patterns and nuances in the data as they emerged on their own. Since the aim of my study was not to test the outcomes of my study against prior assumptions or hypotheses in previous studies, using the general inductive approach meant that as soon as I had identified the main analytical categories and sub-categories in the data, I could go on to analyse and interpret the data in a goal-free way. The main advantage is that I was allowed to be guided by my own evaluation objectives and understanding of the data in the light of my own research questions. This makes the results of my study data-driven rather than hypothesis driven.

The draw back of this approach for my study was that it involved many hours of careful reading and re-reading of a large amount of TAP data with my co-rater in order to pick out patterns and interpret implied meanings. While this was manageable for my small-scale study, it could be a relatively time-consuming and expensive enterprise for a larger scale study involving more learners and data.

10.1.5 Validity and Reliability of the Study

The external validity of my study is not a major concern because the study was not intended to yield high generalizability. However, while this may not be a main issue in this study, it was necessary to establish internal reliability of my data collection and coding procedures. To that end, I carried out co-rating procedures. The many hours of thorough inter-rater checks increased the reliability of my transcription and coding procedures (discussed in Sub-section 7.1.5).

10.2   Originality and Contribution of the Study

10.2.1 Use of Differentiated Texts and Group Analysis

The originality of my study lies mainly in the way I matched the proficiency levels of my learners with the difficulty of the reading texts I have chosen for data collection. As I discussed in sub-section 6.2.2, the use of differentiated texts allowed me to set suitably difficult reading tasks for my learners which I discussed in subsection 6.2.2. The use of texts from different reading levels ensured that there was an appropriate density of known and unknown words in the text. This was important because it allowed the learners to rely on their existing linguistic knowledge to understand the text. At the same time, unfamiliar vocabulary and content in the text triggered the need for the learners to activate mental strategies to decode and infer contextual meaning whilst reading.

A balance of known and unknown words and content in a reading text is essential for a think-aloud study. While many think-aloud studies on reading comprehension and vocabulary learning have been conducted, my think-aloud study is original because of my use of differentiated texts from the ORT series. As I discussed in sub-section 3.2.3, some familiar information is necessary to free up space in the learner's short-term memory for the activation of cognitive processes. Since the complexity of the vocabulary and syntactic structures in the leveled ORT texts build up in difficulty, the texts themselves provide sufficient text-related scaffolding for the learners to retrieve schematic knowledge retrieval during reading. At the same time, unfamiliar information in the text triggers the need for strategy application to decode and infer unfamiliar vocabulary and content during reading. This seemed to work well in encouraging non-automated, cognitively-driven verbalisations from the learners during the think-aloud sessions.

The use of differentiated texts also meant that text difficult was held constant in my study. As a result, all my learners were similarly challenged linguistically.

This enabled me to discuss the relationship between my learners' breadth and depth of vocabulary knowledge, strategy application and comprehension success without text difficulty influencing the results, as it may have done in Nassaji's study (2006). This was a pre-requisite for grouping my learners into 2 separate learner groups for the 2-way chi-square test that investigated the effects of language proficiency on reading comprehension success.

10.2.2 Relationship between Vocabulary Knowledge and Strategy Application

Previous studies up till now as well as my study have focused on the role of strategy application and vocabulary knowledge for vocabulary decoding and contextual understanding during reading. The results of my frequency analysis seem to verify the results in previous research that vocabulary decoding and contextual inferencing success is associated with the type and frequency of strategies learners use as well as the breadth and depth of vocabulary knowledge they have. Nevertheless, my qualitative analysis suggests that the less proficient learners in my study used fewer strategies than the more proficient learners in general. The learners with lower proficiency levels also tended to use fewer higher-order strategies such as metacognitive strategies and contextual inferencing. In fact, the strategies which they applied tended to be those associated with lower means of success in my study.

The results of my Mean of Success Analysis and 2-Way Chi-Square Test in section 8.3 suggest that a learner's vocabulary knowledge may be a determinant of strategy application, both of which have been shown to influence vocabulary decoding and contextual inferencing; and investigated as separate factors influencing reading comprehension in my study as well as previous studies. An important contribution of my study is that it has raised the interesting discussion that an understanding of the relationship between learners' language proficiency levels and their strategy application during reading may be as essential for our understanding of their reading comprehension processes as an understanding of how vocabulary knowledge and strategy application influences reading comprehension separately.

10.3   Limitations of the Study

There are several limitations to my study that I discuss in this sub-section.

10.3.1 Contextualised Study

One limitation of my study is that it is highly contextualized. Out of pragmatic reasons (discussed in Chapter 6), my learner base was restricted to only one group of learners. Though the data collected from this group of learners contained rich and interesting information regarding the knowledge sources and mental processes, learners from other age groups may have provided evidence of other types of linguistic knowledge, external knowledge and mental strategies for decoding vocabulary and inferring contextual meaning. As a result, my study has limited transferability, as I go on to discuss.

10.3.2 Limited Transferability

Although my findings seem to be by and large consistent with the results of previous empirical studies, it is a very small-scale exploratory study. They are based on a rather small database consisting of the verbal protocols, interview responses and questionnaire feedback from 18 learners. My discussion of the knowledge sources involved in vocabulary decoding and contextual inferencing during reading is relevant only to this small group of learners. Therefore, my study has no transferability for learners in other contexts. Additionally, the suitability and effectiveness of my research method was determined for the context of my small-scale study and does not allow me to make any generalizable conclusions on the basis of my findings.

10.4   Areas for Improvement in the Methodology

Several aspects of my methodology could be improved. More time could have been allocated for the different phases within the TAM sessions for learners who required more time to warm up to the task or to think during the task. The act of

thinking aloud could potentially strain some learners' cognitive processes and slow down their rate of thinking, (Jourdenais, 1998; 2001; Yoshida, 2009: 207) and some learners may have benefitted from having more time to think aloud. As retrospection tends to involve higher cognitive processing loads than concurrent reporting (Garner, 1982; Brown and Day, 1983; Afflerbach and Johnston, 1984; Ericsson and Johnston, 1984), additional time-on-task given to the learners may have enabled some to retrieve and verbalise even more knowledge sources.

One method of making my data elicitation procedures in future TAM studies more suitable to young learners is to allow them to complete the task in pairs. I used this method in one of my think-aloud sessions upon the request of the learner, and noticed the benefits of peer collaboration. The transcript from this pair of learners appear to contain fewer verbalisations from me in comparison with the other transcripts, suggesting that partner work may produce more autonomous learner-directed verbalisations. In Willett's (1995) young learner TAM study, she found that her learners produced much better results when they were asked to complete tasks in pairs or small groups. Willett argues that peer transactions tend to be "more playful, provided more varied discourse roles, and resulted in greater elaboration of the core interfractional routine" (p. 489). Conversely, she states that "child-adult transactions were short, the children did not take much responsibility in shaping the transaction, and these routine transactions did not evolve greatly over the course of the year" (p. 489). For future studies, it may also be advantageous to set up a peer-support or expert learner system by pairing up volunteer learners who have already completed one TAM session with first-time learners. Nevertheless this method involves longer data collection sessions so the researcher should carefully consider the consequences for some learners before implementing it across the board.

10.5   Pedagogical Implications of the Study

There are several pedagogical implications of my study that I wish to highlight.

(1) There may be advantages to raising learners' awareness of the importance of strategy application for reading comprehension. During whole class teaching, the teacher could focus on the most effective cognitive and metacognitive strategies for vocabulary decoding and contextual inferencing. However, rather than refer to random strategies during teaching, teachers could concentrate on developing and using instructional materials that teach the most frequently used and effective mental strategies found in empirical studies. Table 15 on page 177 of this thesis may be an interesting strategy-teaching checklist for teachers to work with. Since my study suggests that successful comprehension depends on the application of effective strategies as well as the frequency of strategy application, teachers should identify effective and less effective strategies for decoding vocabulary and inferring contextual meaning amongst their learners and remind them to apply strategies habitually during reading.

(2) It seems that for every attempt to decode the meaning of individual words and infer contextual meaning in a text, my learners had to retrieve between 2 to 4 different types of knowledge sources. This implies that incidental vocabulary learning may be a cognitively demanding exercise for my learners. Therefore, when using incidental vocabulary learning methods in the classroom, teachers should pay attention to two issues.

The first issue is to ensure that learners encounter the same word as frequently as possible. This could be achieved with the use of a graded reading series such as the ORT series, which recycles high-frequency vocabulary. Schmitt and McCarthy (1997) argue that students should encounter these new words in as many diverse contexts as possible in order for them to develop a full understanding of the different components of word meanings of those words.

The second issue is to consider that incidental vocabulary learning could be more effective if it were used in conjunction with some explicit methods of vocabulary learning. For incidental learning to be effective in the classroom, it would be best for it to be considered a starting point (Schmitt and McCarthy, 1997). Schmidt (1993) argues that on a cognitive level, at least some degree of

conscious attention is necessary even for vocabulary acquisition, even when it is dealt with incidentally (discussed in sub-section 2.3.3.2). In the same vein, Robinson (2003) also argues that not all words are embedded in deep contextual meaning. Therefore, some explicit vocabulary learning tends to be necessary.

(3) As I discussed in Sub-section 9.1.1, my learners seemed to retrieve significantly less linguistic and external knowledge during reading, possibly because of their young age. This suggests that they may have a low affinity for attending to grammatical forms. For instance, although they were capable of retrieving linguistic knowledge such as ellipsis (discussed in sub-section 9.2.2), they tended to verbalise this knowledge when promoted. Therefore, there may not be too many advantages in using reading materials that require the learner to retrieve a substantial amount of complex linguistic knowledge and external knowledge to understand the texts.

Since my study suggests that learners' knowledge of deep word meaning influences reading comprehension outcomes and strategy application, there may be advantages in dealing with the deep word knowledge during vocabulary teaching. When asking learners to use bottom-up processing during reading, teachers may encourage them to concentrate more on decoding deep vocabulary meanings rather than superficial word meanings.

(4) The suitability of TAM for my learners suggests that there may be advantages in using TAM processes as a pedagogical tool. The same procedures for eliciting learners' verbalisations during data collection could be used to trigger learners' active thinking processes in the classroom and encourage more learner-directed verbalisations during lessons. In fact, TAM has been recommended as a good alternative assessment technique for young learners to learn how to learn and activate problem-solving strategies. For instance, Meyers et al. (1990) argue that the understanding researchers gain from their TAM studies can be used for devising intervention plans and developing assessment procedures for young learners. They claim that think-aloud protocols might provide information of direct relevance to classroom intervention if the protocols were gathered using

materials that are directly related to the curriculum to which the child is exposed (Meyers et al., 1990: 124).

10.6   Suggestions for Further Research

Considering the suitability of TAM for the learners in my study (discussed in Section 9.3), another investigation that takes into account learners from a wider age group and more varied backgrounds and proficiency levels may produce other insightful findings regarding the various factors influencing the vocabulary decoding and contextual inferencing for different groups of learners. This study focused on the knowledge sources retrieved by the learners for understanding stories. A similar study involving other narrative texts types such as play scripts may yield different but equally interesting results. It would be interesting to replicate the present study with non-fiction texts from the ORT reading series to investigate the range of knowledge source the same learners retrieve for understanding non-narrative genres.

The present study is a case study that provides a snapshot of the knowledge sources and reading comprehension processes of a group of learners at a certain point in their literacy-learning career. The knowledge source retrievals of these learners may have been affected by their past as much as their future skills and abilities may be affected by their current abilities. Since there is evidence that children's cognitive skills correlate with their metalinguistic awareness and age, with the process lasting until young adulthood (Bialystok, 1991; 2001, Afflerbach et al., 2008), I would suggest another longitudinal study of the same group of learners to study the effects of cognitive development on their vocabulary decoding and contextual inferencing processes. Such a study may provide insights on the correlation between emergent literacy learning and other learner-related variables such as learning styles and modalities (Dunn, Beaudry and Klavas, 1989).

Further research could also be conducted to investigate the pedagogical benefits of TAM. Sainsbury (2003: 134) states that thinking aloud offers a window into

the child's understanding whereby the developing understanding is led by the child's spontaneous comments about a story, its characters and pictures. Sainsbury claims that this insight is not usually evident in usual classroom situations where the children are prompted by the teacher's questions. She argues that a teacher's questions tend to frame and structure the responses of the children in a way that supports their developing understanding, yet masks the children's own spontaneous thought processes. Although interesting findings are likely to arise from research that moves from considering TAM as a method of inquiry to a method of instruction, further research is needed to determine the wider pedagogical applications of TAM.

10.7   Chapter Conclusion

My small-scale exploratory study in which I asked 18 young learners to think aloud whilst reading taught me that even young learners may be capable of using a range of existing linguistic, external and strategic knowledge to make sense of written texts. As they read, they revised and adjusted their understanding of incoming information in the light of new evidence. I learned that vocabulary learning and reading comprehension share an interlocking relationship that is regulated by highly complex mental processes. I also learned that decoding vocabulary through context is a cognitively demanding task. This implies that when considering incidental vocabulary acquisition, it is important to consider the benefits of referring to both explicit and implicit learning methods as well as selecting appropriate reading material for the task. As for younger learners such as mine, it is important to take into account the social cognitive factors that influence learning. Although I have discovered several answers that may help me to be more pedagogically effective, I will continue to look for more.

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Appendix 1: Letter of Consent to Parents

Information regarding the purpose for data collection and the procedures for collecting data was given to the learners' parents in the Letter below. Written consent from the parents was obtained on the reply slip attached below the letter.

University of Leeds
School of Education
Leeds, LS2, 9JT
United Kingdom

Participant Letter and Consent Form
Research & Data Collection
PhD Studies in Applied Linguistics
February 2013

Name of Researcher: Annette Elisabeth Schweitzer

Title of Research: Investigating the Mental Strategies of Young Learners for Reading Intervention –
A Qualitative Study Using Verbal Protocols

Dear _____,

I am the main researcher of the abovementioned study leading towards my PhD in Applied Linguistics at the University of Leeds in England. My study examines the mental reading-intervention strategies that young children use to decode word, sentence, text and context-level meanings of written texts. I am currently conducting the main study for my research, which requires oral and written data from 8 to 10-year-old children.

This study has nothing to do with the activities of the German School Shanghai, and the purpose of this

letter is to obtain your consent for _____ to participate in it.

_____ participation will have no affect on _____ work, performance or results at school. I would also like to confirm that the principal has given me consent to pursue my study and conduct my research and data-collection at school. I will adhere to the standard ethical codes for research and data-collection, and ensure the maximum security, confidentiality and privacy of all my research participants and the data they provide.

For data to be collected, my participants will be asked to do the following:

1. Attend one interview with me in the Primary English Room C1.20 during lunch break. Each interview will last between 15 and 20 minutes.
2. Read a short text aloud and respond to a few questions about it.
3. Talk about their individual reading habits, practices and experiences.
4. Complete a short written feedback exercise after the interview. This exercise will take between 10 and 20 minutes, and can be done any time and anywhere after the interview.

I will observe the following guidelines to guarantee the security and privacy of my participants at all times:

1. In the personal interest of my participants, they will not be taken out of their regular lessons at school.

2.   I will ensure that they have a proper lunch before or after the oral interview.

3.   I will conduct the interviews on a one-to-one basis in the primary English classroom at school.

4.   If you allow your child to participate in this study, he or she can withdraw from it any time and at any stage, without question. He or she can also stop the interview anytime after it has started, without question.

5.   My participants' names will not be disclosed during the research and will not appear in any written reports or publications.

6.   All oral and written data obtained from my participants will remain strictly confidential and be treated purely as research data. Their participation and contribution will not be associated with or have any influence on their regular school activities.

7.   The oral segment of the interview will be tape-recorded. If you wish, you may be given a copy of your child's audio interview recording together with all the written transcripts and protocols of the interview.

If you give your consent for your child to participate in my study, please fill out the consent form below, sign and date it, and return it to me. Should you require further clarification at this point or anytime during the research, please do not hesitate to phone me on +86-13621730442 or e-mail me at annette.schweitzer@hotmail.com.

Thank you.

Yours truly,

Annette Schweitzer

Statement of Consent

I have read the brief description and guidelines of the study and I understand the procedures of the interview, which my child will attend. I know that the researcher will ensure the security and privacy of my child at all times. I agree to allow my child to participate in the above study.

Name of participant: _____ Class: _____

Name of parent taking consent: _____

Phone number: _____ E-mail address: _____

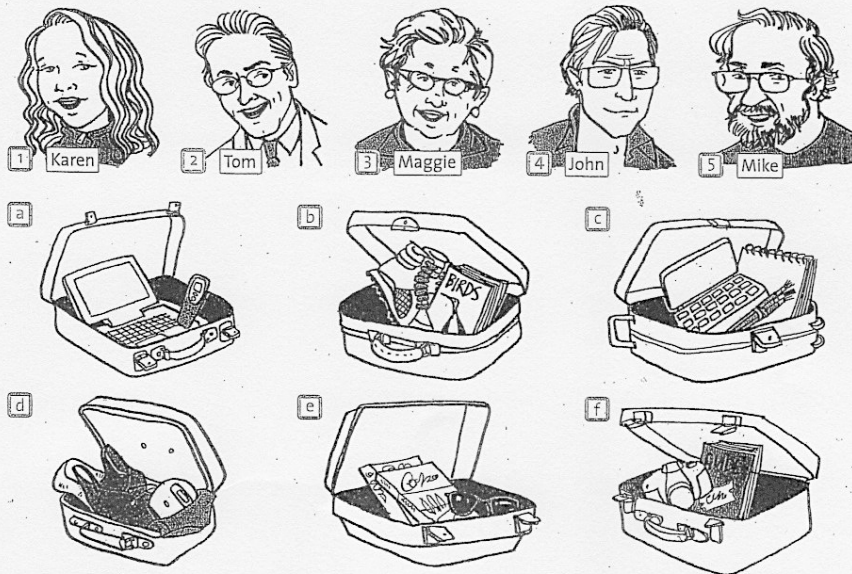Signature: _____ Date: _____

Name of researcher: _____

Signature: _____ Date: _____

Appendix 2a: Pilot Study Visual Materials and Text

The picture only page below was taken from an English Language Textbook and used to familiarise the learners to the thinking aloud process in the pilot study.

The text is an extract from "Bertie Wiggins's Amazing Ears". It was used as a reading text in both the pilot study and main study. In the main study, it was used for the LPL learners only.

## Appendix 2b: Main Study Reading Texts

The first text is an extract from "The Personality Potion". It was used as a reading text in both the pilot study and main study. In the main study, it was used for several LPL and PL learners.

The second text is an extract from "One Girl School". It was used as a reading text in both the pilot study and main study. In the main study, it was used for the PL learners only.

Danny pretended he hadn't seen the empty seat. But Wicks had seen him.

'There's a seat here, Specs. I'm not going to eat you.'

Danny sat down. He hated being called Specs.
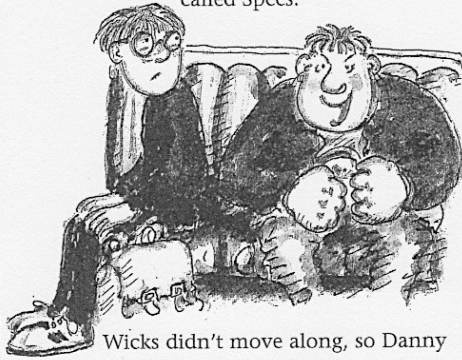
Wicks didn't move along, so Danny had to perch on the edge of the seat.

Wicks pointed to Danny's bag. 'Got your lunch in there?'

'No,' Danny lied. 'I have school dinners.'

Wicks nodded. He pretended to be looking out of the window. Then he made a grab for Danny's bag.

Danny held on, but Wicks punched him on the arm. Danny bit his lip to stop himself crying out.

'Let's have a look then,' said Wicks, unzipping the bag.

He took out Danny's lunch box and said in a dumb voice, 'Well I never – sandwiches! Your mum must have forgot you have school dinners.'

'I've heard there are sixty-five pupils in every class!' one cried.

'Yes!' called another. 'And some children have been lost for weeks in the corridors!'

'Exactly,' said Mrs Whiffy. 'Which is why we must save Marnover School!'
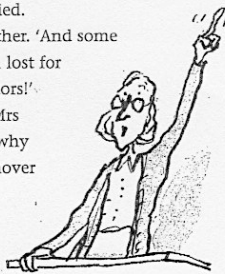
There was a huge round of applause.

Mrs Whiffy hushed the crowd. 'We need some volunteers to take round a petition,' she said, and explained to the children that a petition was a letter of protest that everybody put their name on.

Mrs Whiffy's eagle eyes scanned the room and, to my horror, fell on me. 'You at the back!' she cried. 'You, chewing the gum!' Of course, Mrs Whiffy knew the names of all her pupils, but I hadn't even started at the school yet. If I had my way I never would.

'I've got a bad arm, Miss,' I said.

'That's all right,' said Mrs Whiffy. 'You only need one arm to carry a petition.'