

# **Using a Virtual Learning Environment for the Development of L2 Academic Reading**

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## **Abstract**

The use of a virtual learning environment is a common feature of language programs at colleges and universities worldwide, with the potential to support language development both inside and outside the classroom. This thesis takes a mixed-methods approach to investigate the support provided, via a virtual learning environment, to second language (L2) readers at two colleges of higher education in the United Arab Emirates (UAE). This support takes the form of elaborative feedback within online reading exercises, and post-reading computer-mediated synchronous discussions (CMSD)

The first study, involving 71 students at Ras Al Khaimah Men's College, builds on previous research into elaborative feedback in two ways. Firstly, think-aloud protocols and retrospective interviews were utilized to examine how learners working independently interact with elaborative feedback while completing online reading comprehension exercises. Secondly, the study examined how strategic instruction in the use of elaborative feedback affects its usefulness. The results of two quasi-experiments showed no significant effect for elaborative feedback in comparison with knowledge-of-response feedback as an aid to reading comprehension, nor for the effect of strategy instruction on the usefulness of elaborative feedback. In contrast, findings from the qualitative analysis of think-aloud sessions, interviews and online surveys lend support to the use of elaborative feedback, suggesting that it can assist learners with text comprehension through rephrasing and through helping them to locate answers to comprehension questions within a text.

The second study investigates the use of post-reading CMSD in combination with elaborative feedback with 202 students at Ras Al Khaimah Men's and Women's Colleges. It builds on previous research, as no previous studies had explored the use of post-reading CMSD and elaborative feedback with Arab learners. While the results of a quasi-experiment showed no significant effect for post-reading CMSD on reading comprehension, the qualitative analysis of discussion room logs, interviews and online surveys suggests that such discussion can enhance L2 reading comprehension, and promote both negotiation for meaning and exploratory talk (Mercer, 1995). Furthermore, the analysis suggests that elaborative feedback can act as a useful support to such discussions.

## **Certificate of Authorship/Originality**

I certify that the work in this thesis entitled 'Using a Virtual Learning Environment for the Development of L2 Academic Reading' has not previously been submitted for a degree, nor has it been submitted as part of requirements for a degree to any other university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research and that it has been written by me. Any help and assistance that I have received in my research work and the preparation of the thesis itself has been appropriately acknowledged.

In addition, I certify that all information sources and literature used are indicated in the thesis.

The research presented in this thesis was approved by Macquarie University Ethics Review Committee, reference number: HE28MAR2008-D05699 (see Appendix VII).

Signature of the Candidate

*Signed Electronically, 8th December, 2014.*

*Andrew Bown, 40777596*

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In addition, I would like to acknowledge the following sources, which were used to create the online tests utilised in the two studies described in this thesis.

The adaptation of the IELTS test Pre-test 1, first referred to on page 94, is reprinted from, *Focusing on IELTS: Reading and writing skills* by O'Sullivan, Kerrie and Lindeck, Jeremy on pp58-68, published in 2000 by the National Centre for English Language Teaching and Research (NCELTR).

The adaptation of the IELTS test Pre-test 2, first referred to on page 94, is reprinted from, *Focusing on IELTS: Academic practice tests* by Gould, Phillip and Clutterbuck, Michael on pp54-66, published in 2004 by the National Centre for English Language Teaching and Research (NCELTR).

The adaptation of the IELTS test Post-test 1, first referred to on page 96, is reprinted from, *Focusing on IELTS: Academic practice tests* by Gould, Phillip and Clutterbuck, Michael on pp30-33, published in 2004 by the National Centre for English Language Teaching and Research (NCELTR).

The adaptation of the IELTS test Post-test 1, first referred to on page 96, is reprinted from, *Focusing on IELTS: Academic practice tests* by Gould, Phillip and Clutterbuck, Michael on pp43-46, published in 2004 by the National Centre for English Language Teaching and Research (NCELTR).

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The adaptation of the IELTS test Post-test 3, first referred to on page 191, is reprinted from, *Focusing on IELTS: General training practice tests* by Gould, Phillip and Clutterbuck, Michael on pp. 34-38 published in 2005 by the National Centre for English Language Teaching and Research (NCELTR). Reproduced by permission of Macmillan Education Australia.



## Chapter 1: Introduction

The last decade has witnessed an increase in the popularity of Virtual Learning Environments (VLEs), such as *Moodle* ([www.moodle.org](http://www.moodle.org)), *Blackboard* ([www.blackboard.com](http://www.blackboard.com)), *LAMS* ([www.lamsfoundation.org](http://www.lamsfoundation.org)) and *EdModo* ([www.edmodo.com](http://www.edmodo.com)) in schools, colleges, universities and language institutes worldwide. While these VLEs have not been designed specifically to enhance language teaching and learning, they do offer language teachers a means of providing learners with genuinely communicative online language learning activities without demanding high levels of design and programming skills (Brandl, 2005). In principle, this should have beneficial implications for many aspects of online language teaching and learning, including the development of second language (L2) academic reading. In recent years, the use of mobile learning, or mlearning, has grown worldwide in the field of higher education (Quinn, 2012). As a result, it is now possible to find mobile applications for VLEs such as *Blackboard* and *Edmodo*, which have been specifically designed for the *Android* and *Apple* mobile operating systems used by smartphone and tablet users worldwide. This not only broadens the range of devices on which VLEs can be used, it also increases the possibility for learning to take place away from classrooms, and at a time convenient to the learner. Equally, it increases the likelihood of learners interacting with computer-based materials as part of both their learning and their regular day-to-day activities, whether this interaction is with a desktop PC, a laptop, or a mobile device, such as a tablet or smartphone. While a number of studies have discussed the advantages and disadvantages of various aspects of Computer-mediated Communication (CMC) and Computer-assisted Language Learning (Beauvois, 1992; Brett, 1997; Chapelle, 2001; Kern, 1995; Murphy, 2007; Sauro, 2011), it is evident that reading computer-based texts is assuming an increasingly important role in the lives and educational experiences of L2 learners worldwide (Anderson, 2003; Sawaki, 2001). As a consequence, teachers and administrators working in English language programs in which the primary objective is to prepare students to study academic courses at colleges and universities need to prepare learners for the types of task such study demands.

## **1.1 Context of the Study**

In the United Arab Emirates (UAE), second language reading poses a major challenge to institutions of tertiary education. While many degree programs are run entirely in English, the students often lack the readings skills necessary to engage in study at the Higher Diploma or Bachelor's Degree level or higher. Donaghue and Thompson (2014) note that Emirati students typically have a very low level of first language (L1) reading ability in comparison with international norms. This has implications for L2 reading, given the importance of L1 reading ability as a key determiner of L2 reading proficiency. As Bernhardt (2010) asserts:

The literacy level of readers has a profound impact on what they can accomplish. Readers who struggle in their first language will probably also struggle in their second. Readers who have an array of strategies in their arsenal do not need to be re-taught those strategies (p. 38).

International comparisons further highlight the difficulties faced by L2 readers in the UAE. According to IELTS (2014a), the mean scores internationally on the Academic Reading Module, which grades candidates on a scale from 1 to 9, were 6.1 for females and 5.8 for males in 2013. In comparison, the mean score for test takers from the UAE was 4.7, the lowest among the 40 countries reported. At the same time, the pressure on both students and teachers to improve the reading level of learners is great. Students in the UAE are typically required to score Band 5 in the IELTS exam in order to gain entry to a college or university degree program. Once enrolled, the language of instruction at many institutions is English, with textbooks and online resources also typically provided in English.

## **1.2 Aims of the Thesis**

The aim of this thesis, which involves two related studies that were undertaken at two higher education colleges in the United Arab Emirates, was to explore ways in which L2 reading development could be supported both inside and away from the classroom, through the use of a VLE. The term VLE is used in this thesis in preference to two similar

terms, Learning Management System (LMS) and Course Management System (CMS). While the term CMS has been used in the field of language education (Hamat & Embi, 2005; Morgan, 2003; Sanprasert, 2010), the use of a shared acronym with a similar term, Content Management System, can lead to confusion (Weller, 2007). The term VLE is favoured over LMS, as it was the term used in my place of work during the period in which the research presented in this thesis was undertaken, and is the term with which I am most familiar. However, for the purposes of this thesis, the terms LMS and VLE, which are both widely used (Moore, Dickson-Deane & Galyen, 2011), are considered to be synonymous.

At the time the two studies described in Chapters 4 and 5 were undertaken, students at these colleges were required to score an overall Band 5.5 in the IELTS Academic Test, with no skill below Band 5, in order to graduate with a Higher Diploma. Institutional data indicated that students consistently scored lower in the reading module than in the listening, speaking or writing modules. At the same time, the colleges had invested heavily in *Blackboard*, the institution's VLE of choice, and teachers were encouraged to utilize it with all their students. In my role as the Program Chair of General Education, in which I was responsible for the management of all English language programs at the one of the colleges, I was keen to investigate ways in which the potential of the VLE could be harnessed in order to support the development of the students' L2 reading proficiency.

Two distinct types of support are examined in this thesis: elaborative feedback within online reading comprehension exercises, and post-reading computer-mediated synchronous discussions. For the purposes of this thesis, elaborative feedback will be defined as feedback embedded within online exercises, which provides explanations concerning the correctness or incorrectness of a response and/or provides hints or support to guide the learner towards a correct response. The term computer-mediated synchronous discussions will be used to refer to text-based CMC discussions featuring two or more learners interacting synchronously.

In addition to the applied, professional aim outlined above, in my role as researcher it is my intention to add to the existing body of knowledge on the usefulness of elaborative feedback and computer-mediated synchronous discussions to enhance L2 reading comprehension. With regard to elaborative feedback, a large number of studies have

been undertaken into the effects of different types of feedback embedded within computer-based instructional materials (Brandl, 1995; Clariana, 1993, 2000; Nagata, 1993, 1996; Van der Linden, 1993), and a full review of these studies is presented in 3.3. However, only a few studies have investigated the use of elaborative feedback to enhance L2 reading comprehension (Bown, 2006; Murphy, 2007, 2010). This thesis hopes to build on previous research by using think-aloud protocols and retrospective reports in order to examine how learners interact with elaborative feedback while working independently at a computer completing online L2 reading comprehension exercises. Furthermore, unlike previous studies, this thesis investigates whether focused strategy instruction in the use of elaborative feedback can increase its usefulness as an aid to L2 readers.

With regard to CMC, previous research has highlighted some of the benefits of its use for language learning, which are discussed in 3.4 below. However, few studies have focused on CMC for L2 reading comprehension (Fernández-García & Arbelaiz, 2002; Murphy 2010) and only Murphy (2010) has investigated the use of elaborative feedback in combination with CMC discussions. This thesis aims to add to the body of knowledge by investigating the use of CMC in combination with elaborative feedback as an aid to L2 reading comprehension with Arab learners.

## **1.3 Theoretical Framework**

The theoretical basis for the investigations into elaborative feedback and computer-mediated synchronous discussion as aids to L2 reading comprehension draws on several approaches to second language learning. This eclectic approach is common in the field of computer-assisted language learning (Levy and Stockwell, 2006). The *Compensatory Model* of L2 reading (Bernhardt, 1991, 2005, 2010), which is discussed more fully in 2.2.1, has been used to conceptualize L2 reading, and in particular to highlight the factors which influence L2 reading performance. Any attempt to utilize computer-based instruction to support the development of L2 reading must be informed by an understanding of these factors. The *Compensatory Model* predicts that 50% of the variance in L2 reading performance can be explained by L1 literacy and L2 language



ability. The remaining 50% of variance is unexplained, but is believed to depend on factors such as comprehension strategies, background knowledge, engagement, interest and motivation. In addition, the *Compensatory Model* predicts that the various knowledge sources can compensate for weaknesses in other knowledge sources. I would therefore argue that elaborative feedback that is designed to provide L2 readers with support while completing reading comprehension exercise independently should target factors which affect performance, such as L2 grammar and vocabulary knowledge and knowledge of text structure. Furthermore, attention should be paid to aspects such as interest and motivation, and to strategic knowledge, which together might affect the potential of elaborative feedback to assist with L2 reading comprehension.

Interactionist theories of second language acquisition (SLA) (Gass, 1997; Long, 1996; Pica, 1994, 1997) have informed the approach taken in this thesis, in particular the interactionist approach to CALL proposed by Chapelle (1997, 1998, 2001), which is examined in 3.2.1. This approach suggests that computers can be utilized to assist in the language learning process by providing modified input and by providing opportunities for learners to modify their own output and negotiate for meaning. In the context of the studies undertaken in this thesis, elaborative feedback has the potential to help modify input in the form of L2 reading texts, rendering previously incomprehensible parts of a text comprehensible. Furthermore, computer-mediated discussions can provide modified input, and opportunities to negotiate for meaning, again potentially assisting the reader with reading comprehension. While elaborative feedback can support the reader working independently or with others, computer-mediated discussions require the learner to work collaboratively with one or more discussion partners.

The approach taken in this thesis has also been informed by sociocultural and social-constructivist theories and their reference to *scaffolding* and the *Zone of Proximal Development*. While there are differences between sociocultural and social-constructivist views of learning (John-Steiner & Mahn, 1996), a full discussion of which is beyond the scope of this thesis, proponents of both theories draw heavily on the work of Lev Vygotsky and his concept of the *Zone of Proximal Development* (Commander & Guerrero, 2013; Ghafar Samar & Dehqan, 2013; Yang & Wilson, 2006; Wilhelm, 2001). The Zone of Proximal Development is defined by Vygotsky (1978) as:

The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (p. 86).

In this way, learning takes place through interaction with an instructor or with a more knowledgeable peer, rather than in isolation. The support provided through social collaboration should be sensitive to the current developmental level of the learner, who is then led to a higher level of development (Comander & Guerrero, 2013). The support provided to the learner within his *Zone of Proximal Development* is often referred to as *scaffolding* (Levy & Stockwell, 2006), which helps bridge the gap between what the learner can achieve unaided and that which he is able to achieve with assistance. Sociocultural and social constructivist approaches are discussed in more detail in 2.4 and 3.2.2. With regard to the topics of interest to this thesis, I hypothesize that elaborative feedback has the potential to provide scaffolding to help the L2 reader comprehend parts of a text that he would be unable to comprehend unaided. In addition, computer-mediated synchronous discussions are hypothesized to provide an environment within which learners can interact together, and with a reading text, in order to jointly construct meaning. Within such conversations, it is also hypothesized that less advanced learners will be able to benefit from the scaffolding provided to them by more knowledgeable peers.

## 1.4 Research Hypotheses

The following four hypotheses are tested in this thesis:

**Hypothesis 1:** The use of elaborative feedback in Web-based reading practice materials results in improved L2 reading comprehension.

**Hypothesis 2:** Instruction in the use of elaborative feedback increases its usefulness as an aid to L2 reading comprehension.

**Hypothesis 3:** Post-reading computer-mediated synchronous discussions assist learners with L2 reading text comprehension.

**Hypothesis 4:** Elaborative feedback is a useful support to post-reading computer-mediated synchronous discussion in promoting L2 reading comprehension.

## **1.5 Organization of the Remainder of the Thesis**

Chapter 2 presents a review of the literature on L2 reading, which draws inevitably on that from L1 reading research. Given the vast amount of research into L2 reading in recent years, a full review is beyond the scope of this thesis. Instead, an overview is provided, with the main purpose being to examine the factors that affect L2 reading performance in order to lay the ground for Chapter 3, which examines how computers can be utilized to assist with L2 reading comprehension and instruction. The review begins with a brief look at descriptions of the reading process in L1, including a look at top-down, bottom-up and interactive models. This is followed by an examination of the differences between L1 and L2 reading. One influential model of L2 reading, the *Compensatory Model* (Bernhardt, 1991, 2005, 2010), is presented, along with a recent variation of the model (McNeil, 2012). This is followed by a review of findings from research into L2 reading and their implications for instruction.

Chapter 3 focuses on L2 reading in a computer-based environment. It begins with an examination of the differences between reading online and from paper and then looks at an interactionist approach to computer-assisted reading instruction. This is followed by a discussion of the two aspects of computer-assisted instruction that form the core of this thesis: elaborative feedback and computer-mediated communication (CMC), with an emphasis on their applications for L2 reading development. The use of a virtual learning environment to host CMC tools and reading practice exercises containing elaborative feedback within a single environment is then discussed. The chapter ends with a statement of questions left unanswered by previous research that will be addressed in this thesis.

Chapter 4 presents Study 1, which investigates the use of elaborative feedback as a support to L2 reading comprehension. While numerous studies have examined the effectiveness of different feedback types in instructional settings, very few have investigated the effect of elaborative feedback on L2 reading comprehension. Furthermore, no studies to date have investigated whether strategic instruction in the use of such feedback is beneficial. Using a mixed-methods approach, the findings lend support to the use of elaborative feedback as an aid to L2 reading comprehension and to the use of strategy instruction to enhance the effectiveness of elaborative feedback with some learners.

Chapter 5 focuses on Study 2, an investigation into the use of post-reading computer-mediated synchronous discussions to enhance L2 reading comprehension. In addition, the use of elaborative feedback as a support to such discussions is examined. As with Chapter 4, a mixed-methods approach is utilized. While the results of a quasi-experiment are inconclusive, data from online discussion logs, surveys and interviews lend support to the use of post-reading computer-mediated synchronous discussions. Additional support also emerges for the use of elaborative feedback, both as an aid to the individual learner, and as a support to collaborative discussion among L2 readers.

Chapter 6 concludes with a summary of the findings of the two studies and offers suggestions for L2 reading instruction and for further research.

## Chapter 2: L2 Reading

The importance of reading in today's world is incontestable. According to Grabe and Stoller (2011), approximately 80 per cent of the world's population is able to read at least one language, with many also able to read at least one additional language with varying degrees of proficiency. They stress the necessity for people to possess at least basic literacy skills in order to advance their standard of living and level of education. Similarly, Carrell (1988) contends that reading is the most important skill for the majority of second or foreign language learners of English, and in the case of the latter is the main reason for studying the language in the first place. This position is supported by Anderson (2003), who further notes that while success in reading is often linked to greater success in the other language skills, lower levels of L2 reading ability can be a barrier to academic progress. The challenge to both teachers and learners is great, given the multi-faceted nature of L2 reading ability, which, as will be seen below, rests on the efficient and effective use of numerous resources, such as L2 vocabulary, background knowledge and cognitive and metacognitive reading strategies. The importance of L2 reading is further underlined by the fact that a large amount of attention has been given by applied linguists to the teaching of reading in comparison to other aspects of language teaching and learning (Han, Anderson & Freeman, 2009).

If L2 reading is a key skill, then both its usefulness and its development among L2 learners are today intimately tied to technology. Anderson (2003) argues that with L2 readers depending more and more on online reading as a source of input, the need to train L2 learners how to read online is increasing, with the result that online learning tasks are now growing in popularity in language classrooms worldwide. This need to train L2 readers specifically in online reading arises due to differences that exist between online and paper-based reading. Chapter 3 will look at some of these differences, and at how computers can be used to assist in the teaching and learning of L2 reading. The focus of this current chapter will be theories of the reading process, and models that have been developed to help describe it, differences between L1 and L2 reading, and findings from research into L1 and L2 reading and their implications for instruction.

## 2.1 The Reading Process

Reading is an extremely complex process. As Grabe and Stoller (2011) indicate, any attempt to define L2 reading needs to consider factors such as the different purposes that exist for reading, the complexity of skills, knowledge and processes that contribute to fluent reading, the impact of L2 knowledge on successful reading, and the social context within which reading takes place. With regard to the different purposes for reading, Grabe (2009) notes that the different contexts within which reading takes place and the various goals and motivations for reading necessitate that we read in different ways. Within an academic context, Grabe lists the following six purposes for reading:

1. Reading to search for information (scanning and skimming)
2. Reading for quick understanding
3. Reading to learn
4. Reading to integrate information
5. Reading to evaluate, critique and use information
6. Reading for general comprehension (pp. 7-8).

Although by no means exhaustive, this list underlines the fact that fluent readers habitually read for a variety of purposes. This variety has cognitive implications, as the purpose or goal of reading affects the way that human cognitive capacities are allocated during the process of comprehending text, with appropriate allocation of these limited resources necessary if comprehension is to be successful (Baker & Brown, 1984; Horiba, 2013). However, the purpose for reading is only one of the factors that affect the act of reading itself (Hudson, 2007). In addition, it is necessary to consider the media used, for example a newspaper or a computer screen, the content, such as an academic journal or a postcard, the text structure, be it a graph or an expository text, and the use of strategies and skills. Strategy and skill use depend not only on the choice of strategies and skills, such as when to skim and when to scan, but also on the abilities and levels of metacognitive skills possessed by the reader. All these factors will have an impact on the act of reading that results. The reference to the use of strategies and skills is important in that it points to individual, reader-specific differences in addition to more general, reader-independent factors such as the purpose for reading and the medium of the text. When we begin to look at second language reading in more detail below, it will be

necessary to consider differences in L2 knowledge, in addition to other components of reading ability, such as metacognitive abilities, skills and strategies.

Grabe and Stoller (2011) write that reading for general comprehension, or “the ability to understand information in a text and interpret it appropriately” (p. 11), is the most basic purpose for reading, and acts as a support and foundation for most other types of reading. However, it is at the same time extremely complex, involving the rapid use of multiple skills and strategies and the automatic, time-efficient processing of words. They assert that a description of fluent L1 reading acts as a useful starting point when considering L2 reading, partly because more research has been undertaken into fluent reading in L1 than in L2 contexts, but also because at advanced levels, L1 and L2 reading abilities are similar. Similarly, Grabe (2004) and Hedgcock and Ferris (2009) argue that, while attention must be paid to distinctions between L1 and L2 reading, their similarities in terms of cognitive processing justify the judicious use of findings from L1 research by L2 researchers and practitioners. Grabe and Stoller (2011) write that fluent L1 reading is:

1. a rapid process
2. an efficient process
3. an interactive process
4. a strategic process
5. a flexible process
6. an evaluating process
7. a purposeful process
8. a comprehending process
9. a learning process
10. a linguistic process (p. 11)

Fluent L1 reading is both rapid and efficient, with the multitude of reading processes being coordinated to allow for comprehension to take place (Breznitz, 2006). It is also interactive in nature, both in terms of the interactions between the various processes that lead to comprehension, such as word recognition and main idea formation, and in terms of the interaction between the reader’s linguistic and background knowledge and the text (Commander & de Guerrero, 2013; Singhal, 2011), which leads the reader to a

successful interpretation of the text. Furthermore, fluent reading is a strategic process, in that the successful reader must make conscious decisions in order to address processing and comprehension difficulties (McNeil, 2012), and must also be flexible as the demands placed on him by the interaction with the text change. The fluent reader will evaluate his ongoing interaction with the text with respect to his goals and expectations, and to his feelings with regard to successful text comprehension. Fluent reading is a purposeful process (Hudson, 2007), with the motivation for reading coming either from the reader himself, or being imposed. It is also a comprehending process, though the ways in which comprehending takes place will vary from reader to reader, and a learning process, which is key to an individual's academic development. Finally, Grabe and Stoller (2011) note that reading is fundamentally a linguistic process, as comprehension of a text is impossible without knowledge of the language in which it is written (Koda, 2005).

Given the complexity of the reading process, it is not surprising that attempts to define it have also varied greatly in their focus. For example, Grellet (1981) focuses on the construction of meaning from a written text: "Understanding a written text means extracting the required information from it as efficiently as possible" (p. 3). In contrast, the definition of reading in a web-based environment provided by Warschauer (1999) implies that reading involves much more than interacting with a single text. In addition, the reader needs to know how to locate and evaluate relevant texts from the myriad texts available, and how to utilize the information within the texts: "Reading the Web means intelligently finding, evaluating, and making uses of a great variety of sources of information" (p. 158).

Bernhardt (2010) aligns herself with the definition provided by the RAND Reading Study Group Report (2002):

We define reading comprehension as the process of simultaneously extracting and constructing meaning through interaction and involvement with written language. We use the words extracting and constructing to emphasize both the importance and the insufficiency of the text as a determinant of reading comprehension.

Comprehension entails three elements:



- The reader who is doing the comprehending
- The text that is to be comprehended
- The activity in which comprehension is a part (p.11).

In discussing the reader, the text, and the activity, the report continues by stressing the importance of the sociocultural context, which influences all three. The importance of this context will be discussed later in 2.1.2.

From the above discussion, it is apparent that fluent L1 reading comprehension is an extremely complex process. Before looking at some of the key differences that exist between L1 and L2 reading, let us examine some of the models that have been posited to describe L1 reading. These models can be divided broadly into three types: bottom-up, top-down and interactive, and they differ in the emphasis they give to low-level, bottom-up processes, and high-level, top-down processes.

### **2.1.1 Models of the Reading Process**

Bottom-up models, such as that provided by Gough (1972), offer an essentially text-driven view of the reading process (Singhal, 2005). According to this view of reading, the reader extracts the writer's intended message from the text by moving in a linear fashion from the processing of lower-level features, such as letters and words, to higher level features of the text, such as clauses, sentences and paragraphs (Carrell, 1988). It follows from this that bottom-up models place great emphasis on word recognition and the rapid processing of text while paying less attention to the use of context, an overreliance on which is viewed as typical of a poor reader (Hudson, 2007). In contrast, top-down models begin with higher-level, conceptual processes involving the use of the reader's goals, expectations, and prior knowledge (Grabe and Stoller, 2011; Hudson, 2007; Singhal, 2011). According to the top-down view of reading, the reader comes to the reading text with expectations, which are either confirmed or rejected as the reader samples the text. If these expectations are confirmed, the reading process can continue uninterrupted, whereas if they are rejected the reader will return to the text to read more carefully, in order to generate further expectations or modify existing ones. Unlike bottom-up models, top-down models suggest that the efficient reader need sample only

enough text to confirm or reject her<sup>1</sup> expectations and may ignore parts of the text that seem to be irrelevant (Singhal, 1999; Urquhart and Weir, 1998).

Bottom-up and top-down models of the reading process have both been criticized for their failure to account for experimental findings from both L1 and L2 reading research. For instance, Urquhart and Weir (1998) argue that the serial nature of Gough's (1972) model cannot account for experimental evidence that shows that words can be recognized more quickly than letters. Neither can it account for the evidence that readers make use of higher-level syntactic information at the word recognition stage in order to deal with problems of ambiguity. The weaknesses of top-down models have also been exposed by their failure to describe the behaviour of good readers. Samuels and Kamil (1988), for instance, highlight two weaknesses of conceptually driven top-down models. Firstly, if a reader has little or no knowledge of the topic of a reading text, it will be impossible for her to generate predictions. A second and associated problem is that for skilled readers it may actually be inefficient to generate predictions, as this can require more time than would be needed to simply recognize the words. In other words, top-down models may describe the reading behaviour of beginning readers hampered by weak word recognition skills, but cannot account for the behaviour of more skilled readers (Grabe and Stoller, 2002; Samuels and Kamil, 1988)

Nowadays, the most commonly accepted view of reading is that it is an interactive process involving both bottom-up and top-down processes (Hudson, 2007; Singhal, 2001, 2011). Interactive models vary in the relative emphasis they give to these processes, but are characterised by the acceptance that the various top-down and bottom-up processes do interact during reading. For example, Hudson (2007) presents a number of such interactive models, citing, amongst others, those of Perfetti (1985, 1988 and 1991) and Rayner and Pollatsek (1989) as having a bottom-up, information-processing bias, and that of Anderson and Pearson (1984) as being relatively top-down in approach, with a focus on the utilisation of background knowledge structures (schemata). Grabe and Stoller (2011) cite three compatible models of the reading process, which, they argue, are still relevant in the light of research findings. These L1 reading models will be discussed briefly here, with a more in-depth discussion reserved

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<sup>1</sup> In order to avoid a potentially sexist use of language, male and female pronouns and possessive adjectives are used interchangeably in this thesis.

for L2 models in Chapter 3. The *Word Recognition Model*, posited by Seidenberg and McClelland (1989), is not a complete model of reading comprehension, but rather one that describes how fluent word recognition occurs in order to provide the input necessary for reading comprehension to take place. A number of variants of the *Word Recognition Model* exist (Harm & Seidenberg, 1999, 2004; Plaut, 2005; Rayner, Juhasz & Pollatsek, 2005) but these models are all bottom-up in orientation and make no attempt to describe higher-level processes. For example, Harm and Seidenberg (2004) proposed a model based on connectionist principles to describe how the meaning of words is derived from print. The model was an attempt to resolve the debate concerning the extent to which reading is visual, wherein word meaning is arrived at through a direct mapping from orthography to semantics, or phonological, whereby the mapping moves from orthography to phonology and then to semantics. In their model, both the direct, visual pathway and the phonologically mediated pathway are available, and are utilized jointly to provide input that assists in the construction of meaning. As Grabe (2009) notes, connectionist word recognition models have been influential due to the assumption that trouble-free reading makes little use of higher level, top-down processes. He adds:

Most current models of reading see word recognition as the key component of cognition that is specific to reading. If comprehension is understood as a larger cognitive process including listening and visual comprehension, ... then the one aspect that is unique to reading is the visual processing of orthography and word units into internal language input on which comprehension processes work (p. 101).

The *Simple View of Reading Model* (Gough and Tunmer, 1986; Hoover and Gough, 1990) suggests that reading comprehension is comprised of two main components, word recognition skills and general comprehension ability, with the latter being measured through listening comprehension. Essentially, reading comprehension (RC) is viewed as the product of listening comprehension (LC) and decoding (D).

$$RC = LC \times D.$$

In this way, a measure of decoding skill and a measure of comprehension ability (measured via listening comprehension) when multiplied together will give an accurate

measure of reading comprehension. In addition, neither decoding nor listening comprehension alone can result in reading comprehension. The term listening comprehension here is utilized to represent the various components of verbal ability, including vocabulary, syntax, inferencing and the construction of mental schemas (Kirby and Savage, 2008, p. 2). Decoding, on the other hand, can refer to both word recognition and phonetic analysis (Johnston and Kirby, 2006; Kirby and Savage, 2008). In this way, the *Simple View of Reading Model* is compatible with the word recognition models described above, which could be used to explain or describe decoding, but not listening comprehension. The *Simple View of Reading Model* is very influential and has been used as the theoretical basis for a vast amount of research into L1 reading and has been well supported by the findings of this research (Byrne and Fielding-Barnsley, 1995; Kirby and Savage, 2008, Grabe and Stoller, 2011; Hoover and Gough, 1990; Nation and Snowling, 1997, 1998). However, there is some disagreement over whether reading comprehension should always be determined by the simple multiplication of listening comprehension and decoding or whether they should be combined in different ways (Chen and Vellutino, 1997). Findings may vary depending on the context of the study, and the age and ability levels of the population studied (Chen and Vellutino, 1997; Kirby and Savage, 2008). The *Simple View of Reading Model* is interesting in that listening comprehension is seen as a key determiner of reading comprehension. However, while both decoding and general comprehension abilities are necessary for reading comprehension to occur, the exclusion from the model of other factors such as background knowledge, strategic knowledge and motivation prevent the *Simple View of Reading Model* from being a complete theory of reading comprehension.

The *Interactive Compensatory Model* (Stanovich, 1980) attempts to explain individual differences in reading ability. It contends that reading involves a variety of lower-level, automatic processes, such as word recognition, and less automatic, higher-level processes, for example the use of background knowledge. During the course of normal, efficient reading, the automatic processes will function with little interference from higher-level processes. When the reader experiences difficulty in interpreting a text however, a weakness in one of the lower-level skills may result in the interaction between higher-level and lower-level processes. For example, background knowledge might be used to overcome a weakness in word recognition skills. Although the *Interactive Compensatory Model* was developed to describe L1 reading, it has influenced L2 reading research and theories, including the *Compensatory Model* proposed by

Bernhardt (1991, 2005, 2010). The *Compensatory Model* will be examined later in 2.2.1 in the discussion of L2 reading, and forms an important part of the theoretical basis of this thesis.

In summary, both bottom-up and top-down models of the reading process have been useful in providing insights into the important processes that make up reading. Nowadays, most reading researchers subscribe to an interactive view of reading, exemplified by a number of models in which bottom-up and top-down processes interact during reading. According to such a view, a good reader interacts with a reading text by seeking main ideas and important supporting details while also employing reading strategies and prior knowledge (schemata) in order to construct meaning (Singhal, 2011). Both reading strategies and schemata will be discussed later in 2.3.3 and 2.3.2 respectively.

### **2.1.2 The Importance of Social Context**

While the above models focus largely on the psycholinguistic aspects of reading, and the interaction between the reader and the text, recent years have seen a growing interest in perspectives on reading that emphasize the importance of sociocultural aspects (Bloome, 1993; RAND Reading Study Group. (2002); Street, 1997, 1999, 2003). Bloome (1993) asserts that an investigation into reading should not be limited to an examination of the reader-text or author-reader interaction, which is the focus of psycholinguistic approaches, but should also examine the social context of the reading event, including the role of the author and his relationship with the reader. Bernhardt (2010) notes that a general acceptance of reading as a sociocognitive process took place during the 1990s. Prior to that there had been a division between cognitively focused and socially oriented research; only the realization that both aspects of reading were of import allowed reading research to advance. Yang and Wilson (2006) stress the importance of social context in putting forward a social-constructivist model of L2 classroom reading, stating that “the social context affects when you read, what you read, where you read, who you read with and, of course, why and how you read” (2006, p. 366). Commander and Guerrero (2013) employ a sociocultural perspective on reading, in which meaning can be constructed through collaboration and the interdependence of individual and social

processes. They argue for the view of reading as an interaction between reader and text to be expanded to include the ways that meaning is co-constructed when two or more readers work together collaboratively to comprehend a text.

Placing reading in its social context has implications for the extent to which generalizations about reading can be made across contexts (Hudson, 2007). The view that will be taken in this thesis is that the interactive models of reading outlined above can provide useful insights into reading, which can be used as a starting point in attempts to understand reading within its social context. However, adequate consideration should also be given to these different contexts in order to enable consumers of research studies to judge to what extent particular findings might be relevant or applicable to their own particular contexts. This theme will be dealt with in greater detail in the section on L2 reading below, and again in the methodology section, but it will have clear implications for the way in which the research findings of this thesis are interpreted.

This thesis will now look briefly at how L2 reading differs from L1 reading. It will then examine one influential model of L2 reading, the *Compensatory Model* (Bernhardt, 1991, 2005, 2010), along with a recent, extended version of this model. Finally, it will consider some of the key findings from L2 reading research that have direct relevance to this thesis, and draw from them some implications for L2 reading instruction.

## **2.2 L2 Reading**

As mentioned earlier, a far greater amount of research has taken place into L1 reading than L2 reading. This is a major reason why theories of the former have been used as the starting point for discussions of the latter. However, as we will see, L1 and L2 reading are fundamentally different, despite the vast number of similarities between the two, and despite strong indications from research which show that L1 reading has an important influence on reading in an L2.

The very fact that at least two languages are involved in L2 reading distinguishes it from L1 reading. Bernhardt (2010) notes that the existence of two channels, the 'clear', first

language channel and the 'degraded', second language channel, which function simultaneously, entails that reading in an L1 is different from reading in an L2. In L2 reading, the clear, first language channel provides phonology, processing strategies and word recognition strategies that may on occasion help, and on others hinder, comprehension. In addition, first language literacy and culture guide "the development of the conceptual model on which understanding is based" (p. 29), such that L1 literacy and culture shape the way an L2 text is comprehended. First language knowledge, which is relatively complete, and second language knowledge, which is relatively incomplete, work together in tandem as comprehension occurs. In contrast, L1 reading typically involves the use of the clear, first language channel alone. Bernhardt (2010) argues that an ignorance of this difference in the way L1 and L2 reading occur has hampered research, and prevented assistance from being provided to instructors. However, she also notes that in recent years, the political and social climate has changed, to the extent that second language reading has been afforded greater importance, both by the mainstream L1 reading research community, who finally acknowledged the relevance of L2 reading, and by governmental institutions, such as those in the United States, who realized the need for more inclusive approaches to education. So what has been learnt from recent research into L2 reading with regard to its differences when compared to its L1 sister?

Koda (2005) contends that it is important, given the diversity of L2 reading populations, to define the group of interest in terms of their age and prior literacy experience before outlining the distinctions between L1 and L2 reading. In choosing to focus on cognitively mature L2 readers who are literate in their first language and learning to read an L2, she identifies three key differences. Firstly, those learning to read an L2 typically have prior literacy experience in their L1, whereas those learning to read their L1 usually have none. Secondly, those learning to read their L1 have usually acquired the basic foundations of the language in advance of learning to read, allowing the focus of early reading instruction to be placed on decoding skills, whereas L2 learners often have no such foundation. As a result, learning to read an L2 often occurs in tandem with learning the basics of the language itself. Thirdly, L2 reading involves both the L1 and the L2, whereas L1 reading is assumed to involve only one language (Koda, 2005).

Hedgcock and Ferris (2009) draw on Grabe and Stoller (2002), Hudson (2007) and Koda (2005) in offering a list of six differences between both the processes and the development patterns of L1 and L2 reading: linguistic threshold; metalinguistic and cognitive awareness; print environment; role of multiple linguistic systems; age and maturation; and completeness. With regard to a linguistic threshold, it is posited that while L1 processes rely on naturally occurring aspects of L1 language knowledge, a minimum 'threshold' level of L2 proficiency may be required in order for functional L2 reading skills to develop. L2 reading may also place greater demands on cognitive and metacognitive awareness than L1 reading, which relies less on explicit knowledge of the L1. Hedgcock and Ferris (2009) also suggest that L2 reading may occur in contexts where access to L2 print materials is more limited than typical L1 settings, where L1 materials are freely available. However, as will be seen in Chapter 3, access to the Internet is perhaps reducing the impact of such differences. In line with Bernhardt (2010) and Koda (2005), they note that L2 reading processes involve access to at least two languages and orthographies, which interact in complex ways that may be positive or negative, whereas L1 reading typically involves only one language. Concerning age and maturation, L1 reading skills are typically acquired from childhood onwards, and may occur after L1 oral and aural skills have begun to emerge. In contrast, the L2 reader often acquires L2 reading, writing, listening and speaking skills at the same time, and this acquisition may occur at any age. Finally, with regard to completeness, L1 reading development is often considered to be more complete than L2 reading, which places greater cognitive and metacognitive demands on the reader (p. 33).

Given the differences between L1 and L2 reading cited above, it is clear that while L1 models of the reading process offer a useful starting point for the description of L2 reading, they are inadequate without some modification. In other words, although fluent L1 reading might be the target performance level for an advanced L2 reader (Grabe and Stoller, 2011), L1 and L2 reading are not the same, with processing differences inevitable given the interactions between L1 and L2 that occur in the L2 reader (Bernhardt, 2010; Koda, 2005). Equally, not all L2 readers are advanced-level readers, so an L2 model needs to account for some of the differences in linguistic and non-linguistic knowledge that exist, and that have an impact on L2 reading comprehension.



### 2.2.1 The Compensatory Model of Second Language Reading

One model of L2 reading that grew out of the interactive theories of L1 reading discussed earlier is the *Compensatory Model of Second Language Reading* developed by Bernhardt (1991, 2005, 2010). The *Compensatory Model* is an attempt by Bernhardt to provide a theory of second language reading that can explain findings from L2 reading research more effectively than the abundance of L1 theories in existence. While she acknowledges the influence of L1 theories on her own model, she questions whether any L1 theory can effectively explain L2 reading, given the differences that exist between the two (Bernhardt, 2010).

At the heart of the *Compensatory Model* are the three key components of L2 reading that have been drawn from research studies, namely L2 language knowledge, first language literacy and 'other', along with the notion of compensation. L2 Language knowledge includes knowledge of both L2 grammar and vocabulary, the effect of cognates shared by the L1 and L2, and the linguistic distance between the two languages. Together, these L2 knowledge constituents account for up to 30% of the reading process, according to Bernhardt's *Compensatory Model*. L1 literacy contributes a further 20% to the process, and includes knowledge of the L1 alphabet system, including how letters are mapped to sounds, L1 vocabulary, and L1 text structure. In other words, up to 50% of L2 reading performance can be explained or predicted by two components, L2 language knowledge and L1 literacy. The remaining 50%, or 'other' in Bernhardt's terminology, is accounted for by unexplained variance. These 'other' factors include constituents such as reading comprehension strategies, engagement, background knowledge, and levels of interest and motivation.

Bernhardt (2010) argues that a literate individual reading an L2 relies on multiple sources of information that can be used appropriately, and according to need, whenever a difficulty is encountered. She also asserts that the factors that make up L2 language knowledge, L1 literacy and other unexplained sources of variation in reading performance, are not used independently of one another, but are used simultaneously by the L2 reader, with deficits in one knowledge source being compensated for by greater use of another source. So, for example, a deficit in L2 language knowledge can be compensated for by the use of L1 literacy skills. She expands on her earlier model

(Bernhardt, 2005) by adding that a constituent of one component may compensate for a deficiency in another constituent of that same component, or for a deficiency in another component. For example, knowledge of L2 vocabulary might be used to compensate for a deficiency in grammatical knowledge within the L2 language knowledge component. It might equally be used to compensate for a deficiency in background knowledge, a component of the unexplained variance, or 'other'.

### 2.2.2 An Extended Compensatory Model

Although the *Compensatory Model* makes a valuable contribution to our understanding of L2 reading, Bernhardt (2010) admits that while it can explain up to 50% of the variance in L2 reading, it leaves another 50% unexplained. Drawing on the work of Bernhardt (2005) and on a broad range of L2 reading research, McNeil (2012) proposes an extension of the *Compensatory Model* (CM), in an attempt to account for some of the unexplained variance, or 'other' in Bernhardt's model. He notes:

A compensatory notion of L2 reading helps explain how readers draw from various resources to construct meaning... In its current form, however, the CM struggles to maximally achieve its goal of emulating a juggling and switching of cognition during L2 reading, mainly because it does not predict the contributions of variables outside of L2 language knowledge and L1 reading ability (p. 66).

In an attempt to provide a more effective account of compensatory processing in L2 reading, and in order to be explain a greater percentage of the variance in L2 reading performance, McNeil (2012) incorporates two additional components, strategic knowledge and background knowledge, into an *Extended Compensatory Model*. In addition, this recently proposed model predicts that the relative contributions of the four components differ depending on the L2 reading proficiency level of the learner.

Like the original *Compensatory Model* (Bernhardt, 2005, 2010), McNeil's *Extended Compensatory Model* recognizes the importance of both L1 reading ability and L2 language knowledge for L2 reading and predicts that the relationship between L1 and L2 reading becomes stronger as L2 reading proficiency develops. Equally, both models

predict that L2 language knowledge is a greater predictor of L2 reading ability for low-proficiency L2 readers. However, whereas the original model attributes up to 20% of the variance in L2 reading ability to L1 reading ability, and up 30% to L2 language knowledge, McNeil draws on the findings of a range of research studies (Bossers, 1991, Fecteau, 1999, Lee and Schallert, 1997, Song, 2001) to predict that for high proficiency readers L1 reading ability is a greater predictor of L2 reading ability than is L2 language knowledge. These studies will be examined in more detail in 2.4 below.

The inclusion of strategic knowledge within the *Extended Compensatory Model* is based on the argument that readers draw on alternative knowledge sources when encountering reading difficulties (Stanovich, 1980). This requires the use of cognitive and metacognitive reading strategies as the reader attempts to comprehend the text. In McNeil's model, strategic knowledge is defined as "the conscious cognitive and metacognitive mental actions readers take to plan, repair, evaluate and monitor comprehension processes" (2012a, p. 68). McNeil argues that while there is an overlap between the L1 literacy component and strategic knowledge, they should be considered as separate components. He cites the work of van Gelderen, Schoonen, Stoel, Glopper and Hulstijn (2007), who investigated the contributions of language-specific knowledge (word recognition, vocabulary and grammar) and metacognition to both L1 and L2 reading in a study of 397 Dutch EFL students in grades 8 to 10. They found that in both L1 and L2, language specific knowledge was a greater predictor of reading comprehension in the lower grades, but by grade 10 metacognition was the greater predictor. In placing strategic knowledge within his *Extended Compensatory Model*, McNeil again distinguishes between lower and higher-proficiency readers. For those of low-proficiency, L1 reading ability is considered to be a stronger predictor of L2 reading performance when compared with strategic knowledge. However, for high-proficiency readers, the reverse is true. In fact, strategic knowledge is considered to be the strongest predictor of L2 reading for this group.

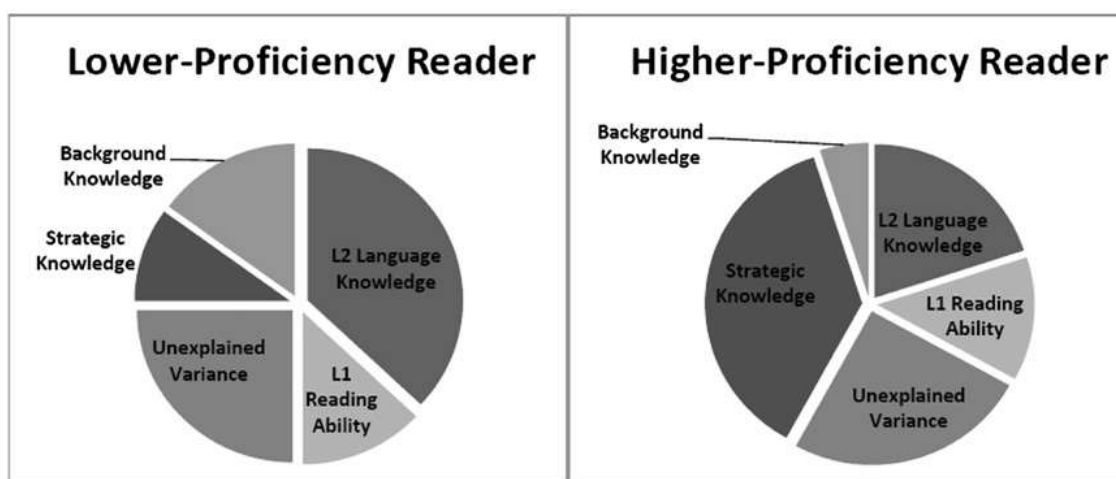
The fourth component in McNeil's *Extended Compensatory Model* is background knowledge. Whereas Bernhardt (2010) includes background knowledge within the 50% of unexplained variance in her *Compensatory Model*, she does not attempt to include it as a separate component. McNeil, on the other hand, attempts to reflect the impact of background knowledge on both automatic, trouble-free text processing, and on

compensatory processing that occurs when background knowledge is utilised to compensate for weaknesses in lower-level skills such as word recognition. While some writers have distinguished between content, formal, and linguistic schemata (Eskey, 1988; Carrell and Eisterhold, 1988; Devine (1988), McNeil's model incorporates only content schemata, which refer to "domain, topical or cultural knowledge readers bring to texts" (2012a, p. 70) within the background knowledge component. As in Bernhardt's (2005, 2010) model, formal schemata are contained within the L1 reading and L2 language components as knowledge of text structure and knowledge of the orthographic, syntactic and phonemic systems. A more detailed discussion of schemata will be offered in 2.4 below.

Again, McNeil distinguishes between lower and higher-proficiency readers when predicting the contribution of background knowledge to L2 reading. He contends that for low-proficiency readers background knowledge can assist with comprehension and reading efficiency. He does note that a minimal level of L2 proficiency is still required for comprehension to take place. For high-proficiency readers, he argues that background knowledge can aid comprehension, but is not a strong contributor to L2 ability. In his *Extended Compensatory Model*, the role of background knowledge as a predictor of L2 reading is greater for lower-proficiency L2 readers than for higher-proficiency readers.

As McNeil notes, lower and higher-proficiency are relative terms. He follows Bachman (2004) in suggesting that a proficiency test administered to a large sample with normal distribution can be used to define lower and higher-proficiency groups. Those whose performance places them in the top one-third would form the higher-proficiency group, those in the bottom third would constitute the lower-proficiency group, while those in the middle third would be excluded. Being relative, it is hard to determine how McNeil's 'lower and higher-proficiency' terms can be viewed in relation to well-known descriptors of L2 language proficiency, such as the nine-band scale utilised by IELTS, with Band 1 referring to a non-user and Band 9 to an expert user (IELTS, 2014b).

Figure 2.1 below illustrates the relative predictive strengths of the four components, L1 reading ability, L2 language knowledge, strategic knowledge, and background knowledge, for higher and lower-proficiency L2 readers.



**Figure 2.1:** The Extended Compensatory Model for lower and higher –proficiency L2 readers (from McNeil, 2012, p. 73).

From Figure 2.1 we can see that the size of the sector indicates its relative importance as a predictor of L2 reading. For lower-proficiency readers, the order of importance, from most to least, is predicted to be L2 language knowledge, background knowledge, L1 reading ability and strategic knowledge. For the higher-proficiency reader, strategic knowledge is the strongest predictor of L2 reading, followed by L2 language knowledge, L1 reading ability and background knowledge. One point worthy of note is that, despite the difference in the relative contributions to L2 reading of the four components depending on the level of L2 reading proficiency, the four components combined account for approximately 75% of L2 reading for both higher and lower-proficiency readers.

It should be noted that while McNeil (2012) proposes the *Extended Compensatory Model* based on research findings, the model itself has yet to be thoroughly tested through follow-up research. It cannot yet claim to meet the standard of a 'good theory', which should be able to explain past and current findings and also predict the future (Bernhardt, 2010). In addition, the number of research studies on which McNeil draws in expanding on Bernhardt's model is limited in comparison to the wealth of studies on which Bernhardt's model is based. Bernhardt's *Compensatory Model* has also received support from others, such as Hedgcock and Ferris (2009), who draw heavily on her 2005 model.

However, despite the differences that exist between the *Extended Compensatory Model* of McNeil (2012) and Bernhardt's *Compensatory Model* (2010), there is much commonality between the two. For instance, while Bernhardt's model only predicts the contributions of L1 reading and L2 language knowledge, Bernhardt does include both strategic knowledge and background knowledge in her '50% unexplained variance' as potential key contributors to L2 reading. Through these similarities, both models can usefully inform second language reading instruction, whether in more traditional, paper-centric instructional settings, or in those where more extensive use is made of computer-assisted instruction. They offer clear indications that both L1 reading and L2 language knowledge are key contributors to L2 reading, and, in their own ways, both Bernhardt (2005, 2010) and McNeil (2012) suggest that both strategic knowledge and background knowledge are also important contributing factors. As will be seen below, a large number of studies support these assertions.

## **2.3 Key Findings from L2 Reading Research**

The number of studies into aspects of L2 reading has increased dramatically in recent decades (Koda, 2005, p. xv), and a full treatment of findings is beyond the scope of this paper. The focus of this section will therefore be limited mostly to aspects of L2 reading that are central to the original *Compensatory Model* (Bernhardt, 2005, 2010) and the extended version of the *Compensatory Model* (McNeil, 2012) discussed above: the relationships between L1 reading proficiency, L2 language proficiency and L2 reading proficiency; the importance of background knowledge in the form of both content and formal schemata; and lastly, reading strategies and metacognitive knowledge. While formal schemata are not explicitly included as a separate component in either Bernhardt's *Compensatory Model* or McNeil's *Extended Compensatory Model*, appearing with the L1 reading component in both models, they are included below as they are particularly relevant to the topic of academic reading, which is central to this thesis.

### **2.3.1 L1 Reading Proficiency and L2 Language Proficiency**

On the relative importance of L1 reading proficiency and L2 language proficiency in determining L2 reading ability, Grabe (2003) states that according to studies “L2 proficiency tends to account for 30% to 50% of the variance in L2 reading comprehension measures, while L1 reading often accounts for less than 20% of the shared variance” (p. 248). This indicates that while both factors are important, generally L2 proficiency has the greater influence on L2 reading proficiency. As we saw earlier, Bernhardt (2005, 2010) also argues that roughly 20% of the variance in L2 reading performance is accounted for by L1 literacy, but is more conservative in her estimation of the contribution of L2 language knowledge, attributing a maximum of 30% to this factor. However, both agree that L2 language is the greater predictor of L2 reading performance.

Hudson (2007) reviews a range of studies that examine whether poor reading in an L2 is predominantly due to poor reading in the first language or to poor knowledge of the L2. His conclusion supports that of Grabe (2003, 2009) and Bernhardt (2005, 2010), stating that studies have generally shown that L2 knowledge is the greater determiner of L2 reading ability, particularly those studies undertaken with lower-level learners. However, Hudson notes that the reader’s level of L2 proficiency, as well as the type of reading task, may also be important variables and that further studies need to be conducted in order to determine whether there is a threshold level of L2 ability beyond which L1 reading skills may be transferred to L2 reading. Again, this may be further complicated by the fact that orthographic differences between L1 and L2 may be great, as is the case with Chinese, an ideographic language, and English, an alphabetic language, or less marked, as is the case with English and Dutch. In summary though, it does appear that both L1 reading ability and L2 language ability are important determiners of L2 reading ability.

In line with McNeil’s model (2012), some studies have indicated that the relationship between L1 reading, L2 language knowledge and L2 reading is not static, and may vary according to the L2 proficiency level of the reader. Lee and Schallert (1997) analysed the L1 and L2 reading ability and L2 language knowledge of 809 Korean middle and high school students. Regression analysis was used to determine that, for the group as a

whole, 56% of the variance in L2 reading ability was due to L2 language knowledge, while 30% was due to L1 reading ability. However, once the groups were divided into different L2 proficiency levels, the researchers found that the correlation between L1 and L2 reading was markedly stronger for the highest ability group ( $r = .47$ ) than for the lowest ability group ( $r = .22$ ). This would indicate that L1 reading ability could account for more than 30% of variance in L2 reading for higher proficiency students, and less for those of lower proficiency. Song (2001) found similar results with a group of 424 Korean EFL learners, while other studies of L1 Turkish learners of Dutch (Bossers, 1991) and L1 Bosnian students of French (Pichette et al. (2003) also suggest that L1 reading is a stronger predictor of L2 reading than is L2 language knowledge for high level learners. The situation is reversed for lower-proficiency learners.

In summary, research has demonstrated that both L1 reading and L2 language knowledge are strong contributors to L2 reading ability. While L2 language may be the single strongest predictor of L2 reading overall, some studies suggest that L1 reading is a stronger predictor for high-proficiency learners. Caution should be exercised when interpreting and comparing the findings from different studies, where different measurement tools are used to assess L1 reading ability, L2 language knowledge and L2 reading ability. However, there appears to be little doubt that both L1 reading and L2 language knowledge are key factors in L2 reading.

### **2.3.2 Background Knowledge and L2 Reading**

Another component of reading ability that has attracted the attention of L2 research has been the role of background knowledge in reading comprehension. One view of background knowledge, schema theory, is a central feature of both top-down models, such as that of Goodman (1982), and of interactive models with a top-down emphasis, for example that of Anderson and Pearson (1984). Schemata are abstract knowledge structures based on the sum of our prior experiences, and these may be activated and modified during reading as we interact with the text (Nuttall, 2005). Carrell and Eisterhold (1998), Devine (1988) and Eskey (1988) describe three categories of schemata: *content schemata*, which contain knowledge about the content area of texts, including culturally specific knowledge; *formal schemata*, which hold knowledge about



text structure and organization, and *linguistic schemata*, which host syntactic, semantic and orthographic knowledge. Hudson (2007), on the other hand, uses only 2 categories, content schemata and formal schemata, including linguistic schemata within the latter category. This thesis will follow Hudson in referring only to content and formal schemata, with linguistic schemata considered as part of L2 knowledge in the case of syntactic and semantic knowledge, and also of L1 reading in the case of orthographic knowledge.

With regard to the effects of content schemata on L2 reading comprehension, a number of studies have indicated that variations in readers' cultural background knowledge can lead to differences in comprehension. For example, Carrell (1987) investigated the use of culturally familiar and culturally unfamiliar reading texts with students of Muslim and Catholic/Spanish backgrounds. Participants from each group read one culturally familiar and one culturally unfamiliar text each. Within each group, half of the participants read texts that were in a familiar, 'well-organized' rhetorical format, while the other half read texts whose rhetorical organization was modified and unfamiliar. In this way Carrell (1987) examined the influence of both formal and content schemata on comprehension. Her findings indicated that content schemata did influence comprehension as participants generally scored higher in reading comprehension tests based on the culturally familiar texts. In addition, they scored higher on texts whose rhetorical organization was familiar than on those whose textual organization was unfamiliar. Carrell concluded that both content and formal schemata affect reading comprehension, though in different ways, with formal schemata being particularly important for comprehension of the "top-level episodic structure of a text" (p. 476) and for sequential and temporal relations within the text.

Although Carrell's (1987) study is limited by the fact that it involved two groups of only 28 Muslim and 24 Catholic Spanish speakers, other studies conducted with different cultural groups have lent support to the finding that background knowledge can affect comprehension. Abu-Rabia (1996) examined the effect of the cultural familiarity of text on the reading comprehension of 80 Hebrew mother-tongue Israeli Jewish and 70 Arabic mother-tongue Israeli Arab school students aged 14-15. Participants were presented with culturally familiar and culturally unfamiliar texts in either their L1 or their L2 (English for the Jewish students, Hebrew for the Arab students). Abu-Rabia

found that students' reading comprehension, as measured by multiple choice questions that tested understanding of both explicit and implicit information, was better when they read texts with culturally familiar content than when they were faced with texts containing content that was culturally unfamiliar. Furthermore, for the understanding of implicit information, the cultural familiarity of text content was shown to have a greater effect on comprehension than the language (L1 or L2) of the text. The findings lend support to the role of background knowledge in facilitating comprehension. One weakness of the study, highlighted by Hudson (2007), is that the texts used are not presented in the article so gauging the relative cultural familiarity of the participants with the content of each text is not possible. In addition, Bernhardt (2010) argues that the learners in Abu Rabia's (1996) study were more instrumentally than integratively motivated. She suggests that motivational factors may be capable of outweighing or helping to overcome culturally incompatible factors within a compensatory framework.

Schema theory has been criticised for its inadequacy as a theory, and for the assumptions made by those who embraced it. Grabe (2009) notes that schema theory is not a complete theory, and is yet to be empirically tested. He argues that it is one of a number of ways of explaining knowledge and memory structures and, in fact, is used simply by many authors to refer to background knowledge. Bernhardt (2005) argues that psycholinguistic, top-down views of reading associated with schema theory do not describe L2 reading effectively, and that researchers in the 1970s and 1980s who adopted schema made unfounded assumptions about reading in a second language without fully investigating the processes involved in L1 and L2 reading. She further notes that studies in the 1990s indicated that the importance of prior knowledge was being overestimated as "it was highly possible that a reader who had all appropriate and relevant knowledge could fail to use it; other times, no apparent relevant or appropriate knowledge and didn't need it" (p. 134). However, while schema theory may not be an adequate explanation of L2 reading theory, this does not imply that background knowledge cannot be used to assist L2 reading comprehension in a compensatory fashion.

Bernhardt (2010) asserts that background knowledge, in the form of content and domain knowledge, is not a good predictor of L2 reading performance, but is rather an idiosyncratic variable. However, she does argue for the development of a culturally

compatible knowledge base, which can assist with L2 reading comprehension (Chan, 2003; Nassaji, 2007). Chan (2003) investigated the effect of culturally familiar background knowledge on reading comprehension in a study of 214 students from Hong Kong and Mainland China. Using a test of General English to divide the participants into intermediate and post-intermediate groups, Chan then used two English cloze tests of reading comprehension, one with culturally neutral content, and one containing content more familiar to the Hong Kong Chinese participants. She found that background knowledge did assist with L2 reading comprehension, but that it was more beneficial to lower-proficiency learners, who relied on it more. She also found that higher-proficiency readers could use their linguistic knowledge to compensate for a lack of background knowledge. These findings are in line with the position of Nassaji (2007), who argues that automatic, trouble-free comprehension is a two-stage process. In the first stage, the propositional content of the text is extracted using lower-level processes, while in the second the propositional content interacts with the reader's prior knowledge, resulting in comprehension. He also contends that high proficiency readers can overcome deficits in background knowledge due to high level text-based comprehension skills that rely on strong L2 knowledge. In support of a compensatory view of reading, Nassaji further suggests that background knowledge can be used strategically to help overcome weaknesses in lower-level processes, such as word recognition.

Other studies have, like Carrell (1987) mentioned above, examined the impact of formal schemata on reading comprehension. As Hudson (2007) notes, syntactic formal schemata are of interest to L2 reading researchers, as knowledge of their effects on comprehension may act as a guide for simplifying or altering texts to make them more accessible to L2 readers. Yano, Long and Ross (1994) investigated the use of simplified and elaborated texts with 483 Japanese college students. Participants were randomly presented with either unmodified (baseline), simplified, or elaborated versions of 13 reading passages, along with a 30-item multiple-choice comprehension test. They found that both simplification and elaboration resulted in improved reading comprehension when compared with unmodified texts designed for native speakers. They also found no significant difference between the effects of simplification, in which the vocabulary and syntactic features of a text are modified, and elaboration, in which parenthetical paraphrasing, redundancy, the explicit statement of underlying thematic linkages and the definition of low-frequency content words are added to the text. They argue for the

use of elaboration of texts for L2 readers in instructional settings, suggesting that it facilitates comprehension while also ensuring exposure to linguistically rich input necessary for further language development. Oh (2001) also argues for the use of elaboration rather than simplification when modifying texts for L2 readers. She used baseline, simplified and elaborated texts with 180 Korean high school students, who were divided into low-proficiency and high-proficiency groups. She found that for both groups, simplification facilitated comprehension when compared with unmodified versions of the same text, although the difference was only significant for the high-proficiency group. Elaborated input, on the other hand, significantly enhanced comprehension for both low-proficiency and high-proficiency groups. These studies both point to the potential of elaborated input for facilitating comprehension with L2 readers.

The insertion of questions into a reading text is another method of assisting L2 reading comprehension that has been investigated, though with mixed results. Al-Shehri and Gitsaki (2010) compared the effects of an integrated reading format, in which multiple-choice comprehension questions were inserted within the body of short online texts, and a split attention format, in which the questions followed the text. With these short texts, they found that the integrated reading format was a more effective facilitator of reading comprehension than the split-attention format with their intermediate-level L2 learners. Brantmeier, Callender and MacDaniel (2011) studied the effects on L2 reading comprehension of embedded adjunct questions (questions designed to aid reading comprehension that are answered while reading a text) within social psychology reading texts, following on from a number of studies which had shown a positive effect for adjunct questions on L1 reading comprehension (Callender and MacDaniel, 2007; Hamaker, 1986; Seifert, 1993). In the Brantmeier et al. (2011) study, 97 native English speaking students of advanced L2 Spanish read two texts of 525 and 646 words respectively, taken from a social psychology textbook. Three versions of each text were prepared, and the participants were randomly assigned to read one of the versions. One version contained embedded “what” questions, another contained elaborative “why” questions, while the third contained no adjunct questions. For each passage, a written recall and a multiple-choice test were used to measure reading comprehension. No significant effect for adjunct questions was found using either the recall or multiple-choice measures. The mean scores for the groups exposed to either the elaborative or

embedded questions were virtually the same on the recall tasks, with both groups outperforming those who received no adjunct questions. However, the differences were not significant. All three groups performed similarly on the multiple-choice tasks. They concluded that the difference, albeit insignificant, in mean scores produced by the recall tasks may be due to the fact that this type of task is more sensitive to differences in meaning extraction than multiple choice tests. Given that all three groups scored over 90% on the multiple choice tasks, it is also possible that these tests were too easy to measure any differences in comprehension level. They conclude that different types of embedded or elaborative questions may be required with L2 readers in order to duplicate the positive findings from L1 research.

Hudson (2007) reviews research into formal schemata and suggests that knowledge of the L2's orthographic, phonemic and syntactic structure, in addition to that of cohesion and text structure, can affect reading comprehension in the L2. In addition, he argues that instruction in such formal knowledge may be of benefit to learners, though further research is needed into the amount and type of training that learners require in order to skilfully apply such knowledge. The notion of skilful use of content and formal knowledge and management of the reading process brings us to the notion of the strategic reader and both cognitive and metacognitive reading strategies.

### **2.3.3 L2 Reading Strategies**

The increased interest in L2 reading in recent years has been accompanied by a growing body of research into L2 reading strategies, which indicates that L2 learners use a broad range of strategies while reading. Singhal (2001) notes that a distinction is often drawn between learning strategies, which are used to increase the effectiveness and efficiency of the learning process (Oxford, 1990), and comprehension or reading strategies, which facilitate comprehension and help the reader to deal with comprehension problems encountered during the reading process. She states that comprehension strategies "indicate how readers conceive of a task, how they make sense of what they read, and what they do when they don't understand" (p. 2). Carrell (1998) identifies a broad range of comprehension strategies, such as skimming a text for the main idea, scanning for specific information, guessing the meaning of unknown words from context, predicting,

confirming and disconfirming inferences and identifying the main idea of a text. She distinguishes reading strategies from reading skills on the basis that skills are applied automatically in an unconscious manner, whereas strategies are selected deliberately in order to achieve a particular goal. In addition, she aligns herself with O'Malley, Chamot, Mazanares, Russo and Kupper (1985) in drawing a further distinction between cognitive and metacognitive strategies. With regard to general learning strategies, the distinction is expressed as follows:

metacognitive strategies involve thinking about the learning process, planning for learning, monitoring comprehension or production while it is taking place, and self- evaluation of learning after the language activity is completed. Cognitive strategies are more directly related to individual learning tasks and entail direct manipulation or transformation of the learning materials. (O'Malley et al., 1985, p. 506).

Metacognitive strategies are therefore vital for monitoring comprehension and for deciding what to do when a breakdown in comprehension occurs. Without metacognitive awareness, the learner will be unable to apply reading strategies that have been taught or otherwise acquired in a strategic manner (Carrell, 1998). With specific regard to L2 reading, Mokhtari and Sheorey (2002) put forward the Survey of Reading Strategies (SORS) as a tool to measure the metacognitive awareness and perceived use of reading strategies of adolescent and adult learners in an academic ESL context. The 30-item survey divides reading strategies into three categories: global reading strategies; problem-solving strategies and support strategies. Global reading strategies are those used to monitor and manage reading, such as having a reading purpose in mind and previewing the length and organization of a text. Problem solving strategies, which include rereading the text to improve comprehension and guessing the meaning unknown words, are utilized when a problem occurs while the reader is engaged in reading the text. Lastly, support strategies are those which provide support to the reader to assist with text comprehension, such as using a dictionary or making notes. Anderson (2003) adapted the SORS in his investigation of online reading strategies. His extended survey is discussed in more detail in Chapter 3.

With regard to the importance of cognitive and metacognitive strategies, McNeil (2012) argues that the use of strategic knowledge to overcome difficulties is central to the notion of compensatory processing in both the *Compensatory Model* and his *Extended Compensatory Model* discussed above. He suggests that the ability to recognize deficiencies in knowledge sources and to select appropriate alternative knowledge sources in order to overcome difficulties related to a particular reading purpose requires the use of cognitive and metacognitive reading comprehension strategies. This use of strategic knowledge has been the focus of numerous investigations in L2 contexts, with particular attention being paid to the relationship between reading strategy use and L2 reading proficiency.

A number of studies have found that high and low proficiency L2 readers differ in their use of comprehension strategies. Phakiti (2003) investigated cognitive and metacognitive strategy use among 384 Thai university students of EFL. He used an 85-item multiple choice reading comprehension test to measure L2 reading performance and a follow-up cognitive and metacognitive questionnaire to investigate strategy use. In addition, 4 highly successful and 4 unsuccessful (as determined by test performance) test takers took part in retrospective interviews. Phakiti found that 15-22% of the variance in reading test scores was explained by cognitive and metacognitive strategies, suggesting that the relatively weak relationship might be due to the fact that strategies are only used when readers encounter difficulties. Other factors, such as language ability might therefore attenuate the impact of strategy use. Phakiti also noticed that cognitive and metacognitive strategy use among high-, medium- and low-proficiency learners differed significantly, with the high-proficiency learners using greater quantities of strategies. Although the strategy use data was self-reported, the finding that higher- and lower-proficiency learners differ with regard to strategy use is consistent with those of other studies (Purpura, 1999; Song, 2005). Phakiti (2008) conducted a second study, which investigated the cognitive and metacognitive strategy use of 561 Thai university students. The participants completed two L2 reading tests along with a strategy use questionnaire. This time Phakiti used structural equation modelling to determine that between 11% and 30% of L2 reading performance was accounted for by cognitive and metacognitive strategy use. In addition, he found that higher-proficiency readers had a greater awareness of strategy use than lower-proficiency readers, based on the self-reported data.

Another factor that may influence reading strategy use is motivation. While empirical research into the relationship between motivation and L2 reading strategy use is sparse (Grabe, 2009; Matsumoto, Hiromori & Nakayama, 2013), research into L1 reading suggests that L1 intrinsic motivation is essential to the development of L1 reading strategies (Guthrie & Wigfield, 2000). Furthermore, L2 learning strategy research suggests a link between learning strategy use and motivation (Oxford & Nyikos, 1989; Shimizu, 2003). For instance, Oxford and Nyikos (1989) reported that L2 learner motivation was a key determiner of both the choice and use of learning strategies. In a recent study of 360 first-year students of English as a Foreign Language at a Japanese university, Matsumoto et al. (2013) investigated the relationship between motivations, L2 reading strategy use, and learner beliefs. They administered a 40-item self-report questionnaire consisting of 24 reading strategy-focused items adapted from the SORS (Sheorey and Mokhtari, 2001), 10 items related to motivation and 6 to learning beliefs at both the beginning and end of a reading course that incorporated explicit reading strategy instruction. The results suggested a relationship between learner motivations and the choice and use of L2 reading strategies, in line with findings from L1 reading research and L2 learning strategy research cited above.

In addition to the evidence that cognitive and metacognitive reading strategies are related to L2 reading proficiency, research has also shown that greater success has been achieved in teaching reading strategies than in teaching listening or speaking strategies, or strategies for overall language proficiency (Modern Languages Review Group, 2005). As Anderson (2009) notes, the teaching of reading strategies should be a major component of classroom based reading instruction, as should guidance in evaluating whether a strategy has been used successfully. Strategy instruction, along with other pedagogical interventions aimed at improving reading comprehension, will be discussed below.



## 2.4 Implications for L2 Reading Instruction

So far we have seen that reading in an L2 is extremely complex, involving the interaction of a variety of processes, knowledge sources and strategies. L1 reading, L2 language knowledge, background knowledge, formal knowledge of text structure and cognitive and metacognitive readings strategy use all contribute to L2 reading proficiency.

According to the compensatory models of L2 Reading, when a reader is engaged in trouble-free reading, automatic processing and the rapid interaction between appropriate knowledge sources take place effortlessly. In contrast, when difficulties are encountered, top-down and bottom up processes, along with all available knowledge sources, may be drawn upon, with weaknesses in one or more components being compensated for by the use of others. As a result, it is argued by many that L2 reading instruction should aim to develop both top-down and bottom-up skills (Carrell et al., 1988; Grabe, 2009; Koda, 2005; Singhal, 2011) in addition to L2 language knowledge. Koda (2005), for instance, identifies seven components that L2 reading programmes should address: *decoding, vocabulary knowledge, syntactic processing, text-structure knowledge, main idea detection, background knowledge, and comprehension strategies*. Despite the importance of the components of L2 reading that Koda (2005) identifies, implications for the instruction of these components are not always clear. For example, she writes that considering “that well-developed decoding skills are a precondition for L2 comprehension, the importance of decoding training is beyond dispute. To date, however, there has been relatively little exploration of how decoding development among L2 readers is best facilitated through teaching” (p. 256).

One area of L2 reading instruction that has received some attention in the literature and which is central to the concerns of this thesis is reading strategy instruction. Anderson (2009) distinguishes between skills, which are automatic, and strategies, which are learnt and used consciously. Once a strategy is automatized, it becomes a skill. He describes strategies as conscious, deliberate and effortful and skills as unconscious, automatic and effortless (2009). Afflerbach, Pearson and Paris (2008) similarly note that reading skills operate unconsciously and without effort, whereas strategies are used deliberately to facilitate decoding and to aid in text comprehension.

Grabe (2009) argues that strategy instruction should be part of reading instruction and not solely taught in separate lessons. He writes:

Teaching for strategic reading involves consistent modelling, scaffolding, extensive practice, and eventually independent use of the strategies by students. Discussions that center on text comprehension are a major way to introduce and practice strategies, and comprehension monitoring should be a regular feature of instruction (p. 240).

Wilhelm (2001) provides a recipe for teaching reading strategies based on Vygotsky's view of learning (1978) and its associated concepts of scaffolding and the *Zone of Proximal Development*. Wilhelm (2001) recommends the following four-step approach to reading strategy instruction based on a modified think-aloud approach.

- Step 1: the teacher models a reading strategy using a think-aloud technique and talks about what the strategy is and why and when to use it.
- Step 2: the teacher uses the strategy while the students assist the teacher and discuss when and how to use the strategy.
- Step 3: the students use and discuss the strategy while using think-aloud and other scaffolding techniques. The teacher observes and provides feedback and assistance where necessary.
- Step 4: the students use the strategy independently, and demonstrate competence through the use of think-aloud techniques. The teacher observes, evaluates and then plans follow-up sessions according to the level of mastery.

Yang and Wilson (2006) describe their social-constructivist view of L2 classroom reading instruction, which is compatible with Wilhelm's approach to strategy instruction and also with both the original and the extended compensatory models discussed earlier. Their approach views learners as active in the construction of their own sociocultural learning environment, within which dialogue and interaction occur. They base this approach on the work of Vygotsky (1978) who argued that learning occurs through both intermental and intramental dialogue. Intermental dialogue is social dialogue, and involves dialogue between the teacher and the student, between students, or between the student and the reading text (Wilson, 1999). However, in order for the

learner to comprehend what is said or written, she must also engage in internal, intramental dialogue as she works actively to construct a mental image of the ideas or knowledge that have been discussed or read.

Key to social-constructivist and sociocultural approaches to learning are the concepts of *scaffolding* and the *Zone of Proximal Development* (Clark and Graves, 2005; Ghafar Samar & Dehqan, 2013; Lantolf & Thorne, 2006). Scaffolding is the support provided to the learner that enables him to complete a task or perform at a level that would be beyond him unaided. This support may come from fellow learners, from the teacher, from reference materials, or from support provided within study materials. Effective teaching therefore requires setting appropriate and relevant challenges which push the student to perform at increasingly higher levels, while also providing the correct amount of support, or scaffolding, necessary to enable these increasing levels of performance. As Yang and Wilson (2006) note:

If the task is not challenging enough, students will be bored and possibly become unmotivated; however, if there is not enough support, students will be frustrated and may give up. Thus, scaffolding enables students to achieve great leaps forward in their language learning (p. 365).

The *Zone of Proximal Development* refers to that which can be accomplished by an individual when working collaboratively with others, in contrast with that which he could achieve while working alone (Ghafar Samar & Dehqan, 2013; Zuengler & Miller, 2006). It is through the support provided by scaffolding that the gap between the two is bridged.

The social-constructivist view of reading sees it as a social practice, with the social context influencing what, with whom, when, where, why and how reading takes place. The L2 reading instructor or curriculum designer should therefore be aware of what students are required to do in terms of social practice when designing a curriculum or reading program. Luke and Freebody (1990, 1999), for example, define the following four resources used by readers: code breaking, meaning making, text using and text analysing. Code breaking, involving the use of both top-down and bottom-up strategies to process the text, is seen as the primary resource. Yang and Wilson (2006) argue that if

classroom instruction focuses solely on code breaking or decoding strategies, such as word recognition, guessing meaning from context and predicting, students may make less progress than when a more balanced approach to instruction is followed, with some time devoted to all four reader resources. Attention needs to be paid to meaning making, which involves the reader interacting with the text to determine what the writer is trying to convey (intermental dialogue), while also constructing her own mental representation of the message (intramental dialogue). As Yang and Wilson (2006) point out, in most cases no single interpretation of a text exists, with reading therefore involving the construction of meaning through both intermental and intramental dialogue. L2 learners also need to learn how to use texts in different social contexts, such as the use of references in academic English, and through text analysis they need to develop awareness of different text structures and genres.

With regard to classroom-based reading instruction, Yang and Wilson (2006) recommend the following strategies for employing a social-constructivist approach to classroom-based reading instruction:

1. The learners should be provided with a context and purpose for reading; they should know why they are reading a text and how it relates to the rest of the program of study.
2. Scaffolding should be provided through modelling; the teacher should utilize a modified think-aloud approach in order to model the reading strategies that the students need to learn.
3. The teacher should ask questions and encourage learners to ask their own questions about reading texts. The teacher's questions should emphasize text awareness, in order to allow for the differing interpretations that individual students will make. In addition, learners should be encouraged to ask their own questions, with group activities providing a useful means of scaffolding this.
4. The four macro skills should be integrated through the use of reading texts as models for students' own writing; an analysis and discussion of reading texts of different genres can support the development of student writing, while also providing meaningful reading tasks.
5. Help should be provided to students to develop an awareness of the author behind the text; this can be achieved by comparing different texts with similar

objectives, such as two reports of the same news story, and deciding which is more effective.

6. Peer-scaffolding should be used to encourage independent use of the four reader roles; collaborating with fellow learners can support the development of decoding, meaning making, text analysing and text using skills.
7. Students should be encouraged to work independently; students should be allowed to read texts of interest to them and for purposes relevant to them. However, sufficient scaffolding should be provided.
8. Macrotasks should be used to encourage the integration of the four macro skills; macrotasks, such as producing a magazine or a web site, provide an authentic audience and help integrate reading for a genuine purpose with the other language skills, which can be motivational.

The approaches recommended by Wilhelm (2001) and Yang and Wilson (2006) that were described above were used to inform the design of the reading materials and activities which feature in Studies 1 and 2, and which are presented later in Chapters 4 and 5. The notions of context, collaboration, scaffolding and skills integration were influential in determining what the learners were asked to do, while the use of modelling and think-alouds influenced the ways in which reading strategies were introduced to the learners. This too will be discussed in greater detail in Chapters 4 and 5.

## 2.5 Summary

In summary, L2 reading is extremely complex, involving interactions between bottom-up and top-down processes and between reader and text. A variety of factors combine to determine L2 reading proficiency, with the *Compensatory Model* of L2 Reading (Bernhardt, 2005, 2010) predicting that L2 language knowledge and L1 literacy together account for approximately 50% of L2 reading ability. The remaining 50% is accounted for by unexplained variance, which consists of factors such as background knowledge, strategic knowledge and motivation. The *Extended Compensatory Model* (McNeil, 2012) attempts to predict the contributions of both background knowledge and strategic knowledge in addition to L1 reading ability and L2 language knowledge. Together these four components are predicted to account for approximately 75% of the variance in L2

reading proficiency. Central to both models is the notion of compensatory processing, wherein deficiencies in one knowledge source can be compensated for by drawing on other knowledge sources when a breakdown in comprehension occurs. L2 reading instruction therefore needs to support the development of bottom-up and top-down skills, L2 language knowledge and background knowledge, while also attempting to provide the strategic knowledge to make the most effective use of these knowledge sources. In addition, while the importance of the cognitive aspects of reading are undeniable, recent years have seen an increase in interest in the social aspects of reading and in the support that can be provided to the learner working in collaboration with others. The following chapter will look at online reading and the potential benefits of Computer-assisted Language Learning (CALL) for enhancing L2 reading instruction.

## Chapter 3: Computers and L2 Reading

Reading in a computer-based environment, be it on a desktop or laptop computer, a tablet PC, or a mobile phone, has assumed great importance in recent years. While 20 years ago access to home computers or the Internet was restricted to a small minority of the world's population, nowadays it is common in many parts of the world for people to have multiple Internet-ready devices providing a virtually limitless quantity of reading matter. Both worldwide and UAE-specific statistics underline the importance of being able to read computer-based text. In 2013, an estimated 40% of households worldwide and 75% of households in developed nations had a home computer, according to data from the United Nations' International Telecommunications Union (ITU, 2013). The same data reveals that nearly 30% of people worldwide had an active mobile broadband subscription, with the figure reaching almost 75% in the developed world. Furthermore, almost 77% of people in developed nations and almost 39% of the entire world population used the Internet. In the UAE, the percentage of people using the Internet grew from around 24% in 2000 to 85% in 2012. Given these statistics, it is inevitable that reading from a computer screen or that of a smartphone or tablet is an everyday occurrence for a significant portion of the world's population, and for Emiratis in particular.

For the vast majority of students in higher education in the UAE, it is essential that they be comfortable reading from a computer screen, as online texts are an integral part of modern academic life. For example, the widespread use of online research databases, such as those available via the Higher Colleges of Technology Library website (<http://libraries.hct.ac.ae/>), offers students a wide range of potential benefits that would be unobtainable without Internet access. In addition to facilitating searches for paper-based books and journals contained within the physical library, the site allows students to search for and gain immediate access to countless online journals. The ability to navigate a website such as this involves some of the same skills that are used when reading a book or a traditional journal article, but it also involves the use of a range of skills that are only relevant in an online environment.

### 3.1 Reading in an Online Environment

Reading online is different from reading from paper in a number of ways. Traditional printed texts encourage the reader to read from left to right and from top to bottom in a linear fashion. In contrast, computer-based hypertexts are read in a different manner, and lead to circular rather than linear eye movements (Ojala, 2000). Hypertext contains features not present in printed text, such as annotations that can be displayed on demand and hyperlinks to other texts, media or resources (Cobb and Stevens, 1996). Such differences between paper-based and Internet-based texts can create difficulties for learners. As Coiro (2003) notes:

Electronic texts introduce new supports as well as new challenges that can have a great impact on an individual's ability to comprehend what he or she reads. The Internet, in particular, provides new text formats, new purposes for reading, and new ways to interact with information that can confuse and overwhelm people taught to extract meaning from only conventional print (para. 1).

Hanson-Smith (2003) describes three categories of authentic electronic text encountered by second language learners via the Internet. Text repositories include resources such as digital libraries, including online journals, and other materials that are essentially printed materials replicated in an electronic format. They differ little in layout from printed materials, although they may contain hyperlinks and search facilities, and can be printed for offline reading. Hanson-Smith's second category consists of electronically-mediated texts that are designed for online reading. These texts include web pages, electronic books and software, and typically feature hyperlinks and hypermedia. Lastly, Computer-mediated communications (CMC) include resources such as online discussion boards, blogs, email and chat tools. Hanson-Smith notes that electronic texts in the second and third categories differ from paper-based texts in several important ways, including the presence of scroll bars, embedded or linked graphics or media, hyperlinks to external resources or websites, and often advertisements. Hanson-Smith (2003) stresses that students worldwide need to be able to use electronic media efficiently and that teachers should act as guides and mentors in helping them to achieve this. In a similar vein, Leu (2002) argues that teachers need to be aware of the online reading strategies used by L2 readers if online tasks are to be



effective. A simple transfer of strategies from a paper-based to an online environment cannot be taken for granted.

### **3.1.1 Reader Preferences for Online or Printed Materials**

Reader preferences for print or online materials have also been studied, with differing results. Bodomo, Lam and Lee (2003) investigated Hong Kong students' preferences for printed or digital materials and found that a clear majority (77%) preferred printed materials. They concluded that the success of the shift to digital, online library resources would depend on users being encouraged and assisted to exploit digital texts. Annand (2008) explored the preferences of 109 students following an introductory course in financial accounting at Athabasca University in Canada. He found that the majority of users (69%) preferred to use a printed textbook rather than an e-book due to usability issues, such as the inability to highlight text, eyestrain, and limited access to a computer. In addition, the relative learning effectiveness of the two media were compared, with no significant difference in knowledge acquisition detected. In a recent study, Cumaoglu, Sacici and Torun (2013) utilized a questionnaire to research the reading habits and preferences of 222 students from 36 Turkish universities. They found that 68% of the students read a book on a weekly basis, with the novel being the most commonly read text type. In addition, 62% of the respondents were readers of e-books, with the vast majority (81%) making use of this medium for research and coursework purposes and 75% using e-books to assist with coursework requirements. In contrast, only 36% of e-book readers read novels or stories in this medium. With regard to the advantages of e-books in comparison with printed resources, 'ease-of-access' was the most commonly reported, with 68% selecting this advantage, while 'ease-of-read' was seen to be an advantage of the e-book medium by only 35% of users. The most commonly used technology for accessing e-books was the computer, which was used by 60% of readers, followed by the cell phone (19%), the smart phone (17%), and the tablet computer (12%).

With regard to L2 readers, Hasaskhah, Barekat and Asa (2013) investigated the reading fluency and medium-related preferences of 30 Master's degree students in an Iranian EFL context. They found that the participants exhibited greater reading fluency when

reading from paper than when reading a digital text. Likewise, the majority of the students expressed a strong preference for reading printed texts. Tseng (2010) explored the perceptions of 88 Taiwanese EFL students who were asked to report on their experiences of reading printed and hypertext materials. Overall, they found that the participants preferred reading printed texts, with eye strain, the inability to leave marks and make notes, and the tendency to inadvertently skip lines being the most highly reported disadvantages of reading hypertext. However, like Hasaskhah et al. (2013) cited above, convenience was seen as a distinct advantage of online reading. Tseng (2010) asserts that teaching students how to read hypertext is of critical importance, given the increasing use of the Internet in foreign language teaching and the different strategies utilized when reading online. While the amount of research into reading strategies used by second language readers is significant (e.g. Anderson, 1991; Carrell, Pharis & Liberto, 1989; Cohen; 1998; Mokhtari and Sheorey, 2002; Sheorey and Mokhtari, 2001), the number of studies that have focused on the strategies used by L2 readers in an online environment is much more limited. Those studies that have been undertaken stress the importance of preparing learners to face the different demands placed on them when reading online.

### **3.1.2 Online Reading Strategies**

Anderson (2003) was one of the first to investigate the online reading strategy use of L2 learners. He adapted the Survey of Reading Strategies (SORS) (Sheorey & Mokhtari, 2001) to investigate the online reading strategies of 247 L2 readers, comprised of 131 EFL learners in Costa Rica and 116 ESL learners in the USA. The Online Survey of Reading Strategies (OSORS), which was administered to the participants after they had been engaged in online reading, divides 38 online metacognitive reading strategies into three categories: 18 Global Reading Strategies; 11 Problem Solving Strategies; and 9 Support Reading Strategies. Global Reading Strategies include reviewing the length and organization of a text prior to reading, making guesses concerning the content of the online text, and utilizing background knowledge to aid text comprehension. Examples of Problem Solving Strategies are rereading difficult portions of text, paying closer attention to the text when difficulties are encountered, and stopping to think about what has just been read online. Finally, Support Reading Strategies comprise tactics such as

taking notes to aid comprehension, translating into L1, and printing off a hard copy of an online text in order to circle or underline information within it. Anderson found that 8 of the top 12 self-reported strategies utilized by the participants while reading academic texts online were Problem Solving Strategies, while 7 of the bottom 12 strategies were Support Reading Strategies. He also found that EFL readers used Problem Solving Strategies more often than ESL learners, whereas no significant differences were found for the use of Global and Support Reading Strategies between the two groups. Anderson (2003) concludes that the high level of use of metacognitive online reading strategies by the EFL and ESL learners underlines the importance of teaching these strategies. "When classroom teachers engage their learners in online learning tasks, a strategy awareness and training component is essential" (p. 21).

Amer, Al Barwani and Ibrahim (2010) followed Anderson (2003) in adapting the SORS (Sheorey and Mokhtari, 2001) to create their own 34-item Online Survey of Reading Strategies. They explored the use of online reading strategies by 123 first-year and 97 fourth-year student teachers of EFL at a university in Oman. The first-year students were categorized as low proficiency language learners, while the fourth year students were labelled as high proficiency. They found that while the overall use of reading strategies was similar for both groups, the high proficiency students used more global strategies than the low proficiency students. While the top ten reported strategies of the fourth-year students were all global strategies, the top ten of the first-year students were a mix of four global, three support and three problem solving strategies. While interesting as early explorations into L2 online reading strategies, the findings of Anderson (2003) and Amer et al. (2010) are limited in their usefulness. Although both studies indicate the importance of online reading strategies, they are weakened somewhat by their reliance on a self-report questionnaire; no observations were conducted to verify the self-report data. In addition, the OSORS was closely modelled on a paper-based reading strategy inventory and did not include reference to navigational strategies that are necessitated by the hypertext medium.

Other studies have used a variety of instruments and investigated reading strategies native to the online environment. Konishi (2003) utilized a background questionnaire, think-aloud sessions and follow-up interviews to explore the reading strategies employed by six Japanese students while reading authentic Web pages in English. The

students were skilled Internet users studying undergraduate and postgraduate degree courses at a university in Australia, had spent from four months to four years in English speaking countries, and had reported Test of English as a Foreign Language (TOEFL) scores ranging from 525 to 627, placing them as high-intermediate to advanced learners. Konishi followed Carrell's (1989, 1998) categorization of reading strategies into cognitive and metacognitive strategies, with the former being further divided into local (bottom-up) and global (top-down) strategies. In addition, she added an additional category, navigational strategies, to include tactics such as scrolling and clicking links, strategies that are not relevant in a print environment. Two reading tasks were used; one focused on browsing, skimming and careful reading, while the other required the participants to search for information and scan. She found that the participants utilized many of the local, global and metacognitive strategies that are associated with reading printed texts, and in particular, with reading a single text carefully. However, other strategies emerged that would not normally be used in an EFL classroom. For instance, checking the consistency between the information contained on two different Web sites and evaluating the veracity or importance of what is written on one site in comparison with another, were examples of strategies that resulted from the open-ended, interlinked nature of hypertext. Equally, scrolling, clicking and selecting the active window were task-related strategies that are native to hypertext. These latter findings align with the views of Leu and Reinking (1996), who assert that reading strategy use is vitally important in a hypertext environment, where the reader is constantly making decisions related to both the reading order and the selection of sources to be read. Konishi's (2003) investigation sheds light on the types of strategies L2 readers utilize when reading authentic hypertext.

Akyel and Ercetin (2009) also investigated hypertext strategy by means of think-aloud protocols and follow-up interviews. They studied the hypermedia reading strategies of 10 advanced-level EFL students enrolled in an English Language department in a Turkish university. Unlike Konishi's study, which focused on the use of authentic sources, a hypertext on the origin of the universe was created, which included annotations providing information about the topic of the text and the vocabulary featured in the text. Prior to the think-aloud sessions, the participants were asked to complete a test of prior knowledge on the topic of the hypertext. Two groups were formed, based on the results of the test, and a standardized (Nelson-Denny) reading test

was administered to ensure that no significant difference in reading ability existed between the two. Akyel and Ercetin employed a mix of quantitative and qualitative data analysis techniques to uncover both the types of strategies used and their relative frequency of use. They divided strategies into two distinct categories; processing strategies were defined as the cognitive and metacognitive strategies that might be used when reading printed text, in addition to strategies linked to the consultation of annotations, while navigation strategies were those used to navigate through the hypertext. They found that the majority of the strategies used by the participants when reading hypertext were the same reported by Anderson (1991) for the reading of printed texts. In addition, readers made use of several strategies specifically related to the annotations, such as referring to them to gain background information, which was by far the most commonly used strategy; commenting on the format of the annotations; and monitoring the use of annotations. However, some of Anderson's processing strategies were not used at all. These included scanning for a word, skipping an unknown word, and adjusting reading rate to aid comprehension. Interestingly, skimming was infrequently used by the participants, as was guessing the meaning of a word from context. Akyel and Ercetin note that the participants suggested that the navigation map provided them with information about the content and organization of the text, therefore obviating the need to skim. Equally, the availability of a glossary in the form of an annotation may have been a key factor for the infrequent use of guessing the meaning of a word. They also found that prior knowledge had an effect on strategy use, with high prior knowledge participants making greater use of both cognitive and metacognitive strategies and navigating through the various nodes of the hypertext according to their interest, while low-prior-knowledge readers followed the hierarchical order of the text when navigating and utilized the background knowledge annotations more to compensate for their deficiency in this area. Other studies have also shown frequent use of annotations to gain background knowledge (Ercetin, 2003; Lomicka, 1998).

Ketabi, Ghavamnia and Rezazadeh (2012) investigated the hypertext cognitive reading strategy use of 23 Persian EFL graduate students from a Linguistics department in an Iranian university. Like Akyel and Ercetin (2009), they utilized the Nelson-Denny Reading Test in order to create a proficient and a less-proficient group, with four students from each level randomly assigned to each group. The selected participants

were asked to complete a self-report questionnaire on the pre-reading, while-reading and post-reading strategies they used when readings hypertexts. After completing this, the students were asked to think aloud while reading an authentic hypertext from a multimedia encyclopaedia. The text contained images, charts, sounds, highlighted words with links to detailed definitions, a dictionary, and links to external sites. Ketabi et al. (2012) found that the most commonly used cognitive reading strategies overall were paraphrasing in L1/L2, which accounted for 23.7% of the strategies utilized during the think-aloud sessions, rereading (17.2%), and skipping or skimming portions of the text (17%). The least used strategies were formulating a question (4%), referring to a glossary to check the meaning of a word (5.3%) and referring to annotations for background information (8%). They also found differences between the proficient and less proficient participants. Skipping or skimming portions of the text was the most commonly employed strategy of the proficient group, whereas paraphrasing was the most-used strategy for the less-proficient group. The minimal use of annotations to get background information is in contrast to earlier studies (Akyel and Ercetin, 2009; Ercetin, 2003; Lomicka, 1998), which all reported frequent use of annotations to gain background knowledge. Ketabi et al. (2012) note that during the follow-up interviews, the participants stated that they felt the annotations would not be useful and that they were more familiar with printed texts. This highlights the importance of context, and in particular of prior familiarity with hypertext features.

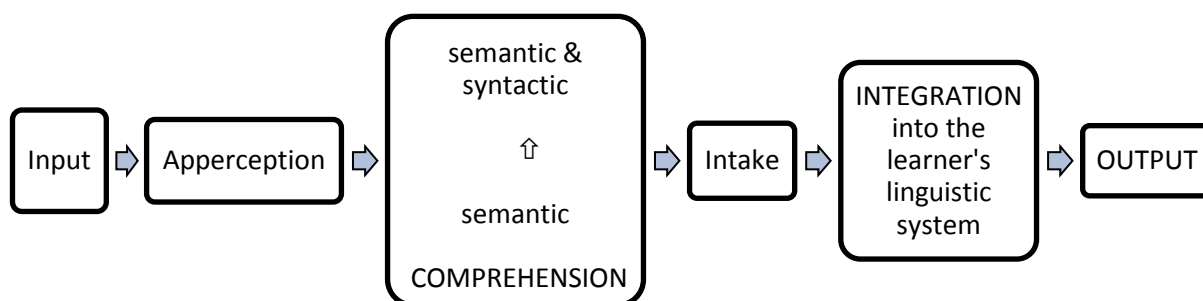
The above research suggests that not only are we unable to assume that print-based reading strategies will be utilized by L2 readers in an online environment (Leu, 2002), but, perhaps more importantly, language teachers need to prepare L2 readers for the differences between the different environments through strategy instruction. Aside from facing difficulties with some of the differences of the online environment, readers may not make use of potentially useful features such as glossaries and annotations for both lexical and background information if they are unaware of the benefits they may bring. What the benefits of hypertext and computer-assisted reading instruction might be is the topic of the next section.

## 3.2 Reading Online and Computer-assisted Instruction

The literature on Computer-assisted Language Learning (CALL) has examined a variety of ways in which computers can facilitate L2 acquisition. From a theoretical perspective, Chapelle (1997, 1998, 2001) embraces an interactionist view of second language acquisition in suggesting that the provision of both modified input in meaning focused tasks, and of opportunities for learners to modify their own output, may lead to conditions favourable to L2 acquisition.

### 3.2.1 An Interactionist Account of L2 Acquisition

Drawing on the work of Gass (1997), Long (1996) and Pica (1994, 1997), Chapelle (1998) presents a simplified model of the components of second language acquisition (SLA) according to the interactionist view, illustrated in Figure 3.1 below.



**Figure 3.1:** The basic components of the interactionist view of the SLA process, adapted from Chapelle (1998, p. 22).

In the above model, input refers to the target language to which the L2 learner is exposed. Depending on learner and input variables, only some of this input is apperceived (or noticed) by the learner, with the remainder being too difficult and therefore unavailable for acquisition. In the third box, at the level of comprehension, it is hypothesized that the semantic substance of a message can be understood with or without syntactic processing. For example, the content of a message may be understood by the L2 learner, who recognizes individual lexical items or non-linguistic signs. It is

thought that only when comprehension of input takes place through both syntactic and semantic processing can linguistic features of the input become intake, which is the language that has been understood and which has the potential to further develop the learner's linguistic system. At the integration stage, intake is held in short-term memory in order to alter the learner's linguistic system, which can then be evidenced through the learner's output.

According to the interactionist argument, input alone is an insufficient condition for SLA; both interaction (Long, 1996) and learner output (Swain, 1985) are also required. A key component of the interactionist account is negotiation for meaning. Long (1996) argues that:

negotiation for meaning, and especially negotiation work that triggers interactional adjustments by the NS [native speaker] or more competent interlocutor, facilitates acquisition because it connects input, internal learner capacities, particularly selective attention, and output in productive ways (pp. 451-452).

Levy and Stockwell (2006) note that through negotiation for meaning, input can be rendered comprehensible and converted to intake by means of interactional adjustments that highlight both linguistic and non-linguistic features of the discourse. In addition, negotiation for meaning also provides opportunities for learner output, which is seen as necessary for acquisition (Swain, 1985; Swain and Lapkin, 1995). While the interactionist account is focused mainly on conversational interactions between interlocutors, modified interaction and negotiation for meaning can also occur during reading. Larsen-Freeman and Long (1991) write:

Modification of the interactional structure of conversation or of written discourse during reading... is a [good] candidate for a necessary (not sufficient) condition for acquisition. The role it plays in negotiation for meaning helps to make input comprehensible while still containing unknown linguistic elements, and, hence, potential intake for acquisition (p. 144).



Van den Branden (2000) investigated the effects of negotiation for meaning on reading comprehension in a study of 151 primary school children aged between 10 and 12 years old. 91 of the children were L1 speakers of Dutch, while the remaining 59 were L2 speakers, mostly of Moroccan origin. The children were divided into four levels of Dutch language proficiency by means of an editing test. Level A was the very high proficiency group, Level B the moderately high proficiency group, Level C the moderately low proficiency group and Level D the very low proficiency group. Van den Branden compared four treatment conditions with the children, who were all asked to read 12 chapters from a Dutch detective story. Every participant experienced all four treatment conditions in a repeated measures design, reading three chapters of the text under each condition. The *unmodified input condition* involved reading an unmodified version of a chapter of the text in silence. In the *premodified input condition* the participants read a version of the text containing simplified vocabulary and syntax, along with elaborative modifications in the form of verbatim anaphoric references. In the *collective negotiation condition* the participants first read an unmodified version of the text in silence and were then able to negotiate the meaning of difficult words and phrases with other participants and the teacher. In the *pair negotiation condition*, the participants again read an unmodified text in silence before being asked to negotiate the meaning of incomprehensible words and phrases with a partner. After each chapter, regardless of the condition, the pupils then worked individually to complete a comprehension test in the form of a multiple-choice question before reading the next chapter. An analysis of variance with repeated measures indicated that students scored significantly higher when reading the premodified version of the text than when reading the unmodified version, the condition which led to the lowest results overall. In addition, results obtained under both the pair and collective negotiation conditions were significantly higher than under the premodified input condition. The highest scores were obtained under the collective negotiation condition, which resulted in significantly higher scores than the paired negotiation condition. Of further interest was the impact of the different conditions at different levels of proficiency. The participants at all levels scored significantly higher on the reading comprehension tests under both negotiation conditions than when reading under the unmodified input condition. In contrast, only the Level B students scored significantly higher under the premodified input condition than under the unmodified input condition. In other words, while the participants at all levels benefited from the opportunity to negotiate for meaning, only one level of

students benefited significantly from the simplification and elaboration of the reading texts. This would suggest that the premodification of texts through simplification and elaboration might be of limited use within contexts where ability levels differ greatly. It might also help explain the inconclusive nature of many of the investigations into elaborative feedback examined in 3.3 below. In contrast, Van den Branden's (2000) findings suggest that the provision of opportunities to negotiate for meaning can be utilised with a broader range of ability levels.

Negotiation for meaning is not limited to human-to-human, face-to-face contexts; interaction with a computer can also lead to negotiation for meaning. As Beatty (2010) writes "there is also room for negotiation of meaning through collaboration where the discourse is both between two learners as well as with the computer software program. A computer can provide a high level of comprehensible input in various media" (pp. 86-87). Similarly, Chapelle (2007) discusses the support that software can provide to a learner to aid comprehension of either written or spoken input. She notes that such help "in interactionist terms, provides modified input, helps make the input salient, potentially resolves miscomprehension, and prompts noticing" (p. 101). The interactionist account of SLA has been influential in the field of CALL research and development, with support from Doughty (1991), Liou (1994) and Stockwell and Harrington (2003), in addition to Chapelle (1997, 1998, 2001 and 2007). It has also been used recently as a framework for research into computer-assisted second language reading instruction (Murphy, 2007, 2010).

Based on the interactionist view, Chapelle (1998) suggests hypotheses for the development of CALL materials and tasks that can promote SLA. While her particular focus is on multimedia CALL, the criteria are equally relevant to web-based materials such as hypertext. Her seven hypotheses are listed below.

1. The linguistic characteristics of target language input need to be made salient.
2. Learners should receive help in comprehending semantic and syntactic aspects of linguistic input.
3. Learners need to have opportunities to produce target language output.
4. Learners need to notice errors in their own output.
5. Learners need to correct their linguistic output.

6. Learners need to engage in target language interaction whose structure can be modified for negotiation of meaning.
7. Learners should engage in L2 tasks designed to maximize opportunities for good interaction (pp.23-24).

### **3.2.2 CALL and Other Accounts of SLA**

While the interactionist view of SLA has been influential in the field of CALL, Levy and Stockwell (2006) note that other theories, such as sociocultural theory and constructivism, have also exerted an influence. Further, they state that while researchers tend to draw on a single theory when investigating CALL, teachers and CALL designers tend to base their work on two or more compatible theories (p. 135). They contrast Chapelle's seven hypotheses above which draw on the interactionist theory of SLA with the eight 'conditions for optimal language learning environments' put forward by Egbert, Chao and Hanson-Smith (1999) that are influenced by a number of theories.

Egbert et al. (1999) posit the following eight conditions for optimal language learning environments.

1. Learners have opportunities to interact and negotiate meaning.
2. Learners interact in the target language with an authentic audience.
3. Learners are involved in authentic tasks.
4. Learners are exposed to an encouraged to produce varied and creative language.
5. Learners have enough time and feedback.
6. Learners are guided to attend mindfully to the learning process.
7. Learners work in an atmosphere with an ideal stress/anxiety level.
8. Learner autonomy is supported (pp. 3-7).

While there are clear differences between the conditions put forward by Egbert et al. (1999) and Chapelle's (1998) hypotheses, there are a number of similarities. Interaction and negotiation for meaning are central to both lists, and the influence of the interactionist account is apparent in both. However, Egbert et al. (1999) also consider

aspects such as authenticity, learner autonomy and affective factors such as anxiety level. In contrast, Chapelle's list is more tightly focused on interaction.

Sociocultural theory and social constructivism have also been influential in CALL research and practice. Based on the contention that learning takes place primarily through social interaction (Vygotsky, 1978), sociocultural theory also places great emphasis on the role of the teacher, who is seen as a key participant in the learning process (Ghafar Samar & Dehqan, 2013; Levy and Stockwell, 2006). In the previous chapter, social-constructivist views of reading were examined, as were the concepts of scaffolding and the *Zone of Proximal Development*. While this paper will take a primarily interactionist view of SLA, the notions of scaffolding and the *Zone of Proximal Development* were considered during the design of the CALL materials and the strategy instruction lessons utilized in the studies described in Chapters 4 and 5 below. This influence will be described in greater detail in the methodology sections of those chapters. In addition, context-related factors such as the 'stress/anxiety levels' referred to by Egbert et al. (1999) will be considered and explored. This position is consistent with Levy and Stockwell's (2006) assertion that while researchers typically align themselves to a single theory of CALL, teachers and designers tend to draw from multiple theories.

While the above discussion has focused on SLA theory in general, the focus of this thesis is L2 reading comprehension and development. We saw in the previous chapter that L2 knowledge is a major component of L2 reading ability, accounting for anywhere between 20% and 30% of the variance in that skill according to a large number of studies (Bernhardt, 2010; McNeil, 2012). By extension, it can be argued that CALL tasks and materials that have a positive impact on L2 acquisition can also benefit the development of L2 reading, particularly if reading forms a major component of the task. Han and D'Angelo (2009) argue for a 'dual approach' to reading instruction, whereby both comprehension and acquisition are dealt with systematically, as part of the instructional process. They assert that a purely meaning-focused approach to reading instruction will restrict intake, due to a lack of focus on the syntactic features of the language. This will ultimately constrain both overall L2 acquisition and the development of L2 reading comprehension skills. They contend that teaching comprehension skills and strategies as well as assisting learners to develop their syntactic awareness will

result in the “balanced development of communicative skills and linguistics systems among L2 learners” (p. 190).

Of particular interest to the investigations into L2 reading comprehension described in this thesis are Hypotheses 1 and 2 from Chapelle’s (1998) list above, which relate to the concept of comprehensible input and attention to linguistic form. Help in comprehending aspects of linguistic input can be achieved through input modification. As Chapelle (1998) notes, “if the input presented in instructional multimedia is intended to expand the learner’s linguistic knowledge, it needs to offer opportunities for the learner to request modifications” (p. 27). Input can be modified through multimedia glosses (Chun and Plass, 1996) or by the provision of immediate computer-generated feedback (Bown, 2006; Murphy, 2007, 2010), both of which can also assist in making linguistic items salient.

Chapelle’s sixth hypothesis, which posits that providing opportunities for the negotiation of meaning will be beneficial to L2 acquisition, is also of key interest in this thesis. In a CALL context, such opportunities can be provided by discussions around one or more computers, or via computer-mediated discussions (Beatty, 2010). Equally of interest is Chappelle’s seventh hypothesis, which relates to tasks that maximize opportunities for good interaction. Opportunities to negotiate for meaning and to engage in quality interaction can be provided by means of computer-mediated communication (CMC). A review of the literature on computer-generated feedback and CMC will now follow.

### **3.3 Feedback in CALL**

As we have seen above, one means of modifying the input provided by reading texts in a CALL environment is through the provision of interactive feedback. Brett (2000) argues that CALL, in contrast to classroom or naturalistic settings, may offer an environment that is particularly suited to the provision of feedback which (is):

- always presented to learners,

- instantaneous,
- applies to each correct response,
- often provides the opportunity for the learner to correct herself,
- private (Chapter 4.2, para. 3).

A variety of types of feedback have been incorporated into computer-based instructional materials, differing both in aim and in the amount of information provided. The most common of these forms are described below.

### 3.3.1 Types of CALL Feedback

Studies on feedback embedded in CALL software have suggested a positive effect on acquisition (Nagata, 1993; Brett, 1997) and a variety of forms of feedback have been researched. Clariana (2000) summarizes the types of feedback that have been investigated in computer-assisted learning (CAL) as follows:

Traditionally investigated types of feedback available in CAL include the following: Knowledge of response (KR) that states "right" or "wrong" or otherwise tells learners whether their response is correct or incorrect; Knowledge of correct response (KCR) that states or indicates the correct response; and Elaborative feedback that includes several more complex forms of feedback that explains, directs, or monitors (Smith, 1988). Elaborative feedback includes the forms listed below:

1. Explanatory feedback provides additional explanations, such as why a learner's error response is incorrect or perhaps why a correct response is correct and various types of additional remedial screens that may amount to new instruction (Merrill, 1985, 1987; Spock, 1987).
2. Directive feedback may provide prompts, hints, or cues to assist the learner in determining the correct response (Nielson, 1990). Answer-until-correct (AUC, Pressey, 1926) is a common form of elaborative feedback where the learner is directed to respond until correct.
3. Monitoring feedback, also referred to as advisement, lets the learner know how they are doing overall (p. 1).

Clariana (2000) draws a distinction between monitoring feedback, which can be used as a motivational tool by offering feedback on ongoing performance, and the other forms of feedback mentioned above, which offer information or error correction related to a specific item.

The question of what type of computer-assisted feedback is the most effective for language learning has been the focus of numerous studies (Bown, 2006; Brandl, 1995; Murphy, 2007, 2010; Nagata, 1993, 1996) but remains largely unanswered. Van Der Linden (1993) investigated the use of elaborative feedback with 23 students of L2 French at the University of Amsterdam. She used log files of learner-computer interactions, interviews and think-aloud protocols to examine the use of feedback contained within CALL grammar exercises. She found that individual differences affected the usefulness of the feedback. While for some students consulting more complex feedback could prove useful, for others it might be confusing. She also found that "Feedback of more than three lines... was hardly ever read until the end" (p. 65), a finding with possible implications for materials design decisions in similar contexts.

Mory (1994) investigated the use of adaptive elaborative feedback with 111 students of Educational Psychology at Florida State University. The treatment group received adaptive elaborative feedback, which varied in terms of the information provided, depending on the correctness of the response, and according to how certain the respondent was about the correctness of his response. The control group did not receive adaptive feedback, receiving instead a consistent, moderate amount of elaborative feedback. Although post-test scores showed no significant effect for adaptive feedback, Mory did find that participants spent more time reading the elaborative feedback when their response certitude was low "during situations in which they probably needed the most instructional clarification, since low certitude estimations usually indicate areas of misunderstanding or low comprehension" (p. 285). Although the study was not directly related to either L2 reading or SLA, Mory's investigation of the impact of response certitude on the use of feedback is interesting, as it highlights the complex nature of feedback use.

Brandl (1995) examined the preferences for different types of error-correction feedback of 21 high- and low-achievement students of intermediate-level L2 German at the

University of Texas in the USA when completing computer-based grammar exercises. Four types of feedback were available to the students in the online tutorial in order to check the grammatical accuracy of their typed answers. *Right or Wrong Feedback* informed the learner whether or not their response contained any mistakes, but did not highlight the error. *Show Error Feedback* marked any errors in the learner's response with a box around an incorrect word. *Grammatical Feedback* highlighted an error and provided hints to help the learner correct it. Finally, *Right Answer Feedback* simply provided the correct answer after first verifying that the learner did indeed wish to view it.

Learners were able to select one type of feedback initially, and then request additional feedback of either the same or a different type until they were able to find the correct answer. Both low- and high-achievement learners selected the *Right or Wrong Feedback* option most often as their initial choice (86% of the time for low-achievement, and 95% for high-achievement). However, differences did occur between the two groups in the choice of follow-up feedback. The high-achievement group selected *Right or Wrong Feedback* as a follow-up to *Right or Wrong Feedback*, *Show Error Feedback*, *Grammatical Feedback* or *Right Answer Feedback* more often than the low-achievement students, while the low-achievement students tended to utilise *Show Error Feedback*, *Grammatical Feedback* and *Right Answer Feedback* more often than the high-achievement group. According to Brandl, this indicates that the high-achievement group demonstrated "more willingness to engage in the error correction process than the low-achievement students" (p. 206). Overall, the high-achievement students also checked the feedback more times than the low-achievement group (1300 to 1200 instances), which Brandl argues suggests a greater degree of cognitive engagement. In addition, the low-achievement students were more likely to look up correct answers while the high-achievement students attempted to find the answers themselves.

Brandl suggests three reasons for the differences in the strategies of feedback use demonstrated by the two groups. Firstly, he argues that poor cognitive monitoring caused low-achievement learners to make numerous faulty corrections to their responses, as they were unable to evaluate their learning. Secondly, the low-achievement students were more likely to resort to strategies that helped them complete the task without actually contributing to the learning process. While students



from both groups often made guesses when answering, data from follow-up interviews suggested that the guesses of the high-achievement group were more often based on grammatical reasoning, whereas the low-achievement group simply guessed randomly. Equally, the low-achievement students were more likely to ask for the correct response, either because they felt that seeing the correct answer would help them, or because they were overwhelmed by the difficulties of the task. Lastly, he suggests that the lack of strategic and background knowledge may have affected the level of intrinsic motivation to complete task. While Brandl's study was based on a small sample size, the data provided from logs of actual feedback choice and follow-up interviews designed to find reasons behind the choices provides an interesting insight into factors affecting computer-based feedback use.

One issue that has been raised regarding the usefulness of feedback in CALL has been that of quality (Nagata, 1993, 1996). Knowledge of response and knowledge of correct response feedback involve very simple evaluations of student's responses. For example, in a multiple-choice task, the evaluation is as simple as comparing the student's response with the correct response and indicating whether or not they match. Elaborative feedback may attempt to move beyond this by attempting to pre-empt where a student's response lies, but real, intelligent feedback that focuses directly on individual learner errors is far more difficult to provide. However, some attempts have been made to investigate feedback generated through the use of Natural Language Processing (NLP). For example, Nagata (1996) compared intelligent feedback produced with the aid of NLP with more traditional, computer-based feedback in a study involving 34 learners enrolled in a second year-language Japanese language course at the University of Pittsburgh. Nagata found that intelligent feedback, which provided detailed grammatical support targeted at learners errors, was more effective than more traditional, workbook like feedback in the form of simple answers sheets, for the development of learners' grammatical use of Japanese particles and certain sentence constructions.

Clariana (2000) compared the effectiveness of different types of feedback, namely *Knowledge of Response* (KR), *Knowledge of Correct Response* (KCR), *Answer Until Correct* (AUC), *Multiple-try Feedback* (MTF), *Elaborative Feedback* (EF) and *Delayed Feedback* (DF), based on several meta-analyses. He summarized the findings as follows: "any

feedback is better than no feedback, a rather disappointing finding after having come so far” (p. 2). Bangert-Drowns, Kulik, Kulik and Morgan (1991) conducted a meta-analysis of 40 studies and found that *Knowledge of Response* was the least effective form of feedback, being less effective than no feedback. *Multiple-try/ Answer Until Correct Feedback* and *Elaborative Feedback* were found to be the most effective. In general terms, providing more information in feedback was found to increase its effectiveness. The results are summarized by Clariana (2000) as follows.

KR<no feedback<KCR<AUC=Elaborative Feedback (p. 2).

Clariana (1993) reviewed 30 studies comparing no feedback, *Knowledge of Response Feedback*, *Knowledge of Correct Response* feedback and *Delayed Feedback* with *Multiple-try Feedback*. *Multiple-try Feedback* is often synonymous with *Answer Until Correct Feedback*, and prompts the learner to try again after an incorrect response. Unlike Bangert-Drowns et al. (1991), Clariana found that all forms of feedback were superior to no feedback but found no difference in effectiveness between the different types of feedback. Clariana (1993) suggests that differences in prior knowledge can have an influence on the effectiveness of the feedback and on the amount of feedback required. “Further analysis however suggests that learner post-test performance may vary as a function of the interaction of prior knowledge and number of feedback trials” (p. 71). He notes that elaboration in the feedback in the form of hints is utilised more effectively by low-prior-knowledge students when they are allowed multiple tries.

The above studies provide insights into the effectiveness of different forms of computer-assisted feedback but it is still unclear which forms are most effective. Indeed, it may be that no one form is most effective. As we have seen above, individual differences in proficiency or achievement level, strategic knowledge and background knowledge, in addition to factors such as motivation, degree of cognitive engagement, and response certitude, may have an impact on the effectiveness of different feedback types in different contexts. While some of the above studies were focused on the effectiveness of feedback for L2 acquisition (Brandl, 1995; Nagata, 1996; Van der Linden, 1993), others were not directly related to L2 language issues. Furthermore, none of the above studies had L2 reading comprehension or L2 reading development as the principal focus.

Indeed, only a few studies have looked at the use of elaborative CALL feedback to assist L2 reading instruction.

### **3.3.2 Elaborative Feedback and L2 Reading Instruction**

Bown (2006) investigated the use of embedded feedback in Web-based L2 reading materials at a higher education college in the United Arab Emirates and found that elaborative feedback was more useful than 'Correct/Incorrect' knowledge of response feedback. However, the study was limited in its significance by the small sample sizes. In a more comprehensive study, Murphy (2007) explored the use of elaborative feedback to promote reading comprehension with 407 Japanese first-year students majoring in English at Kanda University of International Studies in Japan. Students were grouped into high and low-proficiency groups and then randomly assigned to receive either elaborative feedback or knowledge of correct response feedback when completing an online reading comprehension exercise. In addition, they were randomly assigned to complete the exercises either individually or in pairs. Afterwards, all students were asked to complete a related follow-up reading comprehension exercise containing knowledge of correct response feedback in order to measure their comprehension of the text. Like Clariana (2000) and Mory (1994), he found that overall elaborative feedback was not significantly more effective than knowledge of correct response feedback.

Following an interactionist approach to SLA, Murphy had hypothesized that working in pairs while completing the computer-based reading comprehension exercises would enhance reading comprehension when compared with working individually. However, the overall effect of pair-work was also found to be insignificant. Of particular interest to this current study is Murphy's finding that the interaction between feedback type and manner of study (pair-work or individual) was significant. For learners who received elaborative feedback, those who worked in pairs scored higher than those who worked alone, while for students who received knowledge of correct response feedback, those working individually scored higher than those who worked in pairs. The participants who received elaborative feedback and worked in pairs scored the highest in the follow-up comprehension exercise.

Murphy's study, like others, showed no significant effect for elaborative feedback when compared with knowledge of correct response feedback. However, the finding that elaborative feedback, when used in pair-work exercises, can enhance reading comprehension, is worthy of further investigation. While Murphy's study involved students working in pairs around a computer, another possibility for facilitating pair-work while completing reading comprehension exercises exists in the form of computer-mediated communication.

### **3.4 Computer-mediated Communication and L2 Reading**

The potential of Computer-mediated Communication (CMC) as a tool to assist in the language learning process has featured widely in the literature. Studies have shown that such discussions may be more learner-centred and that participation levels are more equal than in face-to-face discussions (Chun, 1994; Warschauer, 1996a). In addition, such text-based activities can provide a vast amount of meaning-focused reading practice (Kelm, 1992) as well as opportunities for the modification of both input and output. While modern computer technologies allow for the use of a variety of forms of synchronous and asynchronous communication, the focus in this thesis will be on 'synchronous written chat' (Lin, Huang & Liu, 2013), which excludes audio and voice chat. Synchronous CMC enables all learners to both read and write text messages that can be viewed in real time (Ortega, 1997, p.83). Discussions can be either one-to-one or many-to-many, allowing for a variety of interaction types. The interactive nature of CMC has even been said to bridge "the historical divide between speech and writing... with the interactional and reflective aspects of language merged in a single medium" (Warschauer, 1997, p.472). This is not to deny the potential for language learning of asynchronous CMC, which has been shown to encourage collaborative learning behaviours (Wang, 2010). This can occur through the sharing of views, perspectives, experiences and feedback among learners (Birch & Volkov, 2007), who are also able to interact with a greater number of peers due to the relative absence of time constraints (Kitade, 2008). However, the decision to focus on synchronous CMC is based on the growing use in everyday life of synchronous discussion applications, such as Whatsapp ([www.whatsapp.com](http://www.whatsapp.com)) and Facebook Messenger ([www.facebook.com](http://www.facebook.com)), which can be used on both mobile devices and personal computers. These two services alone were

being used by approximately 1.3 billion people in March 2015 (Statista, 2015). Such extensive use of synchronous CMC outside of language learning programs suggests a positive attitude among the general population towards this form of communication, warranting its exploration as a valid and authentic means of supporting the development of second language reading.

### **3.4.1 Investigations into CMC for Language Learning**

Early studies into CMC in the 1990s pointed to a number of potential advantages it offered for SLA. Kelm (1992) conducted one of the first studies of CMC, which focused on whole-class discussions between 15 university-level students of L2 Brazilian Portuguese. Kelm noted the vast amount of meaning focused reading practice that resulted from the discussions. He also found that, in comparison with face-to-face oral discussions, CMC resulted in more candid responses, an increased level of participation and greater use of interlanguage by all members of the class. In addition, Kelm concluded that participation was more equal as all participants, including the shyer members, participated in the discussions, and neither the instructor nor any of the students was able to dominate. While Kelm (1992) himself admitted that his findings were impressionistic and “presented without empirical examination or comparison” (p. 453), the study laid useful foundations for further research into CMC. In a related study, Beauvois (1992) based her research on observations of Kelm’s Brazilian Portuguese classes mentioned above. She corroborated Kelm’s (1992) findings and also suggested that the permanent record of discussions that can be maintained by CMC software offer opportunities for review, error correction and personalized grammar lessons. In addition, Beauvois described her own case study involving discussions between her and two high school French students. Like Kelm she found that CMC met with positive student reactions and greater use of interlanguage.

Chun (1994) conducted an investigation into the use of CMC with university-level students of German in their first or second semesters of study. Although she did not undertake any direct quantitative or qualitative comparisons with face-to-face oral discussions, she did find that participants took “a more active role in discourse management than is typically found in normal classroom discussion” (p.28). There was

evidence of more student-initiated interactions with one another, rather than the dominance of teacher-initiated question-response patterns often found in typical classroom settings. In addition, Chun pointed to the potential advantages for the development of reading and writing skills, with CMC offering learners the opportunity to engage in meaning focused, multi-participant discussions that require them to read and comprehend the preceding discourse before responding with coherent and cohesive contributions. Furthermore, she suggested that the similarities between the interaction patterns of CMC and spoken discourse could indicate that skills developed in CMC sessions may be readily transferable and help to improve the speaking skills of the students. A final benefit proposed by Chun (1994) was the absence in CMC of psychological and time pressures inherent in oral classroom discussions. In this way, CMC could be seen to facilitate the low stress and anxiety levels seen as important by Egbert et al. (1999), mentioned above in 3.2.2.

The above studies, while largely impressionistic in nature, pointed to some of the potential benefits of CMC for SLA. These have been followed since by more methodologically rigorous studies that have attempted to evaluate the potential of CMC. Kern (1995) undertook a study into the use of CMC with second-semester French students and used both quantitative and qualitative methods in an attempt to verify claims for CMC made in earlier studies, such as those described above. His findings corroborated many of the earlier claims. For example, he found that, when compared with oral discussions, CMC led to a greater production of interlanguage, the use of more sophisticated language in terms of both the complexity of the structures used and in the range of discourse functions that were utilised, and to more opportunities for students to express themselves. He noted that student-to-student interactions featured more prominently in CMC discussions, where the role of the teacher was less dominant than in typical oral discussions in classroom settings.

Warschauer (1996a) similarly combined qualitative and quantitative methods to test earlier claims that CMC resulted in more equal participation rates among learners. He found that the overall rates of participation in CMC discussions were twice as equal as those in oral discussions. He asserted that a variety of factors, such as shyness, nationality and a learner's perception of his own lack of fluency, could inhibit participation in face-to-face oral discussions. In contrast, CMC discussions were more

equal. In addition, Warschauer's study lent support to the claim by Kern (1992) that students have a tendency to produce more complex language in CMC discussions than is typically found in oral discussions.

Despite the number of advantages of CMC outlined above, synchronous computer-mediated text discussions are not without their limitations and drawbacks. Kelm (1992) highlighted a number of potential problems in his early, impressionistic study. For example, he found that students have a tendency to resort to the use of L1 in order to clarify meaning in situations where their L2 is inadequate unless adequate teacher supervision is provided. He also noted that students' language could also be inadvertently abrupt in CMC discussions and that students are exposed to the incorrect L2 usage of their peers, which may then be copied. While Chun (1994) had suggested that skills developed in CMC activities could be used by learners in oral discussions, Warschauer (1996a) found that CMC discussions contained fewer interactional features, such as confirmation checks and questioning, than are found in equivalent face-to-face discussions. As a result, he contended that both oral and CMC discussions have value and "could be combined in different ways to highlight the advantages of each" (p.22). This was in line with Kelm's suggestion that learners "still need ample practice to orally express themselves in the target language" (1992, p.453). In other words, synchronous CMC was seen to be a valuable supplement to oral discussions but not as a replacement.

Studies of CMC have investigated its potential to support the development of a broad range of aspects of SLA. Sauro (2011) presented a synthesis of research into CMC drawing on 97 studies of synchronous computer-mediated communication (SCMC) for L2 acquisition. The studies featured a variety of modes of synchronous interaction, including text chat, audio or video chat and bimodal chat. Sauro organized her analysis according to Canale and Swaine's framework for communicative competence (Canale, 1983; Canale & Swain, 1980). The framework, which was intended to inform communicative language teaching, divides communicative competence into four components: grammatical competence, sociocultural competence, discourse competence and strategic competence. Grammatical competence includes knowledge of discrete language units and rules for using them, including syntactic, morphosyntactic and vocabulary items. Sociocultural or sociolinguistic competence encompasses knowledge of the appropriateness of language use within a particular context. Discourse

competence relates to the skills necessary to maintain coherence and cohesion during discourse. Strategic competence is concerned with the verbal and non-verbal strategies used to maximize the effectiveness of communication and to overcome breakdowns in communication (Sauro, 2011). The use of such compensatory strategies to overcome misunderstandings is evident when learners negotiate for meaning. Sauro found that grammatical competence had received the most attention, having been a major focus of 48 of the 97 articles. Strategic competence, sociocultural competence and discourse competence featured in 31, 22 and 11 studies respectively.

We saw earlier in 3.2.1 that Chapelle (1998), in her sixth and seventh hypotheses for effective CALL design, called for the development of CALL materials and tasks that can provide opportunities for learners to negotiate for meaning and to engage in good interaction. These two hypotheses were also identified above as being particularly relevant to the support of reading comprehension. The main focus of the following review of the CMC literature will therefore be on studies that have investigated strategic competence, and in particular, the negotiation for meaning that takes place when there is a breakdown in communication. The necessity for quality interaction will also be explored. However, we saw in Chapter 2 that L2 knowledge is a key component of L2 reading so a brief review of CMC studies that focus on other areas of L2 knowledge, such as grammatical competence, will also be offered.

Lin et al. (2013) conducted a meta-analysis of the effects of text-based synchronous chat on SLA. While noting some of the benefits of SCMC in the background to their study, such as its potential for encouraging negotiation for meaning (Blake, 2000), more balanced student participation (Kern, 1995), higher quality (Chun, 1994) and quantity (Sullivan & Pratt, 1996) of learner language output, lower learner anxiety levels (Satar & Ozdena, 2008) and increased motivation (Warschauer, 1996b), they also cite some of the disadvantages associated with its use. For instance, synchronous text discussion involving more than two participants at a time may lead to chaotic exchanges that impede comprehension (Liu & Sadler, 2003). Equally, augmenting the quality of learners' language through the use of CMC may be difficult if learners have a low level of linguistic competence that can affect reading and typing speeds when unknown words are encountered (Hirotani, 2009).



Lin et al. (2013) analysed 10 studies that focused on the use of SCMC to promote SLA in the form of grammatical competence, oral performance, writing performance and lexical development, in order to estimate the overall effectiveness of SCMC when compared with face-to-face, voice-chat and asynchronous computer-mediated discussions. They found a small positive effect ( $m=.33$ ) for SCMC on SLA when compared with other discussion types. Although the effect size was small, it was found to be significant ( $p<.05$ ). However, they suggest five contextual variables that can affect the learning that takes place within SCMC tasks, and which may have reduced the overall effect size, namely L2 language proficiency, target language, learning conditions, treatment duration and grouping dynamics. So, while SCMC appears to have potential for promoting SLA, it is important to consider learner and task variables when evaluating the relevance of a study for a different context. This is not surprising, as it cannot be assumed that a task will be more effective solely because it takes place within an SCMC environment. Concerning task variables, Murphy (2010) notes that “course effectiveness is determined by the pedagogy involved in using media, and not the medium itself” (p. 114). With regard to the effect of individual differences on the results of an SCMC task, Li (2013) investigated the use of CMC for the development of academic literacy in her study of three ESL students studying academic writing at a US university. She found that differences between individuals and between their perceptions of an SCMC task could have an impact on the benefits gained from the task. A review of studies that have focused on negotiation for meaning through different task types in SCMC will now follow.

### **3.4.2 Negotiation for Meaning in CMC**

Task design has been shown to have an important influence on the types of interactions that take place within CMC. Blake (2000), working within an interactionist view of SLA, which was discussed more fully in 3.2 above, investigated the use of SCMC discussions using three different task types with 50 intermediate learners of L2 Spanish from two pre-existing classes at the University of California. The participants were required to take part in paired synchronous chat discussions for an hour a week. The first class completed four tasks, a one-way information gap task and three jigsaw tasks. The second class, who participated the following semester, completed six tasks; two one-way

information gaps tasks, one two-way information gap task, two jigsaw tasks and one decision making tasks. In the jigsaw tasks, the participants each had part of the information necessary to complete a puzzle, and were required to work together in a collaborative manner in order to find a solution. The information gap tasks, whether one-way or two-way, required that each participant ask questions to discover the information possessed by his partner in order to complete a task. Finally, in the decision making task, the participants had access to the same information but were not required to agree on a common solution. Blake found that all task types led to some negotiation for meaning, with the instances typically following the trigger-indicator-response-reaction pattern (Varonis & Gass, 1985). In this pattern, when one of the participants uses a word, phrase or other linguistic item that creates difficulty for his partner, this becomes the 'trigger'. The partner will then indicate his difficulty, leading to a 'response' from his partner, who attempts to explain or clarify the meaning of the item. If the partner's explanation is successful in resolving the misunderstanding, the other partner will react by acknowledging this. Blake utilized a chi-square test to compare the number of negotiations generated by each task type and found that jigsaw tasks were the most successful in stimulating negotiation for meaning. He also found that most negotiation was focused on lexical confusion, rather than grammatical or morphosyntactic issues. He suggested that the learners' grammatical knowledge was perhaps inadequate to provide grammatical explanations, given that they had only received about 200 hours of instruction in Spanish. With regard to the participants' perceptions of SCMC, Blake administered a post-test attitude survey and discovered that learners had a positive attitude to the discussions, viewing them as fun, helpful and useful for improving their communication skills.

In an attempt to discover the different ways in which meaning is negotiated in CMC chats, Lee (2001) undertook a descriptive study of the communication strategies used by 40 students of L2 Spanish at a US university. The participants ranged in ability level from low-intermediate to advanced and were assigned to 12 mixed ability groups, each consisting of three or four students. The groups took part in 10 one-hour synchronous chat sessions in which they discussed open-ended questions on everyday topics. The participants received no instructions other than to focus on the topics and to avoid using a dictionary or other resource. From an analysis of the chat logs, Lee found that eight different communication strategies were used in order to address communication

breakdowns and negotiate for meaning: comprehension checks, clarification checks, confirmation checks, use of L1 (English), word invention, requests, use of approximation and self-corrections. Requests (20%), clarification checks (19%), self-corrections (16%) and comprehension checks (13%) were the most commonly used comprehension strategies. Also of interest was Lee's finding that the learners focused more on the negotiation of meaning, and in particular on individual vocabulary items, than on form, with mistakes related to linguistic inaccuracy being largely ignored. This finding is similar to that of Blake (2000) and does suggest that SCMC may lend itself more to meaning focused rather than form focused negotiation when utilised with learners of lower levels of ability. While this may be a disadvantage with regard to the development of L2 proficiency, it is not necessarily a disadvantage if the goal of a CMC discussion is to provide additional support, in the form of modified input or scaffolding, to help with the comprehension of a reading text.

In a similar study, Lee (2002) explored the modification devices used by 34 intermediate learners of L2 Spanish at a US university. The participants were divided into 12 groups of two to three students and asked to chat with their colleagues once a week for 50 minutes outside the classroom. Like Blake (2000) the trigger, indicator, response and reaction schema (Varonis & Gass, 1985) was used to frame the data analysis. In contrast to her earlier study (Lee, 2001), Lee found nine categories of modification device; the majority were the same as her earlier study discussed above, however 'topic shift' replaced 'word invention' and one additional category 'use of keyboard symbols as discourse markers' was added. Again, requests for help, clarification checks and self-corrections were the most utilised strategies, providing assistance to the learners "in expressing their ideas more clearly, as well as allowing them to attend to feedback and make input and output adjustments". Lee noted that the CMC exchanges were highly interactive and collaborative and that learners provided each other with feedback and scaffolding. She also found that, on occasion, learners utilised multiple communication strategies in order to negotiate meaning and improve mutual understanding. As in her earlier study, the participants tended to negotiate for meaning rather than form, with the majority of linguistic errors being ignored if communication was not impeded. However, she did note that where learners struggled with linguistic forms they occasionally requested help and collaborated in negotiating the correct form. Overall, Lee's study supports the use of CMC for collaborative, meaning focused discussions that

provide opportunities to negotiate for meaning and in which learners can collaborate with their peers by giving and receiving support, feedback and scaffolding.

While the above studies focused on non-native speaker CMC discussions, Fernández-García & Arbelaiz (2003) compared the negotiations that took place in both oral and CMC discussions featuring dyads of non-native speakers of Spanish (NNS-NNS), native speakers of Spanish (NS-NS) and non-native and native speakers (NNS-NS). 14 NNS-NNS dyads, four NNS-NS dyads and nine NS-NS dyads were formed for the study. The native speakers were students from a variety of Spanish-speaking countries studying at the University of Michigan, and the non-native speakers were studying third-year Spanish grammar and composition courses at the same university. Fernández-García & Arbelaiz used a Generalized Linear Model to analyse two factors, Group and Mode. The Group factor had three levels, NNS-NNS, NNS-NS and NS-NS, while the Mode factor consisted of two levels, Oral Mode and Written Mode. They found a significant overall effect for the Group factor, with a significantly larger number of negotiation routines taking place in the NNS-NS dyads when compared with both the NS-NS and NNS-NNS dyads. However, further analysis showed that the difference was only statistically significant in the oral mode. They suggested that the larger number of breakdowns in the oral mode was due to difficulties faced by the non-native speakers in “segmenting oral native speaker input” (p. 132), whereas in the written electronic interactions decoding was facilitated by both the written nature of the medium and by the additional processing time available. No significant overall effect was found for the Mode factor. In discussing their results, Fernández-García & Arbelaiz note that the NNS-NNS discussions in both modes contained few breakdowns in communication and therefore few negotiation routines. They attributed this to the fact that the topics used were familiar to the participants, which again underlines the importance of task type in CMC discussions. In addition, they noted that the learners resorted to the use of L1 to avoid communication breakdowns. They suggest that even though a different task type might encourage more negotiation, the use of L1 in learner-learner interactions could negate this, particularly with lower-level learners.

The above studies suggest that CMC discussions can be a useful tool for promoting negotiation for meaning and modified input and output in learner-learner interactions, especially when suitable task types are utilized. In addition, they can provide large

amounts of meaning-focused reading practice. Another related study by Fernández-García & Arbelaiz (2002) is of particular relevance to the use of CMC for the development of L2 reading as it investigated synchronous CMC discussions based around L2 reading texts. 28 students of L2 Spanish studying third-year grammar and composition class were assigned to one of four groups. Each group took part in two chat sessions that were 20 days apart and were asked to discuss a reading text and associated content questions that they had been assigned for homework. The aim of the discussions was to give the students an opportunity to clarify ideas that they had struggled with while working alone. Like many CMC studies, Fernández-García & Arbelaiz employed the trigger, indicator, response, reaction model presented by Varonis and Gass (1985) to analyse the negotiations for meaning that occurred between their students. They found that all but one of the chat sessions produced instances of negotiation for meaning and that in the majority of cases the negotiation centred on a lexical item rather than a grammatical issue. They also found that learners resorted to the use of L1 to solve misunderstandings, often providing an L1 translation of a word whose meaning was being negotiated. Although the main focus of the study was to determine if and how negotiation for meaning takes place in synchronous CMC discussions, the study illustrated that learners discussed elements of the text they were asked to read, and through this the participants benefited from modified input rendering previously incomprehensible elements of the text comprehensible. While the use of L1 was raised as a concern, we saw in Chapter 2 that a compensatory model of L2 reading (Bernhardt, 2005, 2011) predicts that a reader will compensate for a lack of knowledge in one area by utilising alternative knowledge sources when interpreting a reading text. A weakness in a learner's L2 knowledge might be compensated for by his own L1 literacy knowledge. In Fernández-García & Arbelaiz's study, the weakness in one learner's L2 knowledge is compensated for by the knowledge of a peer, which allows previously incomprehensible elements of a text to be understood through the social construction of knowledge and scaffolding. In other words, a weakness in one area of L2 reading ability can be compensated for by recourse to the knowledge of a peer rather than relying solely on one's own (inadequate) knowledge sources.

### 3.4.3 Feedback and CMC

In addition to the potential benefits for SLA outlined above, SCMC can also facilitate the provision of feedback. Heift and Caws (2000) studied learner-learner feedback in synchronous online discussions between students of L2 French. Stressing their belief that feedback need not necessarily be generated by either the computer or by an instructor, they found that the participants provided feedback to one another, and that less knowledgeable students were able to benefit from the knowledge of their peers. Bower and Kawaguchi (2011) investigated both the negotiation for meaning and corrective feedback that took place in SCMC discussions between 21 Australian university students of L2 Japanese and 21 Japanese university students of L2 English in an eTandem study. They found that explicit corrective feedback on errors did occur in SCMC discussions but that these were infrequent, whereas the SCMC discussions generated a large number of instances of negotiation for meaning. While useful as indicators of the potential of SCMC discussions to provide learner-to-learner feedback, the findings of these two studies are not of direct relevance to L2 reading comprehension.

Murphy (2010) investigated the use of elaborative feedback in combination with pair-work interaction via text based SCMC. The study investigated whether elaborative feedback was more effective than knowledge of correct response feedback for promoting quality interaction and reading comprehension when used in combination with synchronous SCMC pair work activities. In addition, the study aimed to determine whether synchronous SCMC was a useful tool for the promotion of quality interaction between learners working away from the classroom in remote locations. In Murphy's study, 425 Japanese university students were divided into high-- and low-proficiency groups according to results on the KEPT English proficiency test (Bonk and Ockey, 2003). They were then asked to complete two web-based reading comprehension exercises that utilised the same reading text. The first exercise contained six comprehension questions along with either multiple-try elaborative feedback or single-try knowledge of correct response feedback, and was completed while working in a SCMC dyad with a partner of a similar English proficiency level. A follow-up exercise, consisting of six comprehension questions that targeted the same content areas as those in the first exercise and containing only knowledge of correct response feedback, was

completed individually by each participant in order to measure their understanding of the text.

Using a two-way ANOVA, Murphy found that elaborative feedback was significantly more effective at promoting reading comprehension than was knowledge of correct response feedback when used in conjunction with SCMC pair work interactions. In addition, Murphy conducted a qualitative analysis of the chat logs generated by the CMC dyads and found evidence of negotiation of meaning, exploratory talk and quality interaction. He concluded that elaborative feedback which allowed multiple attempts at answering questions was effective at promoting interaction “due to the opportunities afforded the students to re-engage with the reading materials and to interact with partners” (p. 129). In addition, while suggesting that CMC dyads may not be as time-efficient as face-to-face dyads, they are a useful means of promoting quality interaction, particularly for students studying in non-face-to-face environments.

Murphy’s study is relevant to this thesis in two important ways. Firstly, the findings that elaborative feedback and SCMC dyads were both useful in promoting L2 reading comprehension are worthy of further investigation. Secondly, Murphy builds on his earlier study (Murphy, 2007) in presenting a framework for the qualitative analysis of SCMC discussions. Noting the necessity to consider the type of interaction that takes place within SCMC, Murphy underlines two key attributes deemed to be beneficial for the promotion of L2 reading comprehension and L2 acquisition. Firstly, he cites Van den Branden (2000), who noted the importance of learners being actively involved in discussions in order for them to be beneficial and for negotiation for meaning to take place. Secondly, he refers to the requirement that learners participate in ‘exploratory talk’ (Mercer, 1995).

Mercer (1995) put forward three typical types of talk produced in activities where people are encouraged to think together. *Disputational talk* is exemplified by individual decision-making and disagreement and is typified by short exchanges made up of challenges, assertions and counter challenges. *Cumulative talk* occurs when the participants construct discourse together in a positive but uncritical manner, and consists of repetitions, confirmations and elaborations. *Exploratory talk* is characterised by critical but constructive engagement, wherein the participants put forward

statements and suggestions, which are then challenged and counter-challenged. Alternative hypotheses are put forward for joint consideration as the participants work together to reach agreement. Murphy's (2010) framework, which includes these concepts, will inform the data analysis of CMC logs in Chapter 5 of this thesis and will be dealt with in more detail there.

### **3.5 The Potential of Virtual Learning Environments for L2 Reading Instruction**

As seen above, feedback embedded within computer-based L2 reading materials and computer-mediated synchronous discussions both have the potential to assist L2 reading instruction. One way of providing learners with access to such materials and activities is through the use of a virtual learning environment (VLE). Popular and powerful VLEs, such as *Blackboard* ([www.blackboard.com](http://www.blackboard.com)) and *Moodle* ([www.moodle.org](http://www.moodle.org)), are a common feature of college and university language programs worldwide (Hamat & Embi, 2005; Tsai & Ernst, 2009; Yu, Sun & Chang, 2010) and offer a means of hosting materials, facilitating communication and collaboration, and assessing progress within a single virtual space. The term VLE is used here as synonymous with other terms that have been used in educational literature, such as Course Management System, Learning Management System and Managed Learning Environment (Sanprasert, 2010) in describing a software system that contains tools for organizing and presenting course content, communications tools and assessment and gradebook tools (Morgan, 2003; Sanprasert, 2010). In this way, a VLE facilitates both the computer-as-tutor and computer-as-tool roles (Levy, 1997) within a single environment.

#### **3.5.1 The Tutor-Tool Framework**

The tutor-tool framework (Levy, 1997) draws a distinction between two roles of computers within language education settings. In the role of tutor, the computer temporarily replaces the instructor in interacting with the learner and evaluating his responses. In this role the learner is assumed to be working independently of the



instructor, with the 'tutor' assumed to exist within the software. Examples of tutor-type activities are multiple-choice quizzes and cloze questions, in which the learner's responses can be evaluated for correctness, and feedback or additional materials can be provided. In contrast, computer-as-tool applications are those such as word processors, email clients, discussion boards and chat rooms, which "enhance or improve the efficiency of the work of the teacher or student" (p. 184). No underlying pedagogy exists within computer tools, implying that both careful task design and student awareness of how to make use of the tools are vital if their use is to be effective. As Levy notes:

To be successful, teachers and learners need to be clear about the tasks that require completion, they need to understand the tools that provide the support, and they need to know how best to make effective use of these tools. This requires training, both in the mechanics of the operation of the tool and in understanding the effects of the tool on the task (p. 214).

With regard to computer-mediated synchronous discussions, it was seen in 3.4.2 how task type could influence the types of interactions that take place during such chat room discussions. However, Levy's framework, when applied to the use of a VLE, has implications that are not limited solely to task design. Although a VLE may be designed based on an underlying philosophy of learning, the availability of communication tools and quiz tools alongside facilities for presenting tutorial-type content entails that an instructor is not forced into following any one approach. For example, *Moodle* is based on a social-constructivist pedagogy, encouraging discovery-based learning and collaboration among students (Brandl, 2005). However, this does not preclude the instructor from designing more behaviourist materials, such as drill and practice grammar quizzes (Beatty, 2010), or utilizing communication tools in support of a Communicative Language Teaching approach to learning (Hamat and Embi, 2005). Similarly, both the interactionist approach to SLA discussed in 3.2.1 above and the sociocultural and social constructivist approaches to L2 reading instruction and CALL described above in 2.4 and 3.2.2 respectively, can be accommodated within a single environment (Hampel & Pleines, 2013). This possibility will be explored further in Chapters 4 and 5 below, in which a description of the online reading materials and tasks used in the two studies will be offered.

VLEs differ in their design and in the range of tools which they offer. For example, *Blackboard* is a powerful, commercial, enterprise-level VLE, which provides instructors with a large variety of tools for presenting materials, facilitating communication and collaboration, providing feedback, assessing students and checking for academic integrity (Blackboard, 2009). In contrast, Edmodo, is a free social networking site, which provides instructors with access to a limited range of course management and assessment tools (Edmodo, 2015), but which allows learners to access learning materials, and to interact and share information and opinions with other learners in a safe environment (Al-Kathiri, 2015). While the range of tools available may place some limitations on the types of activities that are possible within a VLE, it is the choice and design of the tasks and activities that are provided that will determine the extent to which language learning can be promoted. This is explored in more depth below.

### **3.5.2 Virtual Learning Environments for Language Learning**

The use of VLEs for language learning has been the focus of a variety of studies looking at aspects such as course and activity design (Al Masri, 2005; Hamat & Embi, 2005; Hampel & Pleines, 2013; Sawatpanit, Suthers & Fleming, 2003; Yu et al., 2010), the promotion of learner autonomy (Polisca, 2006; Sanprasert, 2010) and reading strategy instruction (Tsai & Ernst, 2009; Tsai & Talley, 2014). Sawatpanit et al. (2003) describe the development and evaluation of BRIX, a custom-designed VLE for use in foreign language teaching at the University of Hawaii. In focusing on the provision of distance education courses with learners in diverse locations, they note that a VLE should enable the provision of complete language courses. This, they suggest, can be achieved by facilitating cooperative learning through virtual interaction with fellow learners in addition to providing opportunities for human-to computer interaction. They further recommend that a VLE should be capable of providing a variety of exercise types, including ungraded practice materials and graded tests and quizzes. In this way, they argue that both self-study and collaborative learning can be supported. Taking a Communicative Language Teaching approach to SLA, Hamat and Embi (2005) focus on the use of CMC tools within a virtual learning environment. Like Sawatpanit et al. (2003) they argue that a VLE should facilitate communication, and further assert that communication tools should be available at all times through integration with other

tools within the online environment. In contrast to the distance-education focus of Sawatpanit et al. (2003), Al-Masri (2005) investigated the use of a commercially available virtual learning environment, *WebCT*, as support to an on-campus Teaching English as a Foreign Language course for 40 trainee teachers at the Islamic University of Gaza. He reported that the participants responded positively to the use of *WebCT* and felt that it had a positive impact on motivation. However, he also noted that technical problems, such as download times, had had a negative effect on the learners' perceptions of the learning experience.

Technical problems are not the only negative issue to have emerged from research into the use of virtual learning environments. For example, the fact that many VLEs are not designed specifically for language teaching and learning has been shown to weaken their effectiveness in some contexts (Sawatpanit et al., 2003; Yu et al. 2010). Yu et al. (2010) conducted a mixed-methods study into the use of three virtual learning environments, *Blackboard*, *Moodle* and *E-campus 3*, in English language programs at two universities in Taiwan. They surveyed 241 college students enrolled in six English courses at the two universities, in addition to 53 college English teachers. Seven of the teachers and seven of the students also took part in follow-up interviews. Yu et al. (2010) found that both students and teachers had a positive impression of the use of a VLE for language teaching and learning due its perceived ability to provide convenient access to course materials and encourage collaboration among learners. However, the authors noted that the utilisation of a VLE in language teaching contexts was not necessarily intuitive, with the use of tools and resources varying greatly among the teachers polled, implying that the successful use of the VLE depended on the teacher's technical and pedagogical knowledge. They called for both technical and pedagogical training to be provided to instructors, and further argued for the development of discipline-specific virtual learning environments, which would allow teachers to focus on delivering the curriculum rather than struggling with the technology.

Task design and the choice of tools incorporated into a VLE language program can also have an effect on learner motivation, the outcomes of individual tasks and the success of the program as a whole. Hampel and Pleines (2013) describe the design and implementation of a *Moodle* course for Upper-Intermediate learners of German studying via distance learning at the Open University in the United Kingdom. The course design

was influenced by two compatible approaches to language learning: cognitive interactionist views of SLA and sociocultural theory. The former guided the inclusion of activities that provided input, promoted interaction and negotiation for meaning, and provided opportunities for output. The latter stressed the importance of learning through interacting and collaborating with others in a learning community. In addition, Hampel and Pleines (2013) paid attention to the affordances of the online environment provided by *Moodle* and the appropriate use of the tools available within it. Their mixed-methods study, which utilised learner participation logs, surveys and interviews, examined the use of the course over two years and evaluated the changes made to the course after the first year. They found that student participation was greater in discussion forums and in tasks and activities that were linked to assessments. They also found that simplifying the course by reducing the number of tools used and the quantity of tasks set improved student engagement. Another finding from the study was that student participation varied greatly, with large differences in the participation levels of the most and least active learners.

One area of concern in language education, whether in face-to-face or distance-learning modes, is learner autonomy (Benson, 2001; Dickenson, 1995; Littlewood, 1996, 1999), which involves learners taking charge of their learning, and making decisions about what to study and how to study it, in addition to evaluating their progress and seeking opportunities for additional practice (Sanprasert, 2010). The importance of learners being prepared to work independently at the computer is relevant in both on campus and distance-learning contexts. As Levy and Stockwell (2006) state:

The use of CALL assumes that learners possess some degree of autonomy. Although of course it is not always the case, it is still common to see learners plunked down in front of computers and told to work on given tasks for a period of time, and there is often an expectation that learners will continue to focus on the tasks with little or no teacher intervention... For the most part, learners need to be gradually trained and guided to be able to take increasing responsibility for their own learning (p. 198).

While the number of studies into the use of VLEs for promoting learner autonomy among L2 learners is not extensive, a few studies have indicated that their utilisation

may be helpful. Polisca (2006) investigated the use of an independent language learning program delivered via *WebCT* for students of L2 Italian at the University of Manchester in the United Kingdom. Through an analysis of questionnaire and interview data she found that the use of a VLE had a positive impact on the quality of students' independent work and on their motivation. Similarly, Sanprasert (2010) examined the use of a VLE to enhance learner autonomy in a blended learning context with two groups of students following an English Foundation program at Kasetsart University in Thailand. The mixed-methods study utilised a self-report survey and learner journals. Like Polisca (2006), Sanprasert (2010) found that the use of a VLE encouraged the development of learner autonomy, although the guidance of a teacher was seen as crucial.

### **3.5.3 Virtual Learning Environments and Second Language Reading**

As discussed in 2.4 above, reading strategy instruction is viewed as an important part of a balanced L2 reading program. The use of VLEs to assist in strategy instruction has been the focus of some recent research. Tsai and Ernst (2009) used a combination of teacher intervention and a supplementary VLE-based course in order to promote the development of a variety of L2 reading strategies with 124 Chinese-speaking L2 learners of English at a university in Taiwan. The instructor illustrated and demonstrated the use of a variety of strategies, gave feedback, helped learners identify their errors, and evaluated their progress. In addition, their chosen VLE, *Moodle*, was used to provide additional reading strategy exercises, support tools such as online dictionaries and a glossary, communication tools, and online reading resources. Using a pre-test, post-test design, Tsai and Ernst (2009) found that the course resulted in improved reading comprehension scores for both skilled and less-skilled readers. In addition, a self-report questionnaire was administered before and after the course of instruction. It found no significant difference in the strategy use of the two groups prior to the course of instruction, whereas skilled readers used significantly more strategies than less-skilled readers at the end of the course. Tsai and Ernst suggested that the main benefits of the VLE were the additional online self-study practice exercises they provided, and the communication tools within the environment that encouraged peer-to-peer and learner-instructor interactions.

In a recent study, Tsai and Talley (2014) researched the use of *Moodle* to support an L2 reading strategy instruction course with 114 Chinese-speaking L2 learners of English at a university in Taiwan. Their mixed-methods study utilised pre- and post-tests, self-report questionnaires administered at the beginning and end of the course, and records of quizzes and strategy exercises taken within the VLE. Using a quasi-experimental design they compared a treatment group that received strategy instruction in traditional face-to-face mode plus additional online practice materials delivered via *Moodle* with a control group that received the face-to-face instruction alone. While they found no significant difference between the pre-test reading comprehension scores of the treatment and control groups, the treatment group scored significantly higher on the post-test. Similarly, the self-report questionnaire showed no significant differences between the reading strategy use of the two groups prior to the course, whereas at the end the treatment group reported a significantly greater use of cognitive, metacognitive and social affective strategies than the control group. The findings support the use of a VLE to enhance L2 reading strategy instruction, in line with those of Dreyer and Nel (2003), Sung, Chang and Huang (2008) and Tsai and Ernst (2009).

### **3.6 Summary**

Reading online is an important part of the daily lives of many L2 learners worldwide, and for those studying in universities and colleges the hypertext environment brings both opportunities and challenges. Research has shown that differences exist between the strategies used by readers in online and print environments, and it has been argued that learners need guidance and support in the form of strategy instruction to assist them in their online reading. L2 reading instruction can also be enhanced through the use of computer-assisted language learning tools and software packages. Two ways in which support can be provided to learners working at a computer, either in a classroom setting or in a remote location, are through the provision of computer-based feedback within online reading materials, and through the use of computer-mediated communication tools that enable synchronous text-based discussions between learners. A convenient means of providing such support within a single online space is via the use of a virtual learning environment, which can host online reading materials and

communication tools and help support the learner working independently. From this discussion of research into computers and L2 reading, I will now present a statement of questions that remain unanswered by previous research.

### **3.7 Statement of Questions Left Unanswered**

As yet research has not satisfactorily addressed the effects on L2 reading comprehension of feedback embedded in Web-based reading materials. Likewise, the effects of peer-generated feedback provided in post-reading synchronous discussions has only received limited attention. In this regard, the ability of computer-based materials and activities to support the development of learners' reading comprehension skills, both inside and away from the classroom, is still open to question.

Elaborative feedback can be seen to offer the potential to enhance comprehension from both an interactionist and a social-constructivist view of SLA. In the former, it can be seen as a method of providing both modified input and an opportunity for modified interaction, while in the latter it can provide scaffolding. Its effectiveness as an aid to L2 readers working independently or in pairs/groups away from the classroom is worthy of investigation, with any findings of potential benefit to both teachers and commercial materials designers engaged in the production of learning resources.

To date, findings on the effectiveness of elaborative feedback have been inconclusive. This is perhaps due to the variety of contexts in which the studies have taken place, and due to the different instructional goals of the materials featured in the studies. For instance, only Bown (2006) and Murphy (2007, 2010) focused on the use of elaborative feedback to promote L2 reading comprehension. The other studies reviewed covered a broad range of instructional goals, with the majority of the L2 studies having grammar instruction as the focus. For examples, please see the discussion of Brandl (1995), Nagata (1996) and Van der Linden (1993) in 3.3.1 above.

One area that has been overlooked in studies of elaborative feedback has been strategy instruction. While some of the studies reviewed above involved an investigation of the effectiveness of elaborative feedback (Brandl, 1995; Murphy, 2007; Nagata, 1996; Van

der Linden, 1993), they did not take into account the need to train learners in the use of such feedback. As seen earlier in 3.1.2 above, electronic texts bring challenges as well as new supports, and students need guidance in developing strategies adapted to this medium (Hanson-Smith; 2003; Leu, 2002). While studies such as Murphy (2007) included the use of a brief instructional tour of online reading materials in which the participants were made aware of the feedback types available, the learners received no strategic instruction in their use. As Ketabi et al. (2012) argued, if learners are unaware of the potential benefits of useful features contained in computer-based materials, they may elect to ignore them. To date, no studies have examined the impact of strategy instruction on the usefulness of elaborative feedback in online L2 reading materials.

Another area that has been underexplored in previous studies of elaborative feedback in online reading exercises has been the investigation of single learner-computer interactions when confronted with elaborative feedback. While Murphy (2007, 2010) analysed the interactions that took place between learners around a computer (2007) or via CMC discussions (2010) when faced with elaborative feedback, no attempt was made to analyse the interactions that take place when a single learner works independently at a computer while completing an online reading exercise containing elaborative feedback. Van der Linden (1993) utilized interviews and think-aloud protocols when investigating the use of elaborative feedback by L2 students of French, while Brandl (1995) employed follow-up interviews in his study of students of L2 German. However, both studies focused on grammar exercises rather than L2 reading comprehension. Other studies have investigated online reading strategy use using think-aloud protocols and interviews (Akyel and Ercetin, 2009; Ketabi et al., 2012; Konishi, 2003) but the focus of these studies has not been elaborative feedback. In the studies described below in Chapters 4 and 5 a range of data collection techniques were utilised, including screen recordings, think-aloud protocols and post-reading recall interviews, in order to investigate learner-computer actions encouraged by elaborative feedback. Through analysing learner-computer interactions, it is hoped that some light will be shed on the conditions necessary for elaborative feedback to have a beneficial effect on L2 reading comprehension, especially given the inconclusive nature of previous studies. Also worthy of further investigation is the use of pair or small group work when using elaborative feedback. Murphy (2007) found that students who received elaborative feedback while completing reading comprehension exercises in pairs outperformed



those who worked individually. In this first study, the pair-work was oral, with the students working around a computer. In Murphy's (2010) study, the use of text-based CMC dyads in combination with elaborative feedback was also shown to improve L2 reading comprehension. However, no other studies to date have corroborated this finding.

Although Murphy (2010) was the only study encountered that investigated the use of synchronous CMC pairwork discussions in which learners worked together to complete L2 reading comprehension exercises containing elaborative feedback, other research also points to the potential for such CMC discussions to compensate for some of the weakness of pre-programmed elaborative feedback. As we saw in 3.2.1 above, Van den Branden (2000) found that the premodification of reading texts through simplification and elaboration for use with a heterogeneous group of students was only beneficial to a significant degree with a subset of the students, the effect being level dependent. This would suggest that the premodification of texts might be of limited use within contexts where ability levels differ greatly. While elaborative feedback is not identical in form to the elaborative modification of a reading text, the potential strengths and weakness are similar. In both cases, additional information is provided to the learner in a form that has the potential to aid comprehension without simplifying the reading text, and therefore without reducing the text's capacity to provide rich input for SLA. At the same time, instructors or materials developers have to predict the difficulties that students will face when confronting a particular text in order to determine the content and structure of the elaborative modifications. As Van den Branden (2000) notes, such predictions are extremely difficult. Van den Branden cites Ellis et al. (1994) who described the difference in support that can be given between premodifying texts: "[I]t is simply difficult to predict what adjustments are needed in vacuo. The whole point of interactionally adjusted input is that it occurs in context when learners signal their comprehension difficulty. It responds to problems rather than predicts them" (p. 475).

Given the above gaps in existing research, the following research questions will be addressed in this study.

**Research Question 1:** Does the use of elaborative feedback in Web-based reading practice materials result in improved L2 reading comprehension?

**Research Question 2:** Does instruction in the use of elaborative feedback increase its usefulness as an aid to L2 reading comprehension?

**Research Question 3:** Do post-reading computer-mediated synchronous discussions assist learners with L2 reading text comprehension?

**Research Question 4:** Is elaborative feedback a useful support to post-reading computer-mediated synchronous discussion in promoting L2 reading comprehension?

Research Questions 1 and 2 will be the focus of Chapter 4, while Chapter 5 will address Research Questions 3 and 4.

The research questions will be addressed in two separate studies for practical reasons. The number of treatments involved and the amount of time required for data collection preclude the use of a single study with a single set of participants. In addition, elaborative feedback is the sole focus of Chapter 4, whereas the main focus of Chapter 5 is computer-mediated synchronous discussions, which were nonetheless supported by the provision of elaborative feedback.

## Chapter 4: Elaborative Feedback, Strategy Instruction and Online Reading Comprehension

### 4.1 Introduction

As seen in 3.3.2 above, previous research into the effects on L2 reading comprehension of elaborative feedback in online reading materials has been both limited and inconclusive. The majority of studies into computer-based feedback undertaken so far have taken a broadly quantitative, experimental or quasi-experimental approach and have explored aspects other than L2 reading comprehension. However, mixed methods studies into the use of elaborative feedback in L2 grammar exercises (Brandl, 1995; Van der Linden, 1993) suggest that think-aloud protocols and interviews can provide insights into when, how and for whom elaborative feedback might be a useful support in computer-based language learning materials. As noted in Chapter 1, for the purposes of this thesis elaborative feedback will be defined as feedback embedded within online exercises, which provides explanations concerning the correctness or incorrectness of a response and/or provides hints or support to guide the learner towards a correct response.

Studies by Bown (2006) and Murphy (2007, 2010) suggest that elaborative feedback does promote reading comprehension, although they tell us little about how such feedback is used by a reader working independently at a computer. Theoretical support for the potential of elaborative feedback to enhance reading comprehension can be drawn from several sources: the Compensatory Model of L2 Reading (Bernhardt, 2005, 2010), an interactionist approach to L2 CALL instruction (Chappelle, 1997, 2001, 2007), and social-constructivist and sociocultural approaches to L2 reading instruction (Yang and Wilson, 2006; Ghafar Samar & Dehqan, 2013).

The *Compensatory Model* (Bernhardt, 2005, 2010), discussed in 2.2, identifies three principal components of L2 reading. These are L2 language knowledge, first language literacy, and 'other'. Subsumed under 'other' are factors such as strategic knowledge, background knowledge, engagement and motivation. When comprehension difficulties arise as a result of a deficiency in one of the knowledge sources, this is compensated for

by the greater use of another source. If elaborative feedback is to assist with L2 reading comprehension, it would seem logical that it should target the key components of L2 reading. For example, additional knowledge could be provided in the form of L2 vocabulary support, by providing a simplified definition of an unknown word, or by rephrasing part of the text to facilitate comprehension of a syntactically challenging phrase. For this additional guidance within the elaborative feedback to be effective, the learner should be capable of making use of it in a strategic manner. As McNeil (2012) argues, the use of strategic knowledge to overcome comprehension difficulties is central to both the original Compensatory Model (Bernhardt, 2005, 2010) and his extended model (McNeil, 2012).

From an interactionist perspective, elaborative feedback can assist with the modification of input, wherein incomprehensible input is rendered comprehensible. Two of Chapelle's hypotheses for CALL development suggest that "the linguistic characteristics of target language input should be made salient" and that "learners should receive help in comprehending semantic and syntactic aspects of linguistic input" (1998, pp.23-24). Both of these requirements can be met by means of elaborative feedback through the use of highlighting and rephrasing, and through elaborative interrogation in the form of embedded adjunct questions similar to those used in studies by Al-Shehri and Gitsaki (2010) and Brantmeier et al. (2011). Elaborative feedback can also be used to promote negotiation for meaning in interactions between the reader, the text and the computer. Negotiation for meaning is central to the interactionist view of SLA and also featured among Chapelle's (1998) hypotheses for CALL development. As we saw in Chapters 2 and 3, negotiation for meaning typically involves interaction between participants as a result of a breakdown in communication, but it can also take place between a learner and a computer (Beatty, 2010).

From a social-constructivist or sociocultural perspective, elaborative feedback can be utilized as a means of providing scaffolding. In this way, the feedback is used to assist the reader to comprehend a text, or portions of a text, that would be beyond his ability level if working without such support. For successful comprehension to occur, variables, such as the linguistic difficulty of the reading text and of the elaborative feedback provided, need to be at a level such that task achievement is within the reader's *Zone of Proximal Development* (Vygotsky, 1978).

By bringing together the three theories above, it is hypothesized that elaborative feedback in online reading materials has the potential to promote L2 reading comprehension. This feedback should be targeted at key determiners of L2 reading, such as syntactic and vocabulary knowledge, and should be provided in a form that is both accessible to the learner, and at a level that modifies input sufficiently for it to be comprehended. In addition, it is hypothesized that, for the feedback to be effective, the learner should have the strategic knowledge to be able to make use of it effectively.

In order to examine the above hypotheses, this chapter will investigate the following two research questions.

Research Question 1: Does the use of elaborative feedback in Web-based reading practice materials result in improved L2 reading comprehension?

Research Question 2: Does instruction in the use of elaborative feedback increase its usefulness as an aid to L2 reading comprehension?

## **4.2 Method**

A mixed-methods approach to research was used to investigate Research Questions 1 and 2. Riazi and Candlin (2014) cite three paradigms that have informed mixed-methods research (MMR): critical realism, critical theory or transformative learning, and pragmatism. On the subject of pragmatism, they note that:

Pragmatically-oriented MMR researchers use research questions as a springboard to determining the choice of research approach and methods, enabling the investigation of important questions through mixing methods in ways that cannot be adequately addressed with a single approach (p. 142).

Creswell (2003) asserts that a mixed-methods approach makes pragmatic knowledge claims and involves the collection of both quantitative and qualitative data, and it was pragmatism that informed the approach taken in this thesis. As Ivankova and Creswell (2009) assert, mixed methods research:

can provide answers to both 'what' and 'why' questions and this way gain a more complete understanding of the research problem than if qualitative or quantitative methods were used alone (p. 145)

A number of investigations into various aspects of both elaborative feedback use and L2 reading have employed a mixed-methods approach, combining experimental or quasi-experimental designs with qualitative data collections methods. These were reviewed in detail in Chapters 2 and 3 above. For example, think-aloud protocols and interviews have been used in studies of L2 reading strategies (Akyel and Ercetin, 2009; Ketabi et al., 2012; Konishi, 2003) and in investigations of elaborative feedback in L2 grammar exercises (Van der Linden, 1993). Murphy (2007, 2010) employed a mix of experimental and discourse analysis methods in his studies of Japanese university students' use of elaborative feedback in online reading exercises. His design is a useful reference for further investigations into the effectiveness of elaborative feedback and his methods will be referred to in greater detail below.

Following on from the studies cited above, quasi-experimental quantitative data were collected for the present study using a nested or embedded design (Ivankiva & Creswell, 2009; Riazi & Candlin, 2014). The participant samples for the predominantly qualitative procedures, namely the interviews and think-aloud protocols, were a subset of those that took part in the quasi-experiments. The sampling was not random, in as much as all the participants were members of four intact classes. However, for Research Question 1, upon selection, the participants were randomly assigned to either the control or treatment group. In addition, pre-tests were included in the design for both research questions in order to control for pre-existing differences in online reading ability. This is explained in more detail later.

Given that the samples involved were limited to approximately 70 participants, and that the design was not purely experimental, it was intended that the provision of rich qualitative data would be used to explain the findings gathered from the quantitative investigation and to enable others to judge the relevance of the research to their own contexts (Richards, 2003). Furthermore, the possibility of gaining more detailed insights into strategy use and human-computer interaction through the use of think-aloud

protocols and retrospective reports (McKay, 2009) also led me to select a mixed methods approach.

### **4.3 Participants**

The participants were 71 adult students of L2 English studying full-time for a Higher Diploma in either Information Technology and Business or Mechatronics at Ras Al Khaimah Men's College, one of the Higher Colleges of Technology in the UAE. The participants were members of four intact classes, 2BA, 2TA, 4BA and 4TA. The number denotes the semester of study, BA is the code used for a Business class, and TA is the code used for a Mechatronics class. The students were in either the second or fourth semester of their respective six-semester programs and most had completed the Higher Foundations Year, which focuses largely on English language skills but which also includes courses in Maths, Arabic and Computer Literacy. All were preparing for the academic version of the IELTS (International English Language Testing System) examination, which they were due to take at the end of their fourth semester of study, and in which they were required to obtain an overall band score of 5.5, with no score below band 5. All the second semester students were due to sit the IELTS exam approximately 15 months after the start of the data collection period (March to May 2008), whereas the fourth semester students were scheduled to take the exam within a few weeks of the end of this period.

In addition to my role as researcher, at the time of data collection, I was the Program Chair of Higher Diploma General Education Programs at the college. In this capacity I was responsible for the management of all English Language courses forming part of the Higher Foundations and Higher Diploma programs. I was also involved in teaching some of the participants during the course of the study.

### **4.3.1 Treatment and Control Groups**

Four groups were formed in order to investigate Research Questions 1 and 2. Treatment Group 1 (TG1) and Control Group 1 (CG1) were created by randomly assigning members of the four pre-existing classes described above in 4.3 to one of the two groups. This grouping was designed to address Research Question 1. TG1 received an online reading text containing elaborative feedback, whereas CG1 were provided with the same reading text containing knowledge of response feedback. This assignment, along with a fuller description of the treatment and control conditions, are described in more detail in 4.5.1.

Treatment Group 2 (TG2) and Control Group 2 (CG2) were formed according to the pre-existing classes described above in 4.3. TG2 consisted of the participants from the two Mechatronics classes, 2TA and 4TA, while CG2 was made by combining the two Business classes, 2BA and 4BA. This grouping was designed primarily to address Research Question 2. TG2 received strategic instruction in the use of elaborative feedback within online reading exercises, whereas CG2 were given access to online exercises without any classroom instruction. This assignment, along with a fuller description of the treatment and control conditions, is described in more detail in 4.5.2. In addition, a summary of the treatment and control conditions for both research questions is provided in Table 4.1 below.

## **4.4 Instruments and Materials**

The use of a mixed-methods approach led to the development of a range of materials for use in the study. Some of the materials were developed to gather quantitative data only, such as the two pre-tests used in the study, which are described later. Others were designed to gather both qualitative and quantitative data, such as the surveys, which included both Likert-scale and open-ended questions. All the materials used in the study are described below, along with a rationale for their design and use. Where appropriate, some of the materials are included in the appendices for ease of reference. An overview



of the materials and assessments used and the types of data they were designed to gather is shown below in Table 4.1.

#### **4.4.1 Online Surveys**

Three online surveys were developed and administered in various forms at the beginning and end of the study. They were created using the online quiz and survey creation tool, *Respondus* (<http://respondus.com/>), and were delivered using *Blackboard Vista*, the online learning platform in use at the Higher Colleges of Technology. While the majority of the items utilised a Likert-scale format, others were open-ended in order to provide qualitative data (Nunan, 1992).

Study 1 Survey 1 contains eight items, seven of which use a five-point Likert scale, with the remaining question requiring an open-ended response. It was designed to be given to all participants at the beginning of the study in order to gather some preliminary data on their reading habits and preferences. In particular, it was used to ask the respondents about the amount of reading they did in both English and Arabic, and about their attitudes to online and paper-based reading. In view of the importance given to L1 reading as a determiner of L2 reading ability in the *Compensatory Model* of L2 Reading (Bernhardt, 2005, 2010) discussed in Chapter 2, I felt it necessary to gain some insights into the both the L1 and L2 reading habits of the participants. Equally, I wished to uncover some background information about their online and paper-based reading habits due to the different reading strategies that are employed in the two media. The questions from Survey 1 were also intended to be delivered to all participants at the end of the survey, as the first part of either Study 1 Survey 2 or Survey 2 Taught. In this way, it was hoped that any changes in reading habits or attitudes to online and paper-based reading over the course of the study could be examined.

*Table 4.1: Materials and Assessments Used and Their Purpose*

<b>Week</b>	<b>Materials/Assessments/ Procedures</b>	<b>Purpose/Data Collected</b>	<b>Research Question</b>
1	Survey 1	Information about participants' reading habits	Q1, Q2
	Pre-Test 1	Pre-test scores for all students	Q1
2	Reading Practice Exercise 1e (Treatment Group 1)	Treatment condition containing elaborative feedback	Q1
	Reading Practice Exercise 1f (Control Group 1)	Control condition containing knowledge of response feedback	Q1
	Post-Test 1	Post-test scores for all participants to measure effect of elaborative feedback	Q1
3	Think-aloud protocols and follow-up interviews.	Information about reading strategy use and reading habits of 8 volunteer students. Screen and voice recordings.	Q1, Q2
4-7	Access to Reading Practice Materials 1 to 4 and Reading Practice Tests 1 to 3 plus strategy instruction in the use of elaborative feedback. (Treatment Group 2)	Treatment Condition (Lessons audio recorded for later analysis)	Q1, Q2
	Access to Reading Practice Materials 1 to 4 and Reading Practice Tests 1 to 3 (Control Group 2)	Control Condition	Q1, Q2
8	Pre Test 2	Pre-test scores for all students	Q1, Q2
9	Reading Practice Exercise 2 (Treatment Group 2 and Control Group 2)	Preparation for Post-test 2	Q1, Q2
	Post-Test 2	Post-test scores to measure effect of training in the use of elaborative feedback	Q2
	Survey 2 and Survey 2 Taught	Information about participants' reading habits, perceptions of the feedback and training	Q1, Q2
10	Think aloud data and follow-up interviews.	Information about reading strategy use and reading habits of 8 volunteer students. Screen and voice recordings.	Q1, Q2

Study 1 Survey 2 contains all the items contained in Study 1 Survey 1 above, plus 13 additional questions, nine employing a Likert scale and four using an open response format, which were developed to investigate the participants' experiences and opinions with regard to the online reading practice materials and tests that were made available to them during the study. These additional questions focus in particular on the usefulness of the reading practice exercises and the elaborative feedback contained within them, and the suitability of the reading practice tests. They were also written to seek feedback from the participants on ways to improve both the materials in general, and the feedback in particular. The materials are described in detail below. Study 1 Survey 2 was delivered to Control Group 2, who did not receive instruction in the use of the elaborative feedback, via *Blackboard Vista* at the end of the study.

Study 1 Survey 2 Taught contains all 21 of the items included in Study 1 Survey 2 above, plus eight items that were created to investigate the views of Treatment Group 2 on the usefulness of the four lessons they received during the course of the study. These lessons focused on the strategic use of online elaborative feedback and are outlined in detail in 4.5.2.3 below. Six of the items used a five-point Likert scale, while the remaining questions were in an open-response format. Study 1 Survey 2 Taught was delivered to Treatment Group 2 via *Blackboard Vista* at the end of the study.

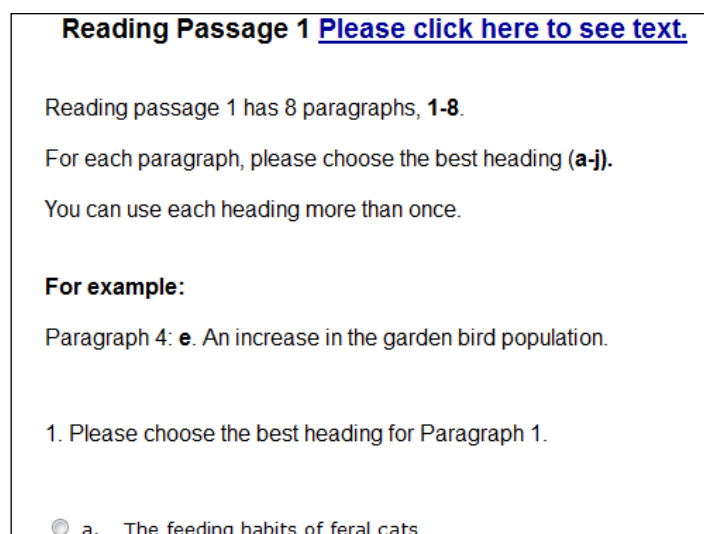
The three surveys were piloted with 10 volunteer students of a similar profile to the participants in the study. The 29 items were checked for linguistic difficulty and ambiguity. Based on the feedback from the volunteers, the language of some of the items was simplified. For example, Questions 11 and 12 (see Table 4.13) use the term 'guided feedback' instead of 'elaborative feedback', which two of the volunteers found confusing. The questions from all three surveys can be seen in the data analysis section in 4.6.2.1 and 4.6.2.4.

#### **4.4.2 Pre-test 1 and Pre-test 2**

In order to measure the participants' online reading ability at different points in the study, two pre-tests were created using Respondus, the same software that was used to create the online surveys described above. Pre-test 1 was developed for use at the beginning of the study as part of the quasi-experimental design used to investigate

Research Question 1, while Pre-test 2 was used in a similar way later in the study as part of the investigation into Research Question 2. As the online reading ability of the participants was predicted to be the most significant confounding variable in the quasi-experimental designs employed in this study, it was necessary to create two robust instruments to measure this. I therefore adapted two published IELTS-type reading practice tests, which I felt would be of a higher quality than tests I could produce myself. Pre-test 1 was adapted from O’Sullivan and Lindeck (2000, pp.58-68), while Pre-test 2 was based on Gould and Clutterbuck (2004, pp.54-66).

Both tests contain 40 items. Pre-test 1 contains three texts, totalling 1893 words, while the three texts comprising Pre-test 2 total 2060 words. Links to these reading texts were provided by embedding hyperlinks within the online tests, on which a participant could click in order to open up the reading texts relevant to each section of the test. The texts would then appear in a separate browser window. A sample link is shown below in Figure 4.1.



**Figure 4.1:** Screen shot showing a hyperlink to a reading text.

Using the timing feature available in Blackboard Vista, the tests were given a 60-minute time limit, and were also password protected so that participants could not access them before their assigned test time.

These particular tests were chosen for a variety of reasons. One important consideration was the fact that the participants were all familiar with the task types found in the

academic reading module of the IELTS, on which these tests were modelled, as they were being prepared for this test as part of their regular English language studies. I felt that the use of familiar task types was important for two reasons. Firstly, the pre-tests would have face validity in the eyes of the participants, as they would be able to relate them to their regular course content, and to their objective of being successful in the IELTS examination (Hughes, 2003). This was intended to ensure that the participants would be motivated to perform well on the tests, a necessary condition if the results were to be truly meaningful. Secondly, I did not want to include unfamiliar task types that might confuse the students, and thereby hamper the ability of the tests to measure their reading ability.

Another important selection criterion when choosing the tests was the content of the reading texts. Background knowledge, as we saw earlier, is considered to be an important factor in reading comprehension. Urquhart and Weir (1998) recommend attempting to minimise the impact of background knowledge when constructing a reading comprehension test. I therefore attempted to choose texts that would be relatively neutral with regard to the participants' area of study (Business and Information Technology or Mechatronics). In addition, I tried to choose topic areas that would be generally familiar to the participants, but about which they were unlikely to have any specialist knowledge.

A third, but equally important reason, for choosing the tests was the desire for quality instruments. The ideal instruments would have been two reading tests, perhaps produced by the IELTS examination board, which had been extensively piloted with a large number of candidates with similar backgrounds to those of the participants in the study. Unfortunately, this option was unavailable to me. As a compromise, I sought permission to use the above-mentioned professionally-produced practice tests as I felt that these would be of a much higher quality than my own purpose-built readings tests. As extensive piloting of the tests ahead of the study was not possible due to practical considerations, such as the lack of access to students of a similar profile to the participants, I decided to convert them into an online format using Respondus without making any significant changes to any of the items.

One additional point of note with regard to both pre-tests was the slight modification of the correct responses for items that required participants to type a short answer. The purpose of the pre-tests was to measure online reading ability, which, as we saw earlier in the literature review, depends to some extent on knowledge of L2 grammar, vocabulary and orthography. In line with this, teachers preparing candidates to sit the IELTS Academic Modules are advised that incorrect spelling and grammar are penalised (Cambridge ESOL, 2014) and this is reflected in the answer keys of the published IELTS practice tests that were adapted for use as Pre-tests 1 and 2.

However, given that the focus of the study was reading comprehension, and the usefulness of elaborative feedback in assisting learners to comprehend a text, I decided to allow responses that were grammatically incorrect or misspelt, if the answer clearly demonstrated comprehension. This is in line with Hughes (2003), who argues that scoring of a test designed to measure reading ability will not be valid if the scoring of responses takes into account spelling and grammar. Given the number of possible misspellings and grammatical errors that could arise, the answer keys entered into Respondus when creating the online versions of Pre-test 1 and Pre-test 2 were not altered from those of the published tests. Instead, it was decided that judgement of acceptable responses to short answer questions that varied from those in the answer key would be made after the participants had completed the test. This process will be described later, in the procedures section.

#### **4.4.3 Reading Practice Exercises 1 and 2**

Two online reading comprehension exercises, Reading Practice Exercises 1 and 2, were created to prepare the participants to take Post-tests 1 and 2 (described later in 4.4.4) respectively. Reading Practice Exercise 1 is based on the same text as that used in Post-test 1. Furthermore, the questions in Reading Practice Exercise 1 test an understanding of the same parts of the text as those assessed in Post-test 1. (See Appendix I for the complete list of questions from Reading Practice Exercise 1, and Appendix II for the questions from Post-test 1). A similar relationship exists between Reading Practice Exercise 2 and Post-test 2. (See Appendix III for the complete list of questions from Reading Practice Exercise 2, and Appendix IV for the questions from Post-test 2).

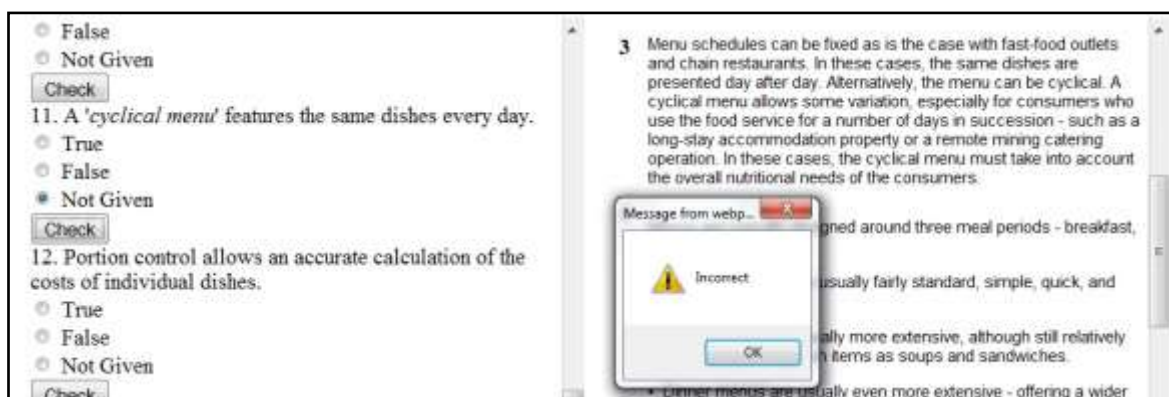
Reading Practice Exercise 1 was produced in two versions, with Reading Practice Exercise 1e containing elaborative feedback, and Reading Practice Exercise 1f containing knowledge of response feedback. Reading Practice Exercise 1e provides the treatment condition for Research Question 1, whereas Reading Practice Exercise 1f provides the control condition (see 4.5.1.2). In all other respects, Reading Practice Exercise 1e and 1f are identical. Only one version of Reading Practice Exercise 2 was created, which contains elaborative feedback, as this exercise was designed for both the treatment and control groups for Research Question 2 (see 4.5.2.2).

When designing Reading Practice Exercise 1, Post-test 1, which was adapted for online delivery from Gould and Clutterbuck (2004, pp. 30-33), was used as the starting point. In addition to the use of the same 770-word text on the subject of food menus, the accompanying questions that were created for Reading Practice Exercise 1 were written to assess the participants' understanding of the same areas of the text tested by the questions in Post-test 1. This resulted in the 15 questions being created for Reading Practice Exercise 1. Questions 1 to 8 in Reading Practice Exercise 1 are multiple-choice gist questions assessing an understanding of each paragraph of the text, and were designed to mirror the requirements of Questions 1 to 7 in Post-test 1. The one additional gist question in Reading Practice Exercise 1 matches the example question included in the instructions for Post-test 1. Questions 9 to 15 are also multiple-choice questions, designed to test the same specific details of the text that are examined by Questions 8 to 14 in Post-test 1. An example of a matching pair of questions is shown in Table 4.2 below, where Reading Practice Exercise 1, Question 12 requires an understanding of the same phrase and of a similar area of the text to that required by Post-test 1, Question 11.

Table 4.2: Matching pair of comprehension questions

Reading Practice Exercise 1, Question 12	Post-test 1, Question 11
<p>12. Portion control allows an accurate calculation of the costs of individual dishes.</p> <ul style="list-style-type: none"> <li>• True</li> <li>• False</li> <li>• Not Given</li> </ul>	<p>11. The expression '<i>portion control</i>' means that...</p> <ul style="list-style-type: none"> <li>a. <i>cooks must follow established menus.</i></li> <li>b. <i>the chef needs to predict diners' wishes.</i></li> <li>c. <i>cooks follow standard ingredient amounts.</i></li> <li>d. <i>all dishes on the menu are the same size.</i></li> </ul>

In addition to the text and accompanying questions described above, feedback was written for each question. As stated above, two versions of Reading Practice Exercise 1 were created. In Reading Practice Exercise 1f, knowledge of response feedback was written for each question, such that a correct answer would be met with "Correct" as the only feedback given. Similarly, an incorrect response would be met with "Incorrect". An example of knowledge of response feedback is shown in Figure 4.2 below.

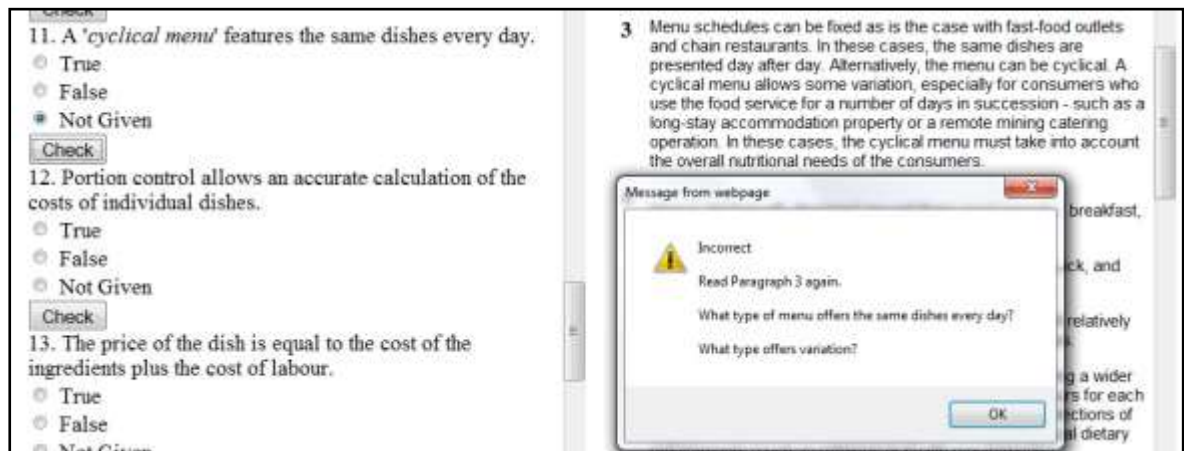


**Figure 4.2:** Screen shot showing an example of knowledge of response feedback following an incorrect answer.

In contrast, Reading Practice Exercise 1e contained elaborative feedback for each correct or incorrect response. If a participant's response is incorrect, the feedback states

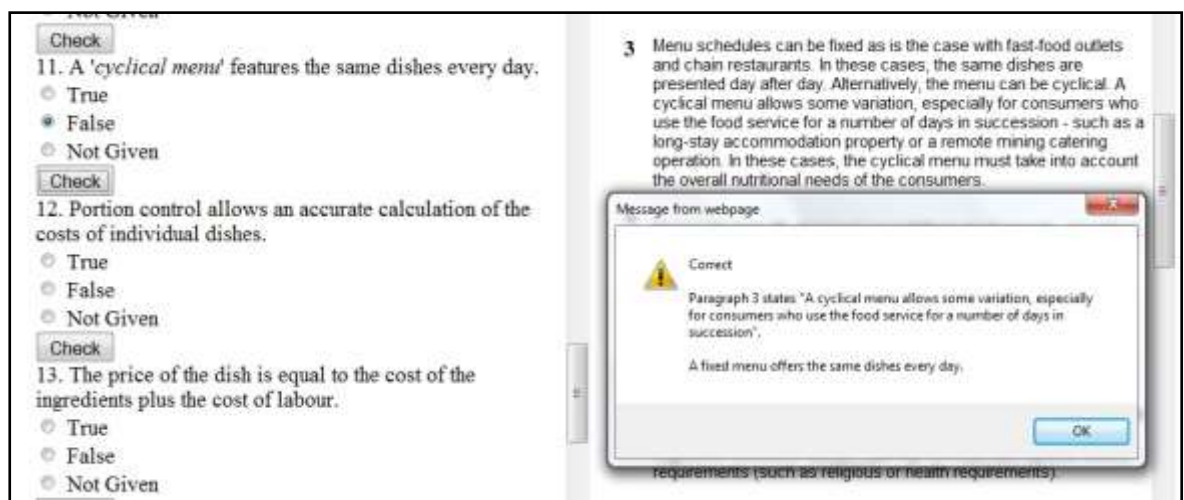


this, and provides the student with further guidance to assist him in finding the correct answer. An example of this is shown in Figure 4.3 below.



**Figure 4.3:** Screen shot showing an example of elaborative feedback following an incorrect answer.

On the other hand, if the participant's response is correct, the feedback confirms this, and also provides an explanation of the correctness of the response through, for example, rephrasing. This is exemplified in Figure 4.4 below.



**Figure 4.4:** Screen shot showing an example of elaborative feedback following a correct answer.

As can be seen from the examples of elaborative feedback above, the participant is always referred to the relevant part of the text for verification, whether he has answered correctly or incorrectly. In contrast, the knowledge of response feedback indicates whether the response is correct or incorrect, with no additional guidance. In both cases,

the participant has as many attempts as necessary to arrive at the correct answer and, unlike Post-test 1, the responses to the questions are neither saved on the Web server hosting the materials, nor scored. When writing the elaborative feedback for each question, a conscious effort was made to keep the feedback as concise as possible. This was due in part to Van der Linden's (1993) study, which found that feedback longer than three lines was usually ignored.

Whereas the tests, pre-tests and surveys used in this study were all created using Respondus and uploaded for delivery and tracking in *Blackboard Vista* through its integrated quiz tool, the reading practice exercises were developed using *Dreamweaver* with the *Coursebuilder* extension ([www.adobe.com](http://www.adobe.com)). Access to the practice exercises was still made available to students via *Blackboard Vista*, which allows links to pages on external Web servers to be included alongside links to its integrated tools.

The principal reason for using the *Dreamweaver-Coursebuilder* combination was the greater flexibility it offered with regard to screen layout and feedback options. The integrated *Blackboard Vista* quiz tool used to deliver the pre-tests, tests and surveys is powerful in terms of its ability to record results instantly and to provide information about the responses of individual participants or groups of test takers, but is limited with regard to the screen layout options it provides. As the purpose of Reading Practice Exercise 1 was to provide participants with an opportunity to comprehend as much of the reading text as possible, I wanted to provide simultaneous access to the reading text, the questions and the feedback. This would avoid, for example, the reader having to remember the contents of the feedback while looking for the answer to a question in the text. As seen in 2.3, Al-Shehri and Gitsaki (2010) found that questions inserted within the body of a text were more effective at promoting L2 reading comprehension than questions that followed the text. Although the questions and feedback were not inserted into the text in these online materials, it was hoped that the ability to view the text, question and feedback simultaneously would reduce cognitive load and eliminate the need for the reader to store large amounts of information in working memory.

Figures 4.2 to 4.4 above illustrate how, using *Dreamweaver and Coursebuilder*, it was possible to place the questions in the left-hand side of the screen, the text in the right-

hand side, and the feedback in a pop-up window that could be dragged anywhere on the screen.

Reading Practice Exercise 2 was based on a 5 paragraph, 656-word text on the topic of language proficiency development, which was taken from Gould and Clutterbuck (2004, pp. 43-44). As with Reading Practice Exercise 1, the topic was chosen for its neutrality with regard to the content area specialisations of the participants. Unlike Reading Practice Exercise 1, which was produced in two versions, only one version of Reading Practice Exercise 2 was created, with elaborative feedback being provided for all the practice questions. In all other respects, the design procedures employed in the creation of Reading Practice Exercise 1 were followed for Reading Practice Exercise 2. The starting point for the creation of Reading Practice Exercise 2 was Post-test 2, taken from Gould and Clutterbuck (2004, pp. 43-46). The relationship between Post-test 2 and Reading Practice Exercise 2 is similar to that between Post-test 1 and Reading Practice Exercise 1 described above, including the use of matching question pairs.

Reading Practice Exercise 2 contains two question types. Questions 1 to 9 are 'True/False/Not Given' questions, and Questions 10 to 12 are multiple choice items with four answer choices, which require the participants to select the best ending for each sentence. Post-test 2 consists of 13 questions in total. Questions 1 to 5 require participants to write a short answer of no more than five words in length. Questions 6 to 9 are multiple-choice in format, with four answers to choose from, and require participants to select the best ending for each sentence. When combined, Questions 1 to 9 of Reading Practice Exercise 2 and Questions 1 to 9 of Post-test 2 require comprehension of the same areas of the text, even though the format of the practice and test questions is not identical. Questions 10 to 13 of Post-test 2 are 'Yes, No, Not Given' questions, while Questions 10 to 12 of Reading Practice Exercise 2 are multiple-choice items with four answer choices. Reading Practice Exercise 2 does not contain a question to match Question 13 of Post-test 2, as the answer to that item is 'Not Given'. It was therefore not possible to provide elaborative feedback focussing on a particular area of the text in order to prepare the participants to answer this question.

#### **4.4.4 Post-test 1 and Post-test 2**

Post-test 1, based on Gould and Clutterbuck (2004, pp. 30-33) and Post-test 2, adapted from Gould and Clutterbuck (2004, pp. 43-46), were both created using Respondus, following the same methods used to create Pre-tests 1 and 2. While the pre-tests each comprised 40 items and three reading texts, to constitute a full IELTS reading practice test, Post-tests 1 and 2 were based on only one text each and were taken from sections 1 and 2 of the same IELTS practice test. The time limit for these tests was set at 20 minutes, which is equivalent to one-third of the time allotted for the pre-tests.

The decision to use only one section of an IELTS academic reading practice test was taken for several reasons, but it did involve making a compromise. Given that the tests would be administered to participants immediately after their exposure to Reading Practice Exercise 1 and Reading Practice Exercise 2 respectively, I made the decision to limit both the tests and the practice exercises to one reading section along with the accompanying questions. Participants would spend 30 minutes working on each of Reading Practice Exercise 1 and Reading Practice Exercise 2 prior to taking Post-test 1 and Post-test 2. This would result in 50 minutes of concentrated effort, plus additional time to move from the practice exercise to the follow-up test. I felt that the participants would not be sufficiently motivated nor have sufficient mental stamina to spend one hour or more working with a longer practice exercise, such as one based on a full IELTS practice test, prior to taking a full length 60-minute, 40-item follow-up reading test.

By reducing the length of Post-tests 1 and 2 to one reading passage each for reasons of practicality, and by limiting them to 14 and 13 items respectively, it was likely that the reliability of the tests would suffer. The compromise between practicality and reliability is addressed by Alderson (2000), who notes that from a reliability standpoint, a larger number of items is required. However, this requirement needs to be considered in light of practical constraints. Similarly, Hughes (2003) notes that the longer the test, the more reliable it is likely to be. At the same time, he adds that a test should not be so long that boredom becomes a factor, with candidates' scores being unrepresentative of their true ability.

#### **4.4.6 Reading Practice Materials and Reading Practice Tests**

In addition to the materials described above, which were designed to be used under relatively controlled conditions, a set of self-study reading practice materials and accompanying reading practice tests was created and made available to all participants as part of the quasi-experimental design for Research Question 2 (see 4.5.2.2).

Reading Practice Materials 1 to 4 were created using the methods described above for Reading Practice Exercises 1 and 2. All the materials contain elaborative feedback, and they are similar to Reading Practice Exercises 1 and 2 in terms of length and task type. Reading Practice Tests 1 to 3 were produced as follow-up practice tests, with items in the test requiring an understanding of the same areas of the text as those explored by the questions in Reading Practice Materials 1 to 3. Each contains 10 questions; six are of the ‘True/False/Not Given’ type, while four are in a multiple-choice ‘What is the main idea of Paragraph X?’ format, with four possible answers to choose from.

Reading Practice Material 4 is similar in design to Reading Practice Materials 1 to 3, but no accompanying follow-up test was produced. One minor difference from Reading Practice Materials 1 to 3 is that the questions require a student to type an answer, rather than select from a list of four options. Ten questions are included, with the first two serving as examples. A student needs to write the number of the paragraph that matches the heading given in each question, or write ‘None’ if the heading does not match any of the paragraphs. Reading Practice Material 4 was created with the primary intention of providing participants with additional practice in the use of elaborative feedback while using a different question type. I produced the texts and questions for Reading Practice Materials 1 to 4 and Reading Practice Tests 1 to 3 in collaboration with a colleague. As no statistical analysis of the results from Reading Practice Tests 1 to 3 was planned, I felt that issues of test reliability were of lesser importance. The tests were produced merely to motivate the students to work on the practice materials and to provide them with practice in using the elaborative feedback contained within Reading Practice Materials 1 to 3.

## **4.5 Procedures**

The data collection procedures employed to address Research Questions 1 and 2 are described below. As mentioned earlier, a mixed-methods approach was used. For the sake of clarity, the quasi-experimental procedures will be described first, with the supplementary data collection procedures being described in a separate section. This is not intended to indicate primacy of one type of data over the other. In fact, some of the instruments used were designed to provide both qualitative and quantitative data. For example, the online questionnaires (Survey 1, Survey 2, and Survey 2 Taught) were all used to generate both qualitative and quantitative data. The timeline for the procedures can also be seen in Table 4.1 above.

### **4.5.1 Quasi-experimental Procedures for Research Question 1**

Research Question 1: Does the use of elaborative feedback in Web-based reading practice materials result in improved L2 reading comprehension?

The aim of this phase of the research was to investigate whether the provision of elaborative feedback within an online reading text could enhance an L2 reader's comprehension of that text in contexts where no training in the use of such feedback had been given. This is in contrast to the procedures for Research Question 2, described in 4.5.2, which were designed to investigate whether strategic instruction in the use of elaborative feedback within online reading exercises could enhance the usefulness of such feedback as an aid to L2 reading comprehension. The timelines for Research Question 2 are therefore longer.

#### **4.5.1.1 Sampling, Assignment and Pre-test**

In order to address this first research question, a quasi-experimental study (Brown and Rogers, 2002) was used. Students from the four intact classes, 2BA, 2TA, 4BA and 4TA, were assigned randomly to two groups so as to form an experimental treatment group (TG1) and a control group (CG1). This was intended to help ensure that potential differences related to the students' area of study (Mechatronics or Business) were controlled for. Furthermore, the use of random assignment in combination with a pre-

test measure was employed in an attempt to strengthen the generalizability of the results.

In Week 1 of the study, a few days after being invited to respond to the first survey, the participants were given Pre-test 1, the 40-item reading test described earlier (see 4.4.2). As with Study 1 Survey 1, Pre-test 1 was delivered to the students via *Blackboard Vista* using the Quiz tool. Two differences exist between using the tool for delivering a test as opposed to a survey; firstly, the submission of a participant taking a test is not anonymous, and secondly, it is awarded a score. As a result, the majority of participants were very familiar with the use of the tool before attempting Pre-test 1, which helped avoid the problem of the reading comprehension scores being affected by the degree of familiarity with the interface. In addition, using a multimedia projector, I demonstrated how to answer the various question types to reduce still further the chances of familiarity with the particular technology affecting the measurement of online reading comprehension.

In order to access the assessment, the participants were required to open the quiz tool and enter a password. Once the test began, the countdown timer started, displaying the time limit of 60 minutes. The assessment was divided into three parts, and for each part the students were instructed to click on a hyperlink in order to view the relevant reading text in a new browser window. The students were monitored during the exam so that they would not interact with one another. On completion of the exam, the participants' attempts were scored automatically by the software. This provided an initial score for each student. Following this, I checked each participant's answers to all items that required a written, rather than a multiple-choice response, to see if adjustment to the scoring of any responses was necessary. As mentioned above, the purpose of Pre-test 1 was to test the online reading comprehension skills of the participants, so spelling, grammar and punctuation mistakes were ignored if comprehension was evident. One example of this is shown below in Figure 4.5.

In this example, the student has made a punctuation error, and his response has been judged as incorrect by the automatic scoring function of the Quiz tool. However, I considered the student's response clearly indicated comprehension, and I therefore took the option to override the score. Although I felt such adjustments were necessary from a

theoretical viewpoint, in practice they had little impact on the participants' scores. From the 66 submissions to Pre-test 1, each containing answers to 40 questions, only five responses were adjusted. In each case, the adjustment resulted in the addition of only one point out of 40 to those scores.

**39. PT1 39**  
Despite statements to the contrary, part-time work is still seen as a \_\_\_\_.

Student Response	Value	Correct Answer
1. 'woman's issue'	0%	Equals <b>woman's issue</b> (100%)

Score: 0/1

Override score:  / 1\*

Comments for Student:

**Figure 4.5:** Overriding a score in the Blackboard Vista Quiz tool.

#### 4.5.1.2 The Practice Stage: Treatment and Control Conditions

In Week 2, students were given an online reading practice consisting of an IELTS-type reading text with 15 accompanying multiple-choice comprehension questions. The materials were made available for 30 minutes in class via Blackboard Vista. Through the use of the 'selective release' feature within Blackboard Vista, different versions of the practice materials were made available to the treatment and control groups. TG1 received Reading Practice Exercise 1e, which contained elaborative feedback, whereas CG1 received Reading Practice Exercise 1f, which included simple knowledge of response feedback indicating that a response was either "correct" or "incorrect". Apart from this difference, the materials were identical in form and content.

#### 4.5.1.3 The Post-test

Immediately after the session with the practice materials, all students from both TG1 and CG1 took Post-test 1, which was described earlier. As seen in 4.4.3 above, the same reading text used in the practice materials formed the basis of the post-test, but the 14 accompanying multiple-choice comprehension questions, all of which were adapted for



online delivery from Gould and Clutterbuck (2004), were different. They were, however, of a similar format to those appearing in the practice stage and successful responses relied on an understanding of the same parts of the text tested by the practice questions. The participants were given 20 minutes to complete Post-test 1, after which their submissions were scored automatically by the Quiz tool in *Blackboard Vista*.

#### **4.5.1.4 Variables**

In this design the independent variable is the feedback type. The two levels are elaborative feedback and knowledge of response feedback. The dependent variable is performance on Post-test 1 and the covariate is performance on Pre-test 1. Among the possible confounding variables are time spent on the test, time spent on the practice stage, student motivation and engagement, and attitudes to online reading.

### **4.5.2 Quasi-Experimental Procedures for Research Question 2**

Research Question 2: Does instruction in the use of elaborative feedback increase its usefulness as an aid to L2 reading comprehension?

#### **4.5.2.1 Sampling and Assignment**

For this phase of the research, two new treatment and control groups were formed. The treatment group (TG2) was made up of the Semester 2 and Semester 4 Mechatronics students (2TA and 4TA), while the control group (CG2) consisted of the Business students in their second or fourth semester of study (2BA and 4BA). The reason for selecting the Mechatronics classes as the treatment group was a practical one; my availability coincided with their scheduled English classes.

#### **4.5.2.2 Treatment and Control Conditions**

During Weeks 4 to 6, all participants were given one weekly reading practice exercise (Reading Practice Materials 1 to 3, described above in 4.4.3) followed by a reading

practice test (Reading Practice Tests 1 to 3, also described above in 4.4.3) as part of their coursework. The practice exercises and post-tests were similar in design to those that were used in Week 2. This time, however, all participants received elaborative feedback in the practice exercises. In Week 7, all participants were given a reading practice exercise (Reading Practice Materials 4) without a follow-up reading practice test.

In addition to the reading exercises and tests, students from two of the four intact classes (TG2) were given guidance and training in the use of the elaborative feedback through think-aloud teacher modelling, elicitation of appropriate strategies, group-work activities and practice exercises. Students from the other two classes (CG2) received the practice reading materials but did not receive instruction in the use of elaborative feedback. Instead, they were asked to complete the exercises as part of their reading course work outside of class time, shown how to access the materials in *Blackboard Vista*, and shown how to take the related post-tests.

Each of the four lessons that were prepared for the members of TG2 was originally planned to last about 20 to 30 minutes, although in practice the first two sessions actually took up most of a 55-minute teaching period. They were based on a teaching model for passing on strategic expertise to students through the use of think-aloud strategies (Wilhelm, 2001). In this four-step model, students are encouraged to become gradually more independent in their use of specific strategies.

In Step 1, the teacher models the strategy under focus, using think-aloud techniques. As the student observes the modelling, the teacher explains when and how the strategy should be used and why it is important. In Step 2, the teacher uses the strategy while eliciting help from the students, who advise on when and how the strategy should be used. In Step 3, students use the strategies, often in small groups, and with the support of scaffolding techniques, such as think-alouds. Meanwhile the teacher monitors and offers support and feedback when needed. Finally, in Step 4, the students use the strategy independently. In addition, they demonstrate their competence in the use of the strategy through think-alouds, while the teacher evaluates this use and plans future follow-up instruction. The four lessons based on the above approach are described below in detail.

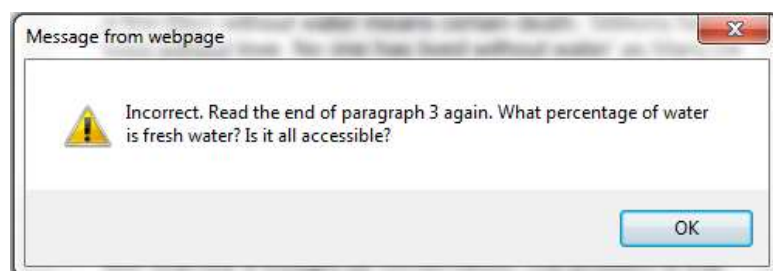
#### 4.5.2.3 Strategy Instruction in the Use of Elaborative Feedback

##### Lesson 1

In Lesson 1, which was given during Week 4 to both classes that constituted TG2, I demonstrated to the participants for the first time how to use the guided feedback. The lesson moved progressively through Steps 1 to 3 of Wilhelm's (2001) model but most of the focus was on Steps 1 and 2.

I began by referring to Pre-test 1 and informing students that it had been an IELTS practice exam that had been converted into an online format. I then informed students that our once-weekly lessons over the next few weeks would be focused on strategies that could help them improve their online reading performance.

In order to model how guided feedback could be used effectively, I showed the participants the first question of an online reading practice exercise similar to that described in the practice stage above. The text was on the subject of water. Using an overhead multimedia projector I focused on the first 'True/False/Not Given' item: Approximately 3% of fresh water is accessible. I answered the item incorrectly by selecting "*True*" and checked my answer. This brought up the feedback shown below in Figure 4.6.

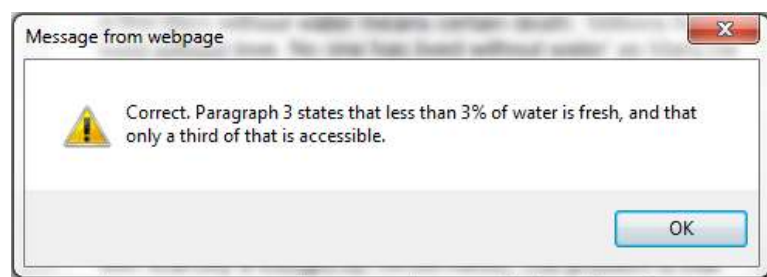


**Figure 4.6:** An example of elaborative feedback following an incorrect response.

I informed the students of both classes that constituted TG2 that a few participants from each class had sat with me and looked at some similar materials during the previous week. In almost all cases the participants had read only "Incorrect" or "Correct" each time the feedback appeared, before attempting to continue with the exercise. The

majority of students in both classes indicated with a show of hands that they felt that they would have behaved in the same way. I informed them that the extra information contained in the feedback was designed to help them understand the text better, and that I would help them make use of the feedback over the next 4 weeks.

Next, I modelled how to use the feedback to help me find the correct answer. I underlined the importance of the second piece of information, which directs them to the appropriate paragraph, as it would help them to find the most relevant part of the text more quickly. With help from the students, I proceeded to answer the two concept-checking comprehension questions, which could lead the reader to the correct answer. I then selected “False”, which brought up the feedback shown in Figure 4.7 below.



**Figure 4.7:** An example of elaborative feedback following a correct response.

I explained the importance of reading the feedback even if the answer was correct, as the objective of the practice exercise was to gain an understanding of the text. I reiterated to the participants that the feedback could help them comprehend the text if it was used properly and modelled how to do this by completing two questions while thinking aloud. For the first of these questions, I elicited general help from the students in finding the correct answer, to encourage their engagement with the task. While doing this, I demonstrated and explained how to use the elaborative feedback through the use of think aloud techniques. This was done in order to demonstrate how the feedback could assist with text comprehension. I stressed once more that it was important to read the entire text of each item of feedback. For the second of the questions, I asked the students to read the question and asked them to work as a class to lead me through the answering of the question while using the feedback to assist them.

After completing this question with the class, I informed them that, in addition to the 'True/False/Not Given' type questions, they would also be looking at some questions that would ask them to decide on the main topic of certain paragraphs. This task type was also familiar to the students as it is a common feature of the IELTS reading exam. In order to help prepare the students for the upcoming group-work task, we answered one question together. I reminded them that each of the four possible answers to the question might relate to topics or ideas that appear in the paragraph, but that they were being asked to determine the main idea or topic. The first response chosen by the class was incorrect, so I asked them to read the feedback and use it to help them find the correct answer. This was another attempt to encourage them to make use of the guidance and support contained within the elaborative feedback. Once they had answered the question correctly, we discussed the feedback that accompanied the correct response, again in order to underline its usefulness for comprehending the text.

After this, the participants were placed into groups of three or four. I showed them where to locate a reading practice text with accompanying questions (Reading Practice Material 1) on the subject of exercise addiction, and then assigned each group a few specific questions to answer. They were told that they would be asked to teach the other students in the class how to use the elaborative feedback to help answer their questions. Initially they looked at the questions individually, and once they had found the correct answers they were asked to work together and discuss how the feedback could be used to help answer each question. During this first lesson with both classes, a large part of the discussion took place in Arabic, but it was evident that the focus of the discussion was the use of the feedback.

After approximately 10 minutes, one student from each group in turn addressed the other students in the class and explained how to utilise the feedback, demonstrating with the help of the teacher's computer, which was linked to a multimedia projector. I encouraged the selected students to think aloud while doing this. Each student chose one or two of his group's questions and at first answered each question incorrectly. He then modelled how the elaborative feedback could help him find the correct answer. Next, the student selected the correct answer, and then showed how the accompanying elaborative feedback could reinforce understanding. This student-led phase lasted for roughly 10 minutes with each class, after which the students were shown how to locate

the online reading test Reading Practice Test 1, which was based on the same text as in Reading Practice Material 1, but with different questions. I asked them to complete Reading Practice Test 1 in their own time before the next lesson, which would take place two weeks later as the following week was devoted to exams throughout the college.

## **Lesson 2**

Lesson 2 again moved through Steps 1 to 3 of Wilhelm's model, though the emphasis shifted to Steps 2 and 3. It began with a quick review of the first lesson and a reminder that the students had been asked to complete a password-protected online test (Reading Practice Test 1) for homework. Within Blackboard Vista, I went to the assessment management tool and showed the students that nobody had completed the assigned test for homework. I reminded them that they needed to complete the 20-minute test as part of their coursework with their regular English teacher and then outlined the plan for the rest of the lesson.

The lesson was built around an online chat session and a discussion forum. To begin with, I handed out an instruction sheet on the use of elaborative feedback, shown below in Figure 4.8. I asked the participants to spend a few minutes reading the sheet and then asked them about the most important points. The key message was that the students should always read all of the feedback, whether they answered a question correctly or incorrectly. The feedback could help them understand the text, and also understand why an answer to a question was correct or incorrect. In addition, the feedback could help the students to better understand a question.

Next, I modelled answering a few questions while thinking aloud. I asked the students to tell me whether I was a 'good' or a 'bad' student, based on my use of the elaborative feedback for each question. I answered a question correctly without even reading the text or the feedback, before quickly closing the feedback window. I elicited from the students that this was inappropriate, as even though the answer was correct, I had not improved my knowledge or understanding of the text. I then asked the students to help me to answer the next 2 questions, eliciting from them the correct strategies to use

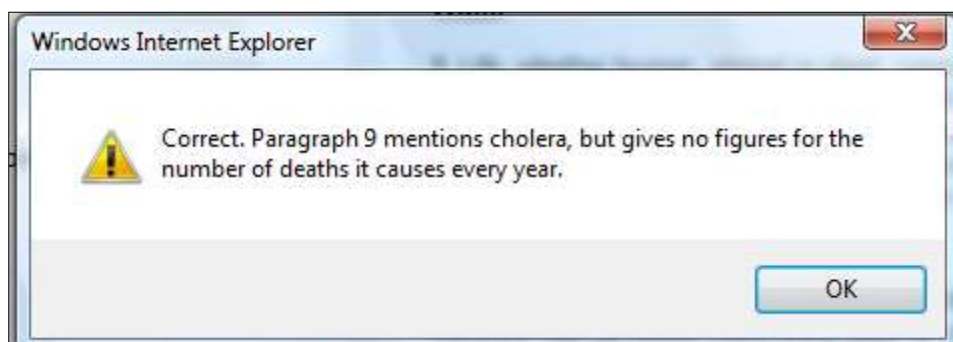
when reading and answering the questions and when using the feedback, and proceeded to model the strategies by thinking aloud.

#### How to Use the Online Guided Feedback to Help Improve Your Reading

First of all, try to answer each question, just as you would in the IELTS exam. Then, when you click on 'Check', you should always do the following.

If you get the answer correct:

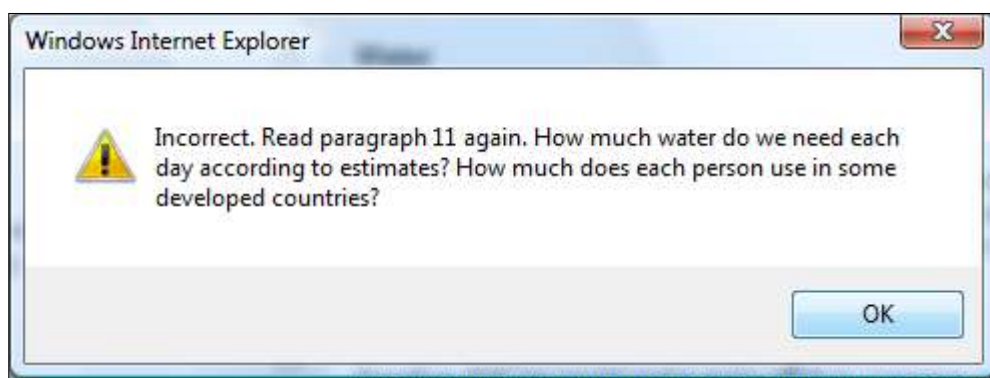
This is good but please read the feedback every time. It will help you to understand the text better. For example, if you receive the feedback below, don't just read "Correct" and then close the feedback window.



You should also **always** read the explanation to make sure you have understood why the answer is correct. The feedback tells you which paragraph contains the answer, and also tells you why the answer you chose is correct. Read that part of the text again to make sure you understand.

If you get the answer incorrect:

You should read the feedback very carefully **every time**. It will help you to find the correct answer, and it will help you to understand the text better. For example, if you receive the feedback below, read the advice and questions/information **carefully**.



The feedback above tells you where to find the correct answer. It also asks some simpler questions to help you to understand the text better. It can also help you to understand the question better.

**Figure 4.8:** Instructions for students on how to use elaborative feedback.

In the next stage of the lesson, the students were split into five groups, each consisting of three or four participants, and sent to online synchronous chat rooms hosted in the

*Blackboard Vista* course. They were given five minutes to discuss and provide answers to the prompt shown in Figure 4.9 below with the intention of giving advice on the use of elaborative feedback to students who had no experience of using it. This was intended to encourage further reflection among the students on the use of the feedback.

When you are doing the practice exercises and you receive feedback

You should

- 1.
- 2.
- 3.
- 4.
- 5.

You should not

- 1.
- 2.
- 3.
- 4.
- 5.

**Figure 4.9:** Chat room prompt for discussion use of elaborative feedback.

After five minutes the students were sent to an asynchronous discussion board within *Blackboard Vista*. One student in each group was asked to post up a summary response to the above prompt with the help of his group. This would provide a permanent record of their advice to other students.

To end Lesson 2, one volunteer was asked to come to the front of the class to attempt an unseen online reading exercise (Reading Practice Material 2) including a text on the subject of fingerprinting with accompanying questions and elaborative feedback. The text and questions were projected onto the whiteboard and the class was asked to help



the volunteer to answer the first two questions. This was to remind students one more time of how to use feedback to help them understand texts while completing such exercises. Once the class had worked together to answer the first two questions, I asked them to complete the exercises for homework and informed that they needed to do an online test (Reading Practice Test 2) on the same text before the next lesson the following week. The test scores would form part of the students' coursework and were used to encourage students to pay attention when completing the practice exercises.

### **Lesson 3**

Lesson 3 focused on Stage 3 of Wilhelm's four-step model. It began with a brief review of what had been covered in the previous 2 lessons and for homework. The classes were asked to think about the steps that should be followed when answering a reading question, and I then elicited each step in turn with particular emphasis on the use of the feedback.

Next, I asked the students to log into the *Blackboard Vista* course in order to access the materials for the lesson. I began by informing them that they would be looking at the reading practice materials (Reading Practice Material 3) during the lesson, and would need to complete the related test (Reading Practice Test 3) for homework.

I asked the students to work in groups of two or three and to complete the exercises collaboratively, in line with the third stage of Wilhelm's four-step model. I stressed that they should work together to answer the questions and understand the text, and reminded them that they should utilize and discuss the feedback when answering the questions. I also informed them that I would be asking them some questions afterwards to check their understanding of the text.

As a follow-up, I asked the pairs and groups how many of the ten questions they had answered correctly first time. I then asked them what they did whenever they got a question wrong, in order to check on the amount of self-reported feedback use. The majority reported having read it, with nobody stating otherwise. Following this, I asked if the feedback had helped them, to which most responded positively. Next, I checked

text comprehension by asking a few global and more specific comprehension questions. I finished the lesson by reminding the students to complete Reading Practice Test 3 before seeing me the following week.

#### **Lesson 4**

To begin this final lesson I informed students that they would take a one-hour IELTS-style online reading test (Pre-test 2) the following week, followed by a 20-minute reading test the week after that. I then told them that that day's lesson would focus on a reading exercise (Reading Practice Material 4) and that there was no associated practice test for this exercise. I also reminded students to complete any tests from Reading Practice Tests 1 to 3 that they had yet to complete, as the marks would be included as part of their coursework.

As part of a brief review of the ground covered so far, I then elicited from the students the key principle of the first three lessons, that it was important to read the elaborative feedback after every attempt at a question. After this, I showed the students Reading Practice Material 4 on the overhead projector, and showed them the two example questions. I then asked them to work together in pairs to answer the remaining 8 questions, reminding them to make use of the feedback. While the students worked in pairs, I monitored and provided assistance where necessary. Once the students had finished the exercise, I led a short feedback phase, during which any difficulties were discussed, before ending the lesson.

#### **4.5.2.4 Pre-test 2**

In Week 8, the procedures described above under Pre-test 1 were repeated. The participants were given the 40-item online reading test under exam conditions, via Blackboard Vista. As with Pre-test 1, the time limit was 60 minutes and the test was password protected.

Pre-test 2 was used to control for differences in online reading ability among the members of TG2 and CG2. I felt this to be particularly important, given the fact that the groups were made up of pre-existing classes. As a result, assignment to the treatment and control conditions was not random. Although a pre-test had already been given in Week 1, I decided to use a second pre-test in case the participants had made any gains in online reading ability since.

#### **4.5.2.5 Practice Materials and Post-test 2**

In Week 9, the members of both TG2 and CG2 were given a 30-minute reading practice exercise (Reading Practice Exercise 2) containing elaborative feedback. This was followed by Post-test 2, which contained 13 questions and had a time limit of 20 minutes. This was designed to assess the participants' understanding of the text featured in Reading Practice Exercise 2. As with previous materials, both Reading Practice Exercise 2 and Post-test 2 were delivered via Blackboard Vista.

#### **4.5.2.6 Variables**

In this design, the independent variable is the type of instruction received in the use of elaborative feedback. The two levels are 'instruction received' and 'no instruction received'. The dependent variable is performance on Post-test 2 and the covariate is performance on Pre-test 2. Among the possible confounding variables are time spent on the test, time spent on the practice stage, student motivation, number of strategy instruction sessions attended by members of the treatment group, and attitudes to online reading.

#### **4.5.3 Supplementary Procedures for Research Questions 1 and 2**

In addition to the quasi-experimental techniques outlined above, a number of additional data collection procedures were followed in order to gather primarily qualitative data. This would be used within the mixed-methods approach to help explain the findings

derived from the analysis of the quantitative data, and investigate the research questions in different ways.

#### **4.5.3.1 Surveys**

A piloted survey was issued to students during Weeks 1 and 9, at the beginning and the end of the data collection period. They were asked to provide data on their own attitudes to online reading and to evaluate both the reading practice exercises and the usefulness of the elaborative feedback.

In Week 1, all participants from both TG1 and CG1 were invited to respond to Study 1 Survey 1, which contained eight items and which was used to gather information about their attitudes to online reading prior to the remainder of the study. The survey was delivered in English via *Blackboard Vista* using the integrated Quiz tool for several reasons. Firstly, the use of a web-based survey tool would reduce the amount of time needed to distribute the survey when compared with a paper-based alternative. Secondly, data collection and analysis would be facilitated by the use of such software. Thirdly, although a number of alternative online survey software packages were available, no additional costs would be involved in using the survey tool within Blackboard Vista, and many of the participants already had some familiarity with the platform, having used it in the course of their college studies. Finally, as we saw earlier, the *Blackboard Vista* Quiz tool was being used to deliver the online reading tests and exercises that would be used to investigate both Research Question 1 and Research Question 2, and I felt that having all the research materials in one online location would simplify the data collection experience for both the participants and me.

In order to ensure that the participants were able to complete the survey, I demonstrated how to answer sample questions using a personal computer and a multimedia projector. I visited each of the four intact classes in order to do this. I stressed that the survey was anonymous and also informed the participants that they could ask either their class teacher or me if they required an explanation or clarification of any of the questionnaire items. As stated above, each item had previously been trialled in advance with a group of 10 students of a similar educational background and

with similar levels of English proficiency so as to avoid items being unclear or incomprehensible to the participants.

In Week 9, all the participants from CG2 were invited to respond to Study 1 Survey 2. This contained the same eight items featured in Survey 1, in addition to 13 items that were produced to investigate their feelings towards the online reading practice exercises, the elaborative feedback contained within them, and the follow-up tests. In contrast, the members of TG2 were asked to respond to Study 1 Survey 2 Taught, which contained all the items in Study 1 Survey 2, plus an additional eight items designed to investigate the respondents' opinions on the strategy instruction lessons on the use of elaborative feedback (Lessons 1 to 4).

#### **4.5.3.2 Interviews and Think-aloud Sessions**

In addition to the questionnaires, eight students were selected from a pool of volunteers to be interviewed twice, during Weeks 3 and 10, before and after their exposure to the practice materials and, in some cases, the strategy instruction lessons. The students were selected partly on the basis of their scores on Pre-test 1, in order to provide a sample with a range of ability levels. This is described in more detail in 4.6.2.3 below. One purpose of the interviews was to give due consideration to the "social situatedness of research data" (Cohen, Manion & Morrison, 2000, p. 267) by gaining a qualitative insight into the students' perceptions of the usefulness of the reading practice materials, the guided feedback and, where applicable, the instruction in the use of the feedback. Another reason for using interviews was to explore in more depth some of questions included in Survey 1 and in both versions of Survey 2. Two of the students were unavailable for interview either during or after Week 10 so their data from Week 3 was ignored.

In addition to the interviews, the students were given sample reading practice exercises with elaborative feedback and asked to think aloud as they interacted with the materials. The spoken interactions were audio taped for later analysis while the on-screen interactions were captured using Camtasia Studio ([www.techsmith.com](http://www.techsmith.com)).

The purpose of the think-aloud sessions was to attempt to investigate the participants' use of elaborative feedback in 'real time'.

By asking the participants to think aloud while interacting with the text, questions and elaborative feedback contained within a reading exercise, I hoped that it would be possible to identify instances where the feedback assisted their comprehension of a text. Through follow-up questioning (retrospective reports) immediately after their interaction with the exercises, I hoped to be able to either discount or gain further support for my 'real time' interpretation of the participants' behaviour and interactions with the materials and feedback.

By running the interviews and think-aloud sessions in two rounds, both prior to and after the participants' exposure to the practice materials and reading lessons, I also hoped to be able to uncover changes in their use of elaborative feedback over the course of the study.

## **4.6 Data Analysis and Results**

The mixed-methods approach to data collection described above produced both quantitative and qualitative data. The data collection was largely concurrent, in that qualitative and quantitative data were collected throughout the course of the study. For the sake of clarity, the analysis of the data from the quasi-experiments for Research Questions 1 and 2, along with the results obtained, will be described first. This will be followed by an analysis of the online surveys, interviews and think-aloud sessions. In this way, it is intended that the quantitative and qualitative data from the surveys and interviews will be used to help explain and support the findings from the quasi experiments, and also to add insights that could not be drawn from an analysis of the quasi-experimental data alone (Ivankova & Creswell, 2009).

## 4.6.1 The Quasi Experiments

### 4.6.1.1 Research Question 1. Does elaborative feedback in Web-based reading practice materials result in improved reading comprehension?

#### Pre-test 1

Pre-test 1 was administered to four intact classes. The results of the 60-minute, 40-item online reading test were exported from *Blackboard Vista* and analysed using Version 20 of *SPSS* (Statistical Package for the Social Sciences). The descriptive statistics for the test showing results by class are shown below in Table 4.3.

*Table 4.3: Scores on Pre-test 1 by Class*

<b>Class</b>	<b>M</b>	<b>SD</b>	<b>n</b>
<b>2TA</b>	10.44	2.99	18
<b>2BA</b>	14.38	5.03	13
<b>4TA</b>	15.88	4.34	17
<b>4IA</b>	15.83	4.45	18
<b>Overall</b>	14.09	4.71	66

66 of the 71 participants completed Pre-test 1, while the remaining five were absent. As we can see from the table, the mean scores of three of the classes are very similar, ranging from 14.38 to 15.83, compared with a mean of 14.09 for the four classes combined. On the other hand, the mean score for members of 2TA is markedly lower at 10.44.

A one-way analysis of variance was carried out to compare the scores of the members of the four intact classes on Pre-test 1. It indicated that there was a significant difference in the mean scores between 2TA ( $M=10.44$ ,  $SD=2.99$ ), 2BA ( $M=14.38$ ,  $SD=5.03$ ), 4TA ( $M=15.88$ ,  $SD=4.34$ ) and 4IA ( $M=15.83$ ,  $SD=4.71$ ),  $F(3, 62) = 6.607$ ,  $p < .01$ . The effect size was large (eta squared = .242). LSD Post-hoc tests demonstrated that the scores obtained by 2TA were significantly lower than those obtained by the other three classes,  $p < .05$ , while the scores of the three remaining groups did not differ significantly from one another.

To put the scores on Pre-test 1 into perspective, the average scores in 4TA and 4IA are roughly equivalent to a Band 5 on the IELTS Academic Reading test, those of 2BA are marginally below this level, and those of 2TA are significantly lower. According to IELTS (2014c), a mean raw score of 15 out of 40 is achieved by candidates who are awarded a Band 5 in the IELTS Academic Reading exam. This represents a ‘modest user’, who “has partial command of the language, coping with overall meaning in most situations, though is likely to make many mistakes. Should be able to handle basic communication in own field.” Although Pre-test 1 was not an official IELTS test, it was adapted from a high quality published practice test (O’Sullivan and Lindeck, 2000, pp.58-68), and so a broad equivalency can be drawn.

Given the pre-existing differences in online reading ability shown above, it was decided to proceed with the plan to randomize the assignment of participants to the treatment and control groups rather than form the groups from intact classes. The 66 participants who completed Pre-test 1 were therefore randomly assigned to two equally sized groups (TG1 and CG1) using the ‘Create Groups’ feature in Blackboard Vista. The descriptive statistics for the performance of the two groups on Pre-test 1 are shown below in Table 4.4.

*Table 4.4: Scores on Pre-test 1 by Group*

<b>Group</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>n</i></b>
<b>TG1</b>	14.24	4.75	33
<b>CG1</b>	13.93	4.74	33
<b>Overall</b>	14.09	4.71	66

From Table 4.4, we can see that the mean scores of the two groups are very close, with a difference of only .31 (14.24 versus 13.93). This difference was tested for statistical significance.

A paired samples t-test was selected as the participants had been randomly assigned to either the treatment or control groups. Furthermore, at this stage, neither group had been exposed to any treatment or control conditions. There was therefore no reason to consider the groups as independent, and there existed a basis for pairing the data



(Kinnear & Gray, 2006). The scores of the 33 participants in each group were sorted from high to low and paired with the corresponding score from the other group. For example, the lowest score obtained by a member of TG1 was 4, and this was paired with lowest score obtained by a member of CG1, which was 6.

A paired samples t-test was carried out to compare the mean scores of the treatment and control groups on Pre-test 1. There was no significant difference in the mean scores obtained by TG1 ( $M=14.24$ ,  $SD=4.75$ ) and CG1 ( $M=13.93$ ,  $SD=4.74$ ),  $t(32)= 1.769$ ,  $p=.086$  (two-tailed).

In summary, the online reading ability of the members of the class 2TA was significantly lower than that of the members of the three other intact classes (2BA, 4IA and 4TA) as measured by their performance on Pre-test 1. In contrast, there was no significant difference in the ability levels of the two randomly assigned groups (TG1 and GG1) prior to the treatment. The average ability level of the participants as a whole was roughly equivalent to a Band 5 on the IELTS Academic Reading exam.

## Post-test 1

Post-test 1 was administered to TG1 and CG1 following a 30-minute, 15-question online reading practice session containing either elaborative feedback, in the case of TG1, or knowledge of response feedback, in in the case of CG1. The results of the 20-minute, 14-item online reading test were exported from Blackboard Vista and analysed using SPSS. The descriptive statistics for the test showing results by group are shown below in Table 4.5.

*Table 4.5: Scores on Post-test 1 by Group*

<b>Group</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>n</i></b>
<b>TG1</b>	7.45	1.95	31
<b>CG1</b>	6.52	2.62	27
<b>Overall</b>	7.02	2.31	58

58 of the 66 participants who completed Pre-test 1 also completed Post-test 1. 31 of the participants were members of TG1, while 27 belonged to CG1. From Table 4.5, we can

see that the mean score of TG1 was higher than that of CG1 (7.45 versus 6.52). This would suggest a positive effect for elaborative feedback on reading comprehension. This was checked for statistical significance by carrying out both a *t*-test and an analysis of covariance (ANCOVA). This time an independent samples *t*-test was used, as the treatment and control groups were now independent, having undergone different treatment conditions (Dornyei, 2007; Kinnear & Gray, 2006).

An independent samples *t*-test was carried out to compare the mean scores of the treatment and control groups on Post-test 1. There was no significant difference in the mean scores obtained by TG1 ( $M=7.45$ ,  $SD=1.95$ ) and CG1 ( $M=6.52$ ,  $SD=2.62$ ),  $t(56)=1.551$ ,  $p=.126$  (two-tailed). The effect size was small ( $\eta^2=.041$ ), with the treatment condition accounting for only 4.1 per cent of the variance in scores on Post-test 1.

According to the results of the *t*-test, no significant effect for elaborative feedback versus knowledge of response feedback on reading comprehension as measured by performance on Post-test 1 was found. Given that Pre-test 1 had been run to check reading ability prior to the treatment, a one-way analysis of covariance was carried out.

The independent variable was the feedback type received (elaborative feedback versus knowledge of response feedback), the dependent variable was performance on Post-test 1, and the confounding variable (covariate) was performance on Pre-test 1. There was a linear relationship between Pre-test 1 and Post-test 1 scores for both the treatment and control groups, as assessed by visual inspection of a scatterplot. A preliminary analysis was run to evaluate the homogeneity-of-regression assumption. This showed that the interaction between the dependent variable and the covariate was not significant in predicting the independent variable,  $F(1, 54)=.466$ ,  $p=.498$ . In addition, the standardized residuals of Post-test 1 were normally distributed for both TG1 and CG1, and for the overall model, as assessed by the Shapiro-Wilk test ( $p > .05$ ) and the Kolmogorov-Smirnov test ( $p > .05$ ). There was homoscedasticity, as determined by the visual inspection of a scatterplot, and homogeneity of variances, as assessed by Levene's test of homogeneity of variance ( $p = .111$ ). The results of an ANCOVA should therefore be meaningful.

The ANCOVA indicated that, after controlling for performance on Pre-test 1, no significant difference in mean scores on Post-test 1 existed between the TG1 ( $M=7.45$ ,  $SD=1.95$ ) and CG1 ( $M=6.52$ ,  $SD=2.62$ ),  $F(1, 55)=2.11$ ,  $p=.152$ . The effect size was small (partial eta squared=.037), with 3.7% of the variance in scores on Post-test 1 accounted for by the treatment condition (elaborative feedback versus knowledge of response feedback).

The results of both the t-test and the ANCOVA support the null hypothesis, which states that elaborative feedback in Web-based reading practice materials does not result in improved reading comprehension.

#### **4.6.1.2 Research Question 2: Does instruction in the use of elaborative feedback increase its usefulness as an aid to reading comprehension?**

##### **Pre-test 2**

Pre-test 2 was administered to TG2 and CG2. TG2, which consisted of participants from the pre-existing classes 2TA and 4TA, had received four lessons focusing on the strategic use of elaborative feedback contained within online reading exercises, and had been given follow-up practice tests. CG2, which consisted of members of 2BA and 4IA, had been given access to the same materials and tests, but had received no instruction in the use of the elaborative feedback. The results of the 60-minute, 40-item online reading test were exported from Blackboard Vista and analysed using Version 20 of IBM SPSS Statistics. The descriptive statistics for the test showing results by class are shown below in Table 4.6.

*Table 4.6: Scores on Pre-test 2 by Group*

<b>Group</b>	<b>M</b>	<b>SD</b>	<b>n</b>
<b>TG2</b>	14.53	3.84	32
<b>CG2</b>	16.03	4.41	32
<b>Overall</b>	15.28	4.17	64

64 participants completed Pre-test 2, with 7 being absent. We can see from Table 4.6 that the mean score of TG2 was lower than that of CG2 (14.53 versus 16.03). This is not surprising, given that TG2 was comprised of members of the intact classes 2TA and 4TA, while CG2 was made up of 2BA and 4IA. We saw earlier that the mean score of 2TA was significantly lower than that of the other three classes on Pre-test 1.

An independent samples *t*-test was carried out to compare the mean scores of the treatment and control groups on Pre-test 2. There was no significant difference in the mean scores obtained by TG2 ( $M=14.53$ ,  $SD=3.84$ ) and CG2 ( $M=16.03$ ,  $SD=4.41$ ),  $t(62)=1.450$ ,  $p=.152$  (two-tailed). The effect size of the grouping variable was small ( $\eta^2=.033$ ), with the treatment condition accounting for only 3.8 per cent of the variance in scores on Pre-test 2. In other words, based on the results of Pre-test 2, no significant difference in the online reading ability was found between TG2, who had received instruction in the use of elaborative feedback, and CG2, who had received no such instruction.

## Post-test 2

Post-test 2 was administered to TG2 and CG2 following a 30-minute, 12-question online reading practice session (Reading Practice Exercise 2) containing elaborative feedback for both groups. The results of the 20-minute, 13-item online reading test were exported from *Blackboard Vista* and analysed using SPSS. The descriptive statistics for the test showing results by group are shown below in Table 4.7.

*Table 4.7: Scores on Post-test 2 by Group*

Group	M	SD	n
TG2	6.37	1.90	30
CG2	6.63	1.64	27
Overall	6.49	1.77	57

57 of the 64 participants who completed Pre-test 2 also completed Post-test 2, with 30 being members of TG2, and 27 belonging to CG2. From Table 4.7, we note that the mean score of CG2 was higher than that of TG2 (6.63 versus 6.37).

An independent samples *t*-test was carried out to compare the mean scores of the treatment and control groups on Test 2. There was no significant difference in the mean scores obtained by TG2 ( $M=6.37$ ,  $SD=1.90$ ) and CG2 ( $M=6.63$ ,  $SD=1.64$ ),  $t(55)=.555$ ,  $p=.581$  (two-tailed). The effect size was small (eta squared= .006), with the treatment condition accounting for only .6 per cent of the variance in scores on Post-test 2.

According to the results of the *t*-test, no significant effect for training in the use of elaborative feedback on reading comprehension as measured by performance on Post-test 2 was found. Given that Pre-test 2 was run to measure general online reading ability post treatment, a one-way analysis of covariance was carried out.

The independent variable was the instruction received in the use of elaborative feedback (instruction versus no instruction), the dependent variable was performance on Post-test 2, and the confounding variable (covariate) was performance on Pre-test 2. There was a linear relationship between Pre-test 2 and Post-test 2 scores for both the treatment and control groups, as assessed by visual inspection of a scatterplot. A preliminary analysis was again run to verify the homogeneity-of-regression assumption. This demonstrated that the interaction between the dependent variable and the covariate was not significant in predicting the independent variable,  $F(1, 53)=.706$ ,  $p=.404$ . In addition, the standardized residuals of Post-test 2 were normally distributed for both TG2 and CG2, and for the overall model, as assessed by the Shapiro-Wilk test ( $p > .05$ ) and the Kolmogorov-Smirnov test ( $p > .05$ ). There was homoscedasticity, as determined by the visual inspection of a scatterplot, and homogeneity of variances, as assessed by Levene's test of homogeneity of variance ( $p = .702$ ). The results of an ANCOVA should therefore be meaningful. One outlier was detected in the scores for Post-test 2, with one member of TG2 scoring more than 3 standard deviations higher than the mean score. An ANCOVA was therefore run twice, with and without the outliers scores included.

The initial ANCOVA, with the outlier included, indicated that, after controlling for performance on Pre-test 2, no significant difference in mean scores on Post-test 2 existed between TG2 ( $M=6.37$ ,  $SD=1.90$ ) and CG2 ( $M=6.63$ ,  $SD=1.64$ ),  $F(1, 54) = .163$ ,  $p = .688$ . The effect size was small (partial eta squared = .003), with .3% of the variance in scores on Post-test 2 accounted for by the treatment condition (instruction versus no instruction).

The second ANCOVA, with the outlier removed, also indicated that, after controlling for performance on Pre-test 2, no significant difference in mean scores on Post-test 2 existed between TG2 ( $M=6.17$ ,  $SD=1.61$ ) and CG2 ( $M=6.63$ ,  $SD=1.64$ ),  $F(1, 53) = .535$ ,  $p = .468$ . The effect size was small (partial eta squared = .01), with 1% of the variance in scores on Post-test 2 accounted for by the treatment condition (instruction versus no instruction). The outlier had no impact on the significance of the result.

The results of both the  $t$ -test and the ANCOVA support the null hypothesis, which states that instruction in the use of elaborative feedback does not increase its usefulness as an aid to reading comprehension.

#### **4.6.2 Supplementary Data Analysis**

##### **4.6.2.1 Round 1 Survey: Study 1 Survey 1**

Study 1 Survey 1 was administered to the participants at the start of the study in order to obtain some general information about their reading habits and attitudes toward reading online in both English and Arabic. 66 participants responded to the anonymous survey, which contained 8 items, although one of the respondents did not submit a response for Item 4. The first seven items used a Likert scale, while Item 8 was open-ended. The results of Items 1 to 7 of the survey are presented below in Table 4.8.

Table 4.8: Results of Items 1 to 7 of Study 1 Survey 1

	<i>M</i>	<i>SD</i>	<i>N</i>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Q1	4.02	0.62	66	16.7%	71.2%	9.1%	3%	0%
Q2	3.53	1.06	66	19.7%	34.8%	25.8%	18.2%	1.5%
Q3	2.88	0.92	66	3%	34.8%	37.9%	19.7%	4.5%
Q4	3.21	1.32	65	7.6%	28.8%	24.2%	13.6%	25.8%
Q5	2.28	0.96	66	18.2%	47%	27.3%	3%	4.5%
Q6	2.97	1.20	65	7.7%	32.3%	32.3%	10.8%	16.9%
Q7	2.95	1.34	66	15.2%	21.2%	27.3%	16.7%	19.7%

Questions 1, 2 and 7 used a Likert-scale: Strongly Agree=5, Agree =4, Neither agree nor disagree=3, Disagree=2, Strongly Disagree=1.

Questions 3 to 6 used a 5-point scale: None=1, Less than 1 hour=2, 1 to 2 hours=3, 3 to 5 hours=4, More than 5 hours=5

### Questions

Q1. I like reading English.

Q2. I like reading English online more than reading from paper.

Q3: On average, how much time do you spend each week reading English online?

Q4: On average, how much time do you spend each week reading Arabic online?

Q5: On average, how much time do you spend each week reading magazine, newspapers or books in English?

Q6: On average, how much time do you spend each week reading magazine, newspapers or books in Arabic?

Q7. I find reading English online more difficult than reading from paper.

We can see from Table 4.8 that overall the participants reported having a largely positive attitude towards reading English and also a slight preference for reading online rather than from paper. With regard to the differences between the two media, there was an approximate balance in numbers between those who stated that online reading was more difficult and those who found reading from paper more challenging.

Overall the respondents reported spending more time reading Arabic than English, with more of that reading taking place online. The least amount of time was spent reading English from paper, with only 7.5% spending more than 2 hours per week on that activity.

One open-ended item, which asked participants to explain their response to Item 7, was included in Study 1 Survey 1. This was used to explore reasons for the perceived relative

difficulty of online versus paper-based reading in English, which, as Anderson (2003) among others has noted, may require readers to make use of different strategies.

As was noted earlier, there was an even split between those who felt it was easier to read English online, and those felt reading from paper was easier, with 24 participants (36.4%) holding each view, with the remainder finding no difference. 64 of the 66 participants who responded to Item 7, explained the reason for their answer in answer to Item 8. One of the participants left the item response field blank, while the response of the other ("NAME#?") was considered to be irrelevant.

The responses were coded and re-coded several times, as recommended by Brown, (2009). The initial coding was intended to be open, although I was inevitably influenced by previous literature on the differences between the two media covered in 3.1 above. This was followed by axial coding, wherein related subcategories were subsumed under higher-level categories (Dornyei, 2007). As a result, four overarching categories related to the perceived relative ease of reading in online and paper-based environments emerged: accessibility, comfort, strategy use and motivation. These are described in turn below.

## **Accessibility**

Accessibility covers factors such as the quality and difficulty of the language contained within reading texts in the two media, and the ability to find an appropriate or relevant text with ease in the first place. These are examined in turn below.

Differences were perceived to exist in the level of difficulty of the language used in online texts when compared with paper-based ones. Some participants felt that online texts were more difficult, as shown in the examples below.

1. *"Because in the online English we find many new words from different countries, but in the paper we find easy words that we studied before."*



2. *"It depends on the level of the English that the website use. Sometime I find it difficult to understand the meaning if they use high level vocabulary of vocabulary"(sic).*

However, others felt that the language encountered in online texts was easier to understand:

3. *"in my point of view I think that reading English online is more easier than reading it from paper, maybe because the person who wrote it wanted from everybody to understand it well, so he might used easy english." (sic)*
4. *"usually the words that been used in the paper is more complicated than the ones online becuae they use the classical language ,but online they use more easy and undersandable words" (sic).*

The quality of the language was also commented on. For example, one respondent believed that online texts had *"wrong spelling and grammer"* (sic) while another suggested that books had *"strong English grammer and vocabulary"* (sic).

While there was a balance between the perceived difficulty levels of the language contained in texts in the two media, one advantage of online reading was the ease with which texts can be located and accessed via the Internet. For instance, reading online was seen as *"easy for me to move from on subject to another and find allot of information than the books"* (sic), which is not a comprehension issue but relates instead to the ease of access to information provided by the Internet.

## **Comfort**

The learners' comfort level in the two media relates to both physical factors, such as fatigue, and with familiarity. One commonly cited negative aspect of online reading was related to fatigue and eyestrain, which were seen as a side-effect of reading from a computer screen. The first example below focuses on eyestrain, which was the most

commonly cited physical problem, while the second also mentions another physical issue, neck pain.

1. *"if the person stay alot reading from the computer secrean his eye will hurt so on paper is much safer and better" (sic).*
2. *"I dont like to stear on the monitor. Also reading from paper is more comfortable for my nick" (sic).*

Physical comfort levels when reading the in two media were certainly seen to differ, with the majority of comments in this category favouring paper-based reading. However, a few participants reported feeling more comfortable when reading online. For example,

3. *"reading online is betterr than reading from paper because it is eaiser for my eyes" (sic).*

Another factor related to comfort was familiarity. Although the participants were all students studying in a technologically rich environment with computers in every classroom, a few of them mentioned being more familiar with reading paper-based texts. No respondents indicated that they were more familiar with computer-based reading tasks.

4. *"online is hardar than on paper because i used to do the reading on paper. i may need a lot of time to use working on line" (sic).*
5. *"BECAUSE I DON'T TRY TO HAVE AN ONLINE READING . I PREFER READING FROM PAPER MORE THAN ONLINE READIND" (sic).*

## **Strategy Use**

The strategic factors mentioned by the respondents were focused on both comprehension strategies that are used when reading a text, such as scanning, and on

learning strategies that are employed when working with a text, for example highlighting, note taking and making use of dictionaries.

Navigating online texts was seen as presenting a difficulty to some participants. The comments related more to navigating within a text rather than navigating the Internet to locate a text.

1. *"i think reading online is more difficult than reading from reading because its slow when i move from passege to anther and also i get lost in the screen" (sic).*
2. *"it's difficult to find the answers online because of the wide screen far away from my eyes and I can't concentrate on the wods" (sic).*
3. *"in paper is more comfrotable because you can highlight the word to remember something and you can scan more easier" (sic).*

The first two examples above relate solely to reading for comprehension and the difficulties involved in reading text from a screen, while the third example covers both reading comprehension, with its reference to scanning a text, and study skills or learning strategies, such as highlighting a text. With regard to the latter, some participants cited reasons why it was easier to take notes, or to highlight or underline parts of paper-based texts, while others noted that highlighting online texts was easier, as was making use of additional online resources, such as dictionaries.

Two examples below show how some participants felt that note taking or underlining in a paper-based environment made reading easier.

4. *"from paper is easier because I can take notes, the hole page is clear" (sic).*
5. *"because, when we are reading online maybe we can't put a line under key words so easily we will forget the the word and in the end we may not understand th topic" (sic).*

In contrast, the examples below show that online reading was perceived to offer different advantages by some respondents.

6. *“Online reading is much better than hardcopy reading because there are many software and websites have dictionaries or translations for example which save lots of time to understand also you can search or resize fonts as you like” (sic).*
7. *“On line I can cut and past any diffecult word and transulate it quieqly or find it in other site Also I can find a Picture for it” (sic).*
8. *“Online language are much simple as i see it, and if I encounter a difficult word, I can Immadiatly found its meaning. The paper text i usually get are coming from the teacher, so I just read it as a duty no more, and when i encounter difficult word I must ask, look and search and that is boring espacially if I am not interested” (sic).*

Example 6 above refers to resizing fonts, which could also benefit readers with accessibility issues such as poor sight, as well as to the possibility of exploiting additional tools, such as online dictionaries and search tools. The seventh example notes the possibility of cutting and pasting parts of a text into online translation tools or searching for pictures to help with comprehension issues. The eighth response alludes to the fact that online resources can be used to resolve word-level comprehension difficulties quickly, and raises the issue of interest, an affective factor that forms the last of the four categories perceived as affecting the relative level of reading difficulty in online and paper-based environments.

## **Motivation**

Given that a majority of respondents had stated a preference for reading online (see discussion of Item 2 of Study 1 Survey 1 in 4.6.2.1) it was perhaps not surprising that online reading was seen as more interesting. Although interest level may not in itself be seen as a factor in influencing the difficulty level of a text, Bernhardt's (2005, 2010) Compensatory Model includes factors such as engagement and motivation in the 'other'

factors determining L2 reading performance alongside L1 reading and L2 language knowledge.

Online reading was seen as more inherently interesting by some respondents, even if it presented other difficulties. The first example below illustrates that despite perceiving online reading to be more difficult than reading from paper due to its physical properties, paper based reading was seen as boring. Similarly the second comment suggests that online reading is seen as more interesting despite the fact that reading from paper is considered less difficult. The third quotation is from a student who considers reading in the two media to be of equal difficulty but who suggests that online reading might be more useful.

1. *"sometimes my eyes tired , and i can't focus on everything on the screen, but at the same time ,, i got boored fast when i read from a paper" (sic).*
2. *"on line is intreasted, but I should stay infront of computer to read it. On the other hand, reading English on paper is easier than reading online" (sic).*
3. *"I think it is same, and may be reading English online is useful more than paper" (sic).*

With any self-reported data, the validity of the results is open to question. In order to attempt to corroborate the findings from this survey and to gather more information about the attitudes and reading habits of the students, some of the questions from this survey were asked again as part of the interviews conducted with six of the participants. The focus of the questioning was on preferences for online or paper-based reading, and reasons for finding reading in one medium more difficult than the other. The findings from the interviews are presented below. These are followed by an analysis of the think-aloud sessions, which were conducted at the same time as the interviews.

#### 4.6.2.2 Round 1 Interviews

The transcripts of the six first-round interviews were analysed using the same method described above for Item 8 of Survey 1. As a starting point, the four categories that emerged from that analysis were used: accessibility, comfort, strategy use and motivation. Despite the initial use of these four categories, I was open to new categories emerging from the analysis. Although no new overarching categories arose, the coding did result in examples of new subcategories emerging, as described below. The extracts from the interviews are identified by participant, for example 'Student 2'. More background information about each participant (Students 1 to 6) is given in the in 4.6.2.3 below.

##### Accessibility

In addition to the earlier findings that differences existed between online and paper-based texts in terms of both the quality and difficulty level of the language and in the ease with which texts on a certain topic could be found, presentation differences in terms of text length also emerged. The example below, from Student 2, shows that not only is the Internet seen as facilitating searches for texts, the shorter format that is often available on the Web can also make online texts more accessible to the reader.

1. *"Well actually I prefer online cos you can surf the Net more and it is easier to read. When you find it in a paper or something you find it real big so people are not gonna read that, it's too long. In the Net you can find it only in paragraph by paragraph so it's easier" (sic). [Student 2]*

##### Comfort

Several of the responses to Survey 1 indicated that reading online was tiring for the eyes. This also emerged from the interviews, with the suggestion that long periods

reading from a screen can lead to fatigue. When asked how long it took for his eyes to hurt, one interviewee responded as follows.

1. *"No not 2 minutes, it take maybe 1 hour or 45 minutes, something like that" (sic). [Student 1]*

The issue of portability also emerged from the interviews, with one of the suggested advantages of paper-based reading being that a book or magazine can be read anywhere. As one student responded when asked whether he preferred reading about his interests online or from paper:

2. *"In paper, because I read it anywhere, not, uh, ... I shouldn't be faced to computer. I can read it when I sleep, I can read it when in the car. Yes, anywhere" (sic). [Student 4]*

## **Strategy Use**

As with the Survey 1, the interviews uncovered differences between strategies used by the participants when reading in the two environments. From the survey data it was clear that several respondents found note taking and highlighting easier when working with paper-based texts. An additional finding from the interviews was the practice of printing off online texts related to the students' area of study from which key information could be highlighted to assist with summary writing.

1. *"But sometimes if it's not a big article, just a small article I just read it and take what I want. But if it's large, I just print it out and mark what I want and write a summary in the computer" (sic). [Student 1]*

Another difference between the two environments is the way in which students navigate through texts. As with the surveys, perceived advantages of both media emerged from the interviews. The first response below was an explanation of why the interviewee liked the layout of the reading practice materials (Reading Practice Exercise 1) he had encountered a few days before the interview, as they were seen to facilitate reading the

questions while viewing the text. In contrast, another student commented that he found the same layout confusing.

2. *"Because I can highlight the question, I put the question here and the paragraph here [referring to the 2 scrolling frames used in the website] but in the paper sometime the question inside and the paragraph in other side. So I can't" (sic). [Student 4]*
3. *"Because I can find the information and online it's hard to find the answer like scroll down, scroll up and also about the question" (sic). [Student 3]*

## **Motivation**

Survey 1 indicated that online reading was seen as inherently more interesting and more useful than paper-based reading, despite some of the challenges it creates. While reasons for this did not really emerge from the responses to Item 8 of the survey, the interview data suggests that online reading is seen as more advanced in terms of the broader technological context, as exemplified by the comment below.

1. *"Yeah, no we are advanced so I like to do to use technology, to use computer. That's all" (sic). [Student 5]*

In summary, both Survey 1 and the first round of interviews suggest that the majority of the participants prefer to read online rather than from paper. Differences in difficulty and preferences are related to four key factors: accessibility, comfort, strategy use and motivation.

The first quasi experiment suggested that elaborative feedback in online Web-based reading practice materials did not result in improved reading comprehension. The findings from the Think-aloud protocols, which were designed to help verify and explain the results of the quasi experiment, are presented below.



#### 4.6.2.3 Round 1 Think-aloud Protocols

Six participants took part in two rounds of think-aloud sessions, with two of the original eight participants selected being unavailable for the second round in Week 10 of the study. A basic profile of Students 1 to 6 (S1 to S6) showing their class and the scores they obtained in each of the tests featured in this study is presented below in Table 4.9. Also shown are the mean scores for each test as a point of comparison. Although Student 2 was absent for both Pre-test 2 and Post-test 2, his think-aloud data was utilised because he was present for all four of the strategy instruction lessons

*Table 4.9 Class and test scores of the think-aloud participants*

Student	Class	Pre-test 1 (out of 40)	Post-test 1 (out of 14)	Pre-test 2 (out of 40)	Post-test 2 (out of 13)
S1	2TA	15	8	19	9
S2	4TA	23	10	Abs	Abs
S3	4TA	17	10	20	6
S4	4TA	20	12	13	8
S5	2TA	6	7	13	8
S6	2TA	9	4	9	6
Mean		14.09	7.02	15.28	6.49

The students were selected largely on the basis of their availability and willingness to be interviewed, in combination with their score on Pre-test 1. Students 1 and 3 were judged to be of ‘average’ reading ability for the population, Students 2 and 4 were regarded as ‘above average’ and Students 5 and 6 were classified as ‘below average’.

As described in the methodology section (4.5.3.2), the six participants were asked to read a text while thinking aloud as they answered comprehension questions. After completing the questions, they were then asked how they had answered each one and whether and how they had used the elaborative feedback. For the analysis of the think-aloud protocols, I utilised both quantitative and qualitative techniques. Firstly, the screen recordings with accompanying audio were viewed several times in order to complete a table for each session. A sample table (Table 4.10) is shown below to illustrate an initial analysis of the think-aloud session with Student 2.

For each session, the question number was recorded, followed by the number of attempts taken for the participant to answer it correctly (Columns 1 and 2). Next, I made a judgement as the researcher (R) as to whether or not the participant had read the elaborative feedback (EF), based on the evidence from the audio and screen recording (Column 3), and whether or not the feedback had helped the participant to answer the comprehension question (Column 5). From an analysis of the retrospective recall part of each session, Columns 4 and 6 were used to record whether, according to the participant (P), he had read the elaborative feedback and, if so, whether he thought it had helped. Finally, in the last column, a description of the type of help the feedback had provided was entered. This was based on a combination of the participant's own comments and my own judgement, derived from observations of the screen recordings and accompanying audio.

It should be noted that in all instances the participants read part of the feedback. Once a participant clicked "Check" while completing the reading exercise, an item of feedback would appear which stated "Correct" or "Incorrect" in addition to elaborative feedback. Where a participant only read "Correct" or "Incorrect", 'No' was entered under Read EF (R) and Read EF (P). This is due to the fact that, as seen in 3.3.1 above, a simple statement of correctness with no further elaboration constitutes knowledge of response feedback.

*Table 4.10 Sample record of a think-aloud session.*

	Attempts	Read EF (R)	Read EF (P)	EF Helped (R)	EF Helped (P)	Type of Help
Q1	1	No	No	No	No	None
Q2	1	No	No	No	No	None
Q3	2	Yes	Yes (incorrect)	Yes	Yes	Location (key word)
Q4	2	Yes	Yes (incorrect)	Yes	Yes	Rephrasing question
Q5	1	No	No	No	No	None
Q6	2	Yes	Yes (incorrect)	Yes	Yes	Location (part of text)

The data from the six think-aloud sessions were then combined to produce Table 4.11 below. The results show that the six students answered a total of 30 questions during the think-aloud sessions. A total of 51 attempts were taken to select the correct

responses to the questions, an average of 1.7 attempts per question. As the researcher, I initially felt that there were eight occurrences of a participant reading the elaborative feedback, whereas retrospective questioning found that there were only five instances according to the participants themselves. From viewing the recordings, I was of the opinion that the elaborative feedback had helped a participant to answer a comprehension question on five occasions, which matched the figure reported by the participants. On only four occasions was there agreement between the participants and myself that the elaborative feedback had been read, with three instances for Student 2 and one for Student 4. One each of these four occasions, there was also agreement that the elaborative feedback had helped the participant to answer the relevant question. Another point of interest was that there were no instances of a participant having read the elaborative feedback after answering a question correctly. On receiving feedback stating “Correct” in addition to elaborative feedback, on each occasion the participants read only “Correct” before moving on to the next question.

*Table 4.11: Summary of Elaborative Feedback use during Round 1 think-aloud protocols*

Student	No. of Questions	Total Attempts	Read EF (R)	Read EF (P)	EF Helped (R)	EF Helped (P)
1	6	11	0	1	0	1
2	6	9	3	3	3	3
3	4	5	3	0	1	0
4	4	7	1	1	1	1
5	4	8	0	0	0	0
6	6	11	1	0	0	0
Total	30	51	8	5	5	5

Note: (R) refers to the researcher’s interpretation of feedback being read or helping. (P) refers to participant’s interpretation.

Given the above findings, it is not surprising that the quasi-experiment described in 4.6.1.1 did not find a significant effect for elaborative feedback on reading comprehension. Of the six participants, only two made any use of the elaborative feedback, with Student 2, who was also the highest scoring student on Pre-test 1, doing so on three occasions and Student 4 on one. This means that the elaborative feedback

could only have influenced text comprehension and/or task completion on four occasions, which equates to 13.3% of the total. It should be noted that the think-aloud sessions were conducted within one week of the Pre-test 1, prior to any lessons in the use of elaborative feedback.

However, with regard to Research Question 1, the think-aloud sessions do provide evidence for the potential of elaborative feedback in Web-based reading practice materials to enhance reading comprehension. On the four occasions when a participant made use of the elaborative feedback, both the participant and I felt that it had assisted with the completion of a reading comprehension question.

As mentioned above, the four instances where the elaborative feedback had helped were coded according to the type of help provided. The coding was both bottom-up and top-down in nature (Gu, 2014). It was top-down in that the feedback itself was either explanatory or directive in nature (please see 3.3.1 above), which would limit the types of help possible. However, as no previous research was found that had utilized think-aloud protocols to investigate the use of elaborative feedback to enhance L2 reading comprehension, I kept an open mind when coding the type of help provided.

Although only four instances arose, these produced two distinct categories: location and rephrasing.

### **Location**

Two instances where the elaborative feedback was determined to have helped Student 2 were categorized as being related to location. One example showed that the feedback had guided Student 2 to the location of a key word relevant to one question, while the other had helped him locate the key part of the text pertinent to another question. The first of these is shown in Extract 1 below.

### Key for extracts

R:	Researcher
S1, S2 etc.:	Student 1, Student 2 etc.
Σ:	Simultaneous speech
[ <i>italics</i> ]:	Researcher's comments and observations
" <i>Italics</i> ":	Question wording/extract from text
" <b>Bold type</b> ":	Feedback given during reading exercises
'True/False/Not Given/A/B/C/D':	Choices available in multiple-choice questions

### Extract 1: Location Think-aloud

S2: *[Reading Question 3. quietly] "Tsunamis can be caused by meteorites" [Moves mouse quickly over the second half of Paragraph 2, then moves to Paragraphs 3, 4, 5, 6, and 7. Does not proceed to Paragraphs 8 or 9. Clicks 'Not Given' and receives the following feedback, which is visible for about 6 seconds]:*

**"Incorrect. Read paragraph 4 again. Look for the word 'meteorite'. What does it say about meteorites?"**

*[Hovers mouse over first and second sentences of feedback and reads them quietly under his breath. Hovers mouse over Paragraph 4 and stops it on the word "meteorite". Clicks "True" and receives the following feedback, which is visible for 1 second]:*

**"Correct. Paragraph 4 tells us that "even meteorite impacts" can cause tsunamis".**

Extract 1 shows Student 2 reading the feedback received after an incorrect response, following its guidance, and then selecting the correct response. Student 2 is tasked with deciding whether the statement "Tsunamis can be caused by meteorites" is true or false, or if the answer is not given in the reading text. His first selection is 'Not Given'. On checking his answer he is informed that his first response is incorrect.

There is evidence to support my judgment that he read the elaborative feedback and that it helped him to answer the comprehension question. Firstly, the feedback is visible for six seconds and the participant reads it under his breath. Secondly, the mouse pointer moves across the first two sentences of the feedback. Thirdly, the participant

moves the mouse pointer to Paragraph 4, as instructed by the feedback, and fourthly he stops the mouse on the word 'meteorite', another instruction from the feedback. He then proceeds to select the correct answer "True".

Further evidence that the elaborative feedback helped Student 2 came from the retrospective recall session that took place immediately after he had completed the reading practice exercise. Student 2 confirms having read at least part of the elaborative feedback, and suggests that it helped him locate the word 'meteorite' that he had been unable to find by scanning.

### Extract 2: Location Recall

R: And, Number 3 ... I think first of all you put 'Not Given'.

S2: Yeah.

R: Why did you put 'Not Given' the first time?

S2: Because I did not see this word [*Pointing to "meteorites" in Q2*]. I looked but I did not uh ... I was just scanning.

R: You couldn't find 'meteorites' in the text yeah, you were just scanning? OK. And when you put 'Not Given', can you put 'Not Given' and check, what did you read then when you were doing the exercise?

S2: [*Hovering over the feedback*] I read "paragraph 4" and "look for the word" [*indicating meteorite*] and I thought it would be there in Paragraph 4 and I read Paragraph 4 and it was here I think, there it is.

R: So, in this case did the feedback help you find the correct answer after  $\Sigma$  you

S2:  $\Sigma$  Yes

R: How do you think it helped you?

S2: By finding this word [*meteorites*] so it has to be an cause. [*Mouse hovers over start of Paragraph 4*] The names of the cause and underwater ... I think, [*inaudible muttering*], so I think helpful.

R: So it helped you find the answer in the text, yeah?

S2: Yeah

## Rephrasing

The second type of help provided by the elaborative feedback, rephrasing, is exemplified below in Extracts 3 to 6. Extracts 3 and 4 illustrate an example of rephrasing a question in order to facilitate comprehension. Extracts 5 and 6 feature an example where rephrasing is used to help a student evaluate whether information is general or specific in nature.

Extract 3 below shows how Student 2 reads the part of the text relevant to answering Question 4, which asks whether ““More tsunamis are caused by landslides than by underwater volcanic eruptions”. On selecting “False” he receives the feedback, which rephrases the initial question through the provision of a hint, which asks whether the two causes are compared. Without reading the text again, he selects the answer “Not Given”.

### Extract 3: Rephrasing Think-aloud (Meaning)

S2: *[Reads Q4 under his breath]* “More tsunamis are caused by landslides than by underwater volcanic eruptions.” *[Hovers mouse quickly over second half of Paragraph 4, then over Paragraph 5. Appears to hesitate over ‘Not Given’ before clicking ‘False’.* *Receives the following feedback, which is visible for about 4 seconds]:*

**“Incorrect. Read paragraph 4 again. Does the text compare the frequency of these two causes?”**

*[Without referring to the text again he clicks “Not Given” and receives the following feedback, which is visible for about 1 second]:*

**“Correct. The text does not compare the frequency of these two causes.”**

Although it might seem that this is a mere guess in response to the elaborative feedback, the student is able to justify his response in the recall session. From Extract 4 below, we can see that he states correctly “It does not mention any comparing”. Both Paragraph 4, which is mentioned by the feedback, and Paragraph 5 contain references to landslides, and Paragraph 4 includes a reference to volcanic eruptions. It would seem that the

rephrasing provided by the feedback provided at least partial support through clarifying the meaning of the question for the student.

#### **Extract 4: Rephrasing Recall (Meaning)**

R: OK. ... Right, what about ... Number 4, what did you put for the ... uh the first time. I think you got it ... I can't remember what you put; you either put 'True' or 'False'. Can you remember what you put?

S2: I think uh, I don't remember.

R: I can't remember. OK, so let's say you put 'False' [*this is what he did put*] uh, the feedback there, did you read all of that feedback or not?

S2: Uh, yeah I read it all because it says "Does the text compare the frequency of these 2 causes?" It does not mention any comparing. It just said often I think maybe in somewhere.

R: So you could remember the paragraph, yeah?

S2: Yeah, I think it said often [*hovering mouse of Paragraph 4*] but I don't know where exactly. [*Finding it in Paragraph 5*] Here, "*are often a result of these earthquakes*".

R: OK, now ... [*S2 clicks 'Not Given' and sees feedback for about 1 second*] so you could remember .. cos I noticed that you didn't look at Paragraph 4 again, you just changed your answer, that's cos you could remember, yeah?

S2: Yeah

In addition to rephrasing having the potential to assist comprehension through the clarification of meaning, it can also be used to help a student evaluate the type of information contained within a paragraph. This type of comprehension question is a



feature of many examinations, including the IELTS exam, where a participant may be asked to select an appropriate heading for a paragraph.

In Extract 5 below, Student 4 reads Question 7, which asks about the main idea of Paragraph 3. He proceeds to read all of Paragraph 3 and then returns to the question to read the four possible answers. He first selects an incorrect response, after which he receives and reads the elaborative feedback. He then rereads the paragraph and then proceeds to select the correct answer, which is confirmed by further feedback.

#### **Extract 5: Rephrasing Think-aloud (Information Type)**

S4: *[Reading Q7 aloud]. “Choose the best answer A, B, C, or D for each of the following questions. What is the main idea of Paragraph 3?” [Scrolls down to Paragraph 3, then hovers mouse over Q7. Mumbles inaudibly while reading Paragraph 3 aloud. Then hovers mouse over options] Maybe “The maximum speed of a tsunami”. Right, can I check now?*

R: Yep, you can check whenever you want.

S4: *[Selects Option ‘B’ “The maximum speed of a tsunami” and receives the following feedback]:*

**“Incorrect. Is this the main idea or should the answer be more general?”**

S4: *[Reads feedback aloud to himself- visible for 6 seconds. Returns to Paragraph 3, hovering mouse over it as he reads inaudibly aloud. Hovers mouse over options again before settling on option C] Maybe “General information about tsunamis.” [Clicks ‘C’ and receives the following feedback, which is visible for about 1.5 seconds]:*

**“Correct. The information in A, B and D is all given, so the answer must be C. This is general information”.**

S4: Yes.

In Extract 6 below, Student 4 confirms having read the feedback and also states that he found the feedback helpful. He notes that on rereading he decided that the main idea of the paragraph was general, rather than specific, information about tsunamis. This led him to select the correct answer at the second attempt. While one might suggest that the presence of the word ‘general’ in both the feedback and the correct answer may have led Student 4 to answer the question correctly, this could only partly explain his correct

choice at the second attempt. His use of the word 'specific' as the opposite to 'general' clearly demonstrates his awareness of the two types of information, as the word 'specific' does not appear in the feedback, text or question. This will be discussed further in relation to Extract 7 below.

#### **Extract 6: Rephrasing Recall (Information Type)**

R: Now, the first Question 7, OK, firstly you got the answer wrong. Can you remember what you put first, which answer?

S4: First?

R: Yeah, secondly you got it right but ..

S4: First, first I choose this .. [*indicating B*]

R: Right, so you put 'B', can you check, can you put 'B' please for one second?

S4: Ok.

R: And then you checked ...

S4: [*Checks answer to reveal feedback*]:

**"Incorrect. Is this the main idea or should the answer be more general?"**

R: Did you read that?

S4: [*Scrolling mouse over feedback*] Yes.

R: You read it?

S4: [*Reading aloud*] "Is this the main idea or should the answer be more general?" Yes, I read this.

R: You read that, and then did it help you find the answer?

S4: Yes.

R: How did it help you?

S4: Because it talk about general. Not in the specific something. [*Scrolling to the top of Para 3*] Tsunami, then I think it talking about tsunami. Then I search for general information about tsunami [*scrolling over response 'C'*] and choose it.

While there is some evidence that on each of the four occasions that a participant read the elaborative feedback it helped him to answer a comprehension question following an initial incorrect response, it does not follow that simply reading the feedback is a sufficient condition for it to assist comprehension. This issue will be discussed in more detail in the analysis of the Round 2 think-aloud protocols. However, one example from the first round highlights how the very same feedback that helped Student 4 answer Question 7 in Extracts 5 and 6 above might not have helped Student 5 even if he had read it.

In Extract 7 below, taken from the recall session with Student 5, he is asked if he read the elaborative feedback “Incorrect. Is this the main idea or should the answer be more general?” while attempting to answer Question 7. He states that he did not read the feedback and when asked if it would have been helpful his response suggests that the language used in the feedback is beyond his comprehension. This is in stark contrast to Student 4, who successfully interprets and then utilises the feedback in order to answer the question.

#### **Extract 7: Rephrasing Recall (Information Type)**

R: Right, now what does it tell you after “Incorrect”?

S5: [*Reads the feedback*] “**Is this the main idea or should the answer be more general?**”

R: Did you read that the first time?

S5: No.

R: Would it have helped you?

S5: “Is this the main idea or should the answer be more general?”

R: Could that help you to choose the best answer here or not, afterwards?

S5: I don’t think so because I don’t understand “main idea or should the answer be more general?”

However, the main barrier to the elaborative feedback providing assistance during the first round of think-aloud protocols was more fundamental; the majority of participants did not read the elaborative feedback on the vast majority of occasions. Whether or not this is affected by instruction in the use of elaborative feedback is explored below in answer to Research Question 2.

#### **4.6.2.4 Round 2 Surveys: Study 1 Survey 2 and Study 1 Survey 2 Taught**

##### **Part 1**

The items that make up Part 1 of both versions of Study 1 Survey 2 were identical to those that constituted Study 1 Survey 1, which was analysed above (see 4.6.2.1). The purpose of Part 1 was to obtain some general information about the participants' reading habits and attitudes toward reading online in both English and Arabic after the study in order to attempt to detect any changes in either over the course of the study. The results for the treatment and control groups (TG2 and CG2) and for the entire cohort combined are shown below in Table 4.12.

The results above show that very little change was detected in the general reading habits of the participants over the course of the study. While 66 participants responded to Survey 1, only 24 and 30 students completed Survey 2 and Survey 2 Taught respectively, giving a combined total of 54 submissions. As a result, any minor changes in the findings should be treated with caution.

In comparison with Survey 1, there was a stronger preference for reading English online this time ( $M=4.13$ ,  $SD=.99$ ) from Survey 2 (both versions combined) compared to ( $M=3.53$ ,  $SD=1.06$ ) from Survey 1, with no significant difference between the treatment and control groups. In addition, for the treatment and control group combined, there was a slight increase in the amount of reading undertaken in both languages, both online and from paper. As the results of both surveys were anonymous, it was not possible to test for significance using paired samples or repeated measures.

Table 4.12: Results of Items 1 to 7 of Study 1 Survey 2 and Survey 2 Taught

	Treatment Group			Control Group			Combined		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Q1	4.27	.69	30	3.88	.68	24	4.09	.71	57
Q2	4.23	.90	30	4.00	1.10	24	4.13	.99	57
Q3	2.93	.87	30	3.20	.98	24	3.06	.92	57
Q4	3.40	1.28	30	3.17	1.43	24	3.30	1.34	57
Q5	2.47	.86	30	2.54	1.02	24	2.50	.93	57
Q6	3.37	1.16	30	2.92	1.28	24	3.17	1.22	57
Q7	2.73	1.39	30	2.63	1.31	24	2.69	1.34	57

Questions 1, 2 and 7 used a Likert-scale: Strongly Agree=5, Agree =4, Neither agree nor disagree=3, Disagree=2, Strongly Disagree=1.

Questions 3 to 6 used a 5 point scale: None=1, Less than 1 hour=2, 1 to 2 hours=3, 3 to 5 hours=4, More than 5 hours=5

#### Questions

Q1. I like reading English.

Q2. I like reading English online more than reading from paper.

Q3: On average, how much time do you spend each week reading English online?

Q4: On average, how much time do you spend each week reading Arabic online?

Q5: On average, how much time do you spend each week reading magazine, newspapers or books in English?

Q6: On average, how much time do you spend each week reading magazine, newspapers or books in Arabic?

Q7. I find reading English online more difficult than reading from paper.

Next, between-group differences were explored. An independent samples t-test was carried out to compare the mean scores of TG2 and CG2 for Questions 1 to 7. For Question 1 there was a significant difference in the mean scores obtained by TG2 ( $M=4.27$ ,  $SD=.69$ ) and CG2 ( $M=3.88$ ,  $SD=.68$ )  $t(52)=-.2.088$ ,  $p=.042$  but the magnitude of the difference was moderate (eta squared=.078). The grouping variable accounted for only 7.8% of the variance in scores for 'I like reading English'. This suggests that the treatment may have had a positive effect on attitudes towards reading in English. However, it should be remembered that the groups were not randomly assigned so this result should be interpreted with caution. No other significant differences existed between the two groups.

In summary, Part 1 of the survey suggests that while no major changes in reading habits occurred during the course of the 8-week study, attitudes toward online reading became more favourable, and the participants felt more comfortable engaging in this activity.

As with Survey 1, one open-ended question, Item 8, was included to explore reasons for the perceived relative difficulty of online versus paper-based reading in English. As with Survey 1, the responses were coded. However, the starting point this time was the four categories that emerged from the analysis of Survey 1, namely accessibility, comfort, strategy use and motivation. While no new categories emerged, with many of the responses similar to those resulting from Survey 1, one interesting change was in the reference to strategy use. Several of the respondents reported using time saving strategies to navigate through a text, perhaps due to their broader experience with online reading in an academic context. For example, one student noted that online reading was easier “because its east to find words by press (control F)” (sic) while another stated that “Reading online saves time in searching”. This aside, there was little change between the types of responses to this item when compared with the parallel item in Survey 1.

## **Part 2**

Part 2 of Survey 2 and Survey 2 Taught was developed to investigate the participants’ experiences and opinions with regard to the online reading practice materials and tests that were made available to them during the study. The results are shown below in Table 4.13.

Table 4.13: Results of Part 2 of Study 1 Survey 2 and Study 1 Survey 2 Taught

	Treatment Group 2			Control Group 2			Combined		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Q9	4.53	.63	30	4.5	.72	24	4.52	.67	54
Q10	4.17	.83	30	4.08	.65	24	4.13	.75	54
Q11	4.60	.62	30	4.79	.41	24	4.69	.54	54
Q12	4.43	.77	30	4.50	.59	24	4.46	.69	54
Q13	4.10	.76	30	4.12	.80	24	4.11	.77	54
Q14	3.07	.58	30	2.96	.36	24	3.02	.49	54
Q15	3.47	.68	30	3.29	.55	24	3.39	.63	54
Q16	4.40	.72	30	4.67	.56	24	4.52	.67	54
Q17	3.73	1.11	30	3.67	1.13	24	3.70	1.11	54

Questions 9-13 and Question 16 and 17 used a Likert-scale Strongly Agree=5, Agree =4, Neither agree nor disagree=3, Disagree=2, Strongly Disagree=1.

Questions 14 and 15 used a Likert-scale: much too difficult=5, too difficult=4, at my level=3, too easy=2, much too easy=1.

#### Questions

Q9. The reading exercises helped me to improve my online reading skills.

Q10. The reading exercises helped me to improve my paper-based reading skills.

Q11. The guided feedback in the reading exercises helped me to understand the reading texts.

Q12. The guided feedback in the reading exercises helped me to prepare for the online tests.

Q13. The reading texts were interesting.

Q14. The questions in the practice exercises were:

Q15. The questions in the online tests were:

Q16. I think the online reading tests can help me prepare for the IELTS exam.

Q17. I preferred to complete the reading exercises alone without asking for help.

From Table 4.13 it can be seen that the participants received both the online reading exercises and the elaborative feedback favourably. The exercises were seen as valuable in improving online and, to a lesser extent, paper-based reading skills. The strongest rating was for Question 11, where the participants from Treatment Group 2 and Control Group 2 combined reported that the elaborative feedback had helped them to understand the reading texts ( $M=4.69$ ,  $SD=.54$ ), a finding of direct relevance to Research Question 1.

An independent samples *t*-test was employed to test for between-group differences. No significant differences between the mean scores of Treatment Group 2 and Control Group 2 on Questions 9 to 17 were found. With regard to research Question 2, this might suggest that the strategy training had little effect on the usefulness of the elaborative feedback for reading comprehension.

In addition to the Likert-scale type items analysed above, the following 4 open-ended items were included at the end of Part 2 in order to gather more information about the students' opinions of the reading practice exercises and elaborative feedback and recommendations for their improvement.

- 18. What did you like about the reading practice exercises?
- 19. What would you like to change about the reading practice exercises?
- 20. What did you like about the guided feedback in the reading practice exercises?
- 21. What would you like to change about guided feedback in the reading practice exercises?

The responses to these items corroborated the findings that emerged from analysis of Items 9 to 17 above, which had suggested that the participants had a very positive attitude towards the practice exercises and elaborative feedback. The responses were coded in a similar way to those of Part 1 of Survey 1, with four categories emerging: text comprehension, task completion, reading skills, and motivation.

## **Text Comprehension**

Answers to the open-ended questions suggest that the elaborative feedback helped the participants with text comprehension, with virtually all the comments being positive. Only one comprehension-related suggestion for improvement of the practice exercises was offered: "some vocabulary should be more clear", which is perhaps surprising when one considers that Item 14 above found that 13% (7 participants) felt that the exercises were too difficult.

The responses indicate that elaborative feedback can enhance reading comprehension in a number of ways. The first example below simply suggests that elaborative feedback



can assist with comprehension, while the second indicates that it can also encourage reflection. The notion that the feedback can make the text easier, which is expressed in the third response, lends support to the idea that scaffolding or input modification provided by elaborative feedback can assist a reader to understand something that might otherwise be beyond his ability level. The fourth response is of interest given the importance of vocabulary for L2 reading comprehension. The response shows that the elaborative feedback was perceived as a useful aid in clarifying the meaning of unknown words, an example of input modification rendering input comprehensible. Finally, the fifth response links text comprehension with assistance in answering comprehension questions, which is discussed below.

1. *"the feedback was very helpfull and helped me to understand the texts" (sic).*
2. *"IT HELP ME TO INDERSTAND AND THINK MORE" (sic).*
3. *"it gives ideas about the passage and make the text eaiser" (sic).*
4. *"it show me how to know the meaning of the words without even know them before" (sic).*
5. *"it had a feedback that guided me through the question and gave me a bitter idea of the text" (sic). (Item 19)*

### **Task Completion**

The responses under this category were related to the questions in the reading practice exercises, those in the follow-up tests, and relevance to their future IELTS exam sittings. The examples below illustrate different aspects of task completion as perceived by the respondents.

1. *"I like the guided feedback very much because it shows you where the answers in the text like in paragraph 1, 2 or 3" (sic).*

2. *"it makes me understand the question".*

This first example above is focused very much on answering a comprehension question in order to complete a task in hand at the current time. The second example is interesting in that the participant clearly felt that the elaborative feedback was useful in clarifying the meaning of the questions in the exercise. While the principal aim of the feedback is to assist with text comprehension, it is also important that learners are able to understand the questions themselves if they are to be answered successfully.

The third example below illustrates how the feedback in the reading exercises can assist a student to find the correct answer after submitting an incorrect response at the first attempt.

3. *"it shows me where I'm mistake in and to give me some sentences to think about and go back to find the correct answer" (sic).*

Other examples related to future tasks, in particular the follow-up tests and the IELTS exam.

4. *"in fact, it helps me alot because it prapare me for the test. i understand the passage from practice exercises" (sic).*
5. *"it helps me for IELTS and see the kind of questions will be in it" (sic).*
6. *"it doesn't tell what is the answer but it tells you what you should foces on"*

The fourth comment above shows how the feedback in the exercises was perceived to help with preparation for the follow-up tests by improving text comprehension, while the fifth shows how the similarity of the question types encountered in the online exercises to those in the IELTS exam was seen to be good preparation for the latter. The sixth statement suggests a positive attitude towards the fact that the feedback guides students towards solving a question rather than simply offering the answer.

The suggestions for improvement to the practice materials that fell within this category were of two types; two respondents suggested increasing the number of questions while another suggested adding open-ended questions. A related suggestion from a member of the control group was that students should have the opportunity to discuss their mistakes with a teacher afterwards. While Item 18 found that the majority of participants preferred to complete the exercises alone, some felt otherwise, and this suggestion from member of the control group perhaps reflects the fact that they had not had an organized opportunity to work on the materials with others.

While the practice exercises containing elaborative feedback were seen to be useful in assisting the learners to complete specific current or future tasks, they were also seen as valuable aids to more general reading skills development, an aspect which is addressed below.

## **Reading Skills**

Several participants commented that the elaborative feedback had helped them to improve their reading skills, though the majority of such comments did not give much indication of how this had happened or which particular skills had been improved. For example, one noted that *“it help to improve my skills at reading”* (sic), while another commented that *“its improves my skills in reading and I learn new stuff”* (sic).

However, a few comments were more specific, focusing on skimming and reading quickly. The first example below shows that the respondent felt that the practice exercises containing elaborative feedback helped with the development of skimming skills, while the second shows that the respondent was of the opinion that the exercises had helped him to read more quickly, and to focus more on understanding the text.

1. *“it can improve my skimming skills”* (sic).
2. *“to be honest i feel it hepls a lot to gain some skills like reading fast and try your best to understand”* (sic).

We saw from Table 4.13 above that, in general, the participants felt the practice materials helped them to improve their paper-based reading skills. The comments above related to general reading skills development suggest that the participants believed that the exercises could help prepare them for other reading tasks in both online and paper-based media. This could potentially have a beneficial effect on motivation, the final category to emerge from the analysis of the responses.

## **Motivation**

While the majority of the responses to Items 18-21 of the survey were positive, with very few suggestions for improvement, virtually all the negative responses were categorized as motivational in nature.

With regard to the practice exercises, one respondent from the control group wrote that he liked “Nothing really, I hate reading” (sic), while another made the following suggestion for improving the materials:

1. *“well, if its possibile to change the boring topic that most of the time they gave us will be better. :) but i know that they don’t see the student’s profissions. what they like or dond like in this case” (sic).*

Two other respondents suggested that the materials should be made more interesting through changing the topics covered. While the topics covered by the materials were seen as boring by a few respondents, no negative comments or suggestions for improvement were made with regard to the elaborative feedback.

The importance of topic selection for motivation was highlighted by one respondent, who noted the following:

2. *“If I like the topice, ofcourse I will like the exercises and I want to improve my skills by doing the reading practice exercises” (sic).*

Apart from the degree of interest participants might have in the topics featured in the reading exercises, another motivational aspect that emerged from the responses was the usefulness of the materials. The two examples below illustrate that the perceived usefulness may be related to a general improvement in language ability, as shown in the third example, or more specifically as an IELTS preparation tool, as exemplified by the fourth.

3. *“is very useful for me and it can improve my English” (sic).*

4. *“It is good and useful for out IELTS preparation” (sic).*

In summary, the responses to Part 2 of Survey 2 and Survey 2 Taught suggest that both the reading practice materials and the elaborative feedback were received very favourably by the participants. Almost every participant felt that the elaborative feedback enhanced reading comprehension, and that it assisted with completing the comprehension questions included in the practice exercises. The exercises were seen to help with the development of both online and paper-based reading skills and were generally regarded as motivating. Only a few suggestions were made for improving the exercises and these were related to topic selection and a wider choice of question types.

### Part 3

This part of Study 1 Survey 2 Taught was designed to investigate the views of the treatment group (TG2) on the usefulness of the four lessons they received during the course of the study. The results are shown below in Table 4.14.

*Table 4.14 Results of Part 3 of Study 1 Survey 2 Taught*

	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>N</i></b>	<b><i>1</i></b>	<b><i>2</i></b>	<b><i>3</i></b>	<b><i>4</i></b>	<b><i>5</i></b>
Q22	4.57	.63	30	63.3%	30%	6.7%	0%	0%

Q23	4.63	.61	30	70%	23.3%	6.7%	0%	0%
Q24	4.17	.80	30	41.4%	34.5%	24.1%	0%	0%
Q25	4.40	.62	30	46.7%	46.7%	6.7%	0%	0%
Q26	3.53	1.28	30	26.7%	30%	23.3%	10%	10%
Q27	4.20	.81	30	40%	43.3%	13.3%	3.3%	0%

Questions 22 to 27 used a 5-point Likert-scale: Strongly Agree=5, Agree =4, Neither agree nor disagree=3, Disagree=2, Strongly Disagree=1.

### Questions

- Q22. The lessons about how to use the reading exercises and feedback were useful.  
Q23. The lessons helped me improve my online reading skills.  
Q24. The lessons helped me improve my general, paper-based reading skills.  
Q25. The lessons helped me to use the guided feedback in the online exercises.  
Q26. I would like more lessons about how to use the guided feedback.  
Q27. I would like more lessons about how to read online.

From Table 4.14, it can be seen that the reading strategy lessons (described in 5.5.2.3 above) were received very favourably by the students, with over 93% finding them useful and feeling that they helped them to improve their online reading skills. In addition, approximately 76% were of the opinion that the lessons had also helped improved their paper-based reading skills, despite the online emphasis of each lesson. This is perhaps not surprising, given the similar finding from both versions of Survey 2 described above. With regard to the elaborative feedback, over 93% of the participants thought the lessons had assisted them in making use of the feedback. Almost 57% wished to have additional lessons in the use of the feedback, while 20% were satisfied that no further lessons were required. However, more than 83% of the students responded that they would like more lessons on how to read online.

The following two open-ended items were included at the end of Survey 2 Taught, to investigate further the students' opinions of the lessons and collect recommendations for their improvement.

### Questions

28. What did you like about the lessons on how to use the reading exercise and feedback?  
39. What would you like to change about the lessons?

The responses were coded, with the starting point for the codes being the four categories that emerged from both versions of Survey 2 above, namely text comprehension, task completion, reading skills, and motivation. Two additional categories emerged, one of which had previously arisen from the analysis of Survey 1 and the first round of interviews: that of strategy use. The second new category was collaboration, which emerged from the participants' opinions about the strategy instruction lessons.

### **Strategy Use**

With regard to strategy use, one result of the lessons that was appreciated was the increased use of feedback. For example, one participant wrote:

1. *"I start to use the feedback more offen on the internet" (sic).*

Although this may appear to be a reference to using feedback generally when using the Internet, this is almost certainly a reference to the practice exercises, given that elaborative feedback is not readily available on the Internet.

The lessons were also considered to have helped the participants to use the feedback, and to reflect further on questions that had been answered incorrectly.

2. *"how to use the feedback to answer the questions".*
3. *"it shows us how to think on the answer if it write or wrong and why" (sic).*

### **Collaboration**

Although a majority of the respondents to Question 17 (see Table 4.13 above) indicated that they preferred to complete the reading exercises while working alone, one comment from Survey 3 suggests that working in a group and discussing the materials can be beneficial. In response to Question 28, the participant wrote:

1. *“the groub work and the deccation on it with the other students” (sic).*

The majority of the respondents had no suggestions for improving the lessons. However, three suggested alternative topics in order to make the lessons more interesting and one simply responded “just more interesting”. Another respondent suggested including pictures without explaining why this would be an improvement. Lastly, one participant suggested doing the lessons on paper. These suggestions, with the possible exception of the unexplained “put some pictures” comment, were categorised as falling within the motivation category that emerged from the analysis of Survey 2 and Survey 2 Taught above. They highlight the importance of lessons and materials being perceived as interesting if they are to engage students. The points emerging from Survey 2 were further explored in the second round of interviews, which are discussed below.

#### **4.6.2.5 Round 2 Interviews**

The second round of interviews focused on the attitudes of Students 1 to 6 with regard to the reading practice exercises, the elaborative feedback within them, and the lessons on how to exploit the feedback. They were transcribed and then coded using the categories that had previously emerged from the Questions 18 to 21 and Questions 28 and 29 above: text comprehension, task completion, reading skills, motivation, strategy use and collaboration. These all related to the students’ attitudes towards the reading exercises and feedback. In addition, the categories which emerged from Question 8 of Survey 1 and Survey 2, which focused on the perceived differences in difficulty between reading online and from paper, were employed: accessibility, comfort, strategy use and motivation.



All six participants felt that the feedback had been useful, providing assistance in answering the questions (task completion) and in understanding the text (text comprehension).

1. *"First I understand the whole text before I exam it and the feedback it helps us it helped me to come to find the answer and to understand the questions" (sic). [Student 4]*
2. *"I see the feedback give me a lot of help and if you get it right for the first time you will see why you get it right and make you understand it more and when you get it wrong you will see why you get it wrong and where is the goals in the paragraph where you can find your answer so it is very useful" (sic). [Student 6]*

However, whether or not this assistance was exploited could depend on a participant's level of motivation:

3. *"No I think it helps you understand the text not only to do the questions but when I asked my friends they don't need to understand the text it just only for answer the questions but about me I try to understand all of what they say" (sic). [Student 1]*

Equally, the feedback was not always useful. For example, accessibility issues arose when some of the vocabulary in the feedback was too difficult for the student.

4. *"There are some vocab that I don't understand that I know where to find the answer and the words before then afterwards it'll get easier make you understand what they mean by this" (sic). [Student 2]*

While the elaborative feedback was generally considered helpful, some feedback items that simply restated what was in the text did not always provide the participants with sufficient support.

5. *"Yes very helpful they make me reconsider where I should read what I have to know to answer the question but sometimes the feedback doesn't help it just tells me what*

*you say so it doesn't help but others it help me it helps me to know where is the answer so when I read I understand" (sic). [Student 1]*

Where additional support was needed, it was sometimes provided by a fellow student while working together collaboratively.

6. *"With a partner because when I cannot understand the feedback my partner can help me and when my partner haven't ... had not understand the text or understand the feedback I helped him" (sic). [Student 4]*

One of the major benefits of the lessons reported by the participants was the change in strategy use that resulted. Whereas before the lessons the students made little use of the elaborative feedback, afterwards they knew both how to use it and why.

7. *"At first when I checked I didn't read I just read correct or incorrect. I didn't think it would be helpful but after we get lessons and we know where this feedback, where we can get help. I know that it would be helpful and I get serious and read it" (sic). [Student 1]*

The exercises and feedback were also seen as valuable in improving general reading skills, even when reading from paper. For example, Student 5 felt that he had learnt what to focus on when answering a comprehension question, and had also learnt to read more carefully.

8. *"I think so because when I make a mistake I read the feedback and see what I should focus on. So if I had from paper reading from paper so I would see the question and to the paper and see what I should focus on... Yeah the practice with the feedback made me read more carefully. The feedback taught me what I should focus on like I said before" (sic). [Student 5]*

Very few suggestions were made for improving the elaborative feedback. Apart from the comment about the level of vocabulary used in the feedback in Comment 4 above, Student 2 also suggested that the feedback be provided in stages, rather than all at once.

9. *"Maybe if you press check it only shows you which paragraph it does not show you the true statement. Make them look for the answer to understand more the text and you didn't get it at all then they will get statement" (sic). [Student 2]*

In summary, the practice exercises and elaborative feedback were received very favourably and the feedback itself was considered to be a valuable support to text comprehension. The lessons themselves were also regarded as useful and resulted in a change in strategy use among the participants. Examples of the students making use of the elaborative feedback during the second round of think-aloud sessions are described below. These sessions took place after the four lessons that were focused on the strategic use of the feedback.

#### 4.6.2.6 Round 2 Think-aloud Protocols

The Round 2 think-aloud protocols were analysed in the same way as those from Round 1, although one minor difference existed in the way verification of a participant's reading of the elaborative feedback was undertaken. Perhaps due to the training the students had received, it was clear in nearly all instances that the student had read the elaborative feedback because they had read it aloud while hovering the mouse pointer over it. On the handful of occasions where this was not clear, I asked the participants during the retrospective recall phase to confirm whether or not they had read the feedback. A summary of the key findings is shown below in Table 4.15.

*Table 4.15: Summary of Elaborative Feedback use during Round 2 think-aloud protocols*

Student	No. of Questions	Total Attempts	Read EF (R)	Read EF (P)	EF Helped (R)	EF Helped (P)
1	6	9	6	6 5 + 1	3	2
2	6	8	6	Partial	2	3
3	6	10	6	6	0	1
4	6	8	6	6	2	2
5	6	8	6	6	2	2
6	4	6	4	4	2	1
Total	34	49	34	33 + 1 Partial	11	11

Note: (R) refers to the researcher's interpretations of feedback being read or helping. (P) refers to participants' interpretations.

As can be seen from Table 4.15 above, one clear effect of the strategy instruction sessions that focused on the use of elaborative feedback was that every participant read almost all of the feedback, even after answering a question correctly at the first attempt. Only one exception to this existed, when Student 2 read only part of the elaborative feedback displayed after he had answered a question correctly at the first attempt. This means that all the feedback was read for 33 of the 34 questions answered (97.1%), or after 48 of the 49 attempts at a question (98%). Furthermore, the feedback was read 100% of the time after an incorrect response. This is in stark contrast to the Round 1 think-aloud protocols, where the elaborative feedback was only read on 4 occasions, and each time only after an incorrect response. After a correct response, there were no occasions on which the elaborative feedback was read.

In addition, we can see that the elaborative feedback was seen to have helped a participant to answer a comprehension question on 11 occasions according to my observations. Similarly, the participants themselves suggested that the feedback had helped them to answer a question on 11 occasions, although our interpretations did not always match. On two occasions (once for Student 1 and once for Student 6), a participant answered a question correctly at the second attempt, and I initially felt that the feedback had helped. However, following discussion with the participants, it emerged that it had not helped, due to vocabulary issues. On two other occasions (once for Student 2 and once for Student 3), a participant had answered a question correctly at the first attempt and I felt that the feedback had been of no assistance. After discussion with the participants, it emerged that the feedback they had received after a correct answer had helped to enhance their understanding of the text, either through confirming their understanding of part of the text, or through showing the location of the actual answer in the text. A more detailed example will be provided later in this section under 'Confirmation'. The help provided to students after they had initially failed to answer a question correctly is summarized below in Table 4.16.

*Table 4.16: Summary of help provided following an incorrect response*

Student	No. of Questions Answered Incorrectly First Time	No. of Times Feedback Helped After Incorrect Response
1	3	2
2	2	2
3	2	0
4	2	2
5	2	1
6	2	1
Total	13	8

From Table 4.16 above, it can be seen that out of the 13 occasions where the participants answered a comprehension question incorrectly the first time, the elaborative feedback helped them by improving their understanding of either the question or the text on 8 occasions. This means that the elaborative feedback provided adequate support 61.5% of the time, while no or insufficient support was given on 38.5% of the occasions when it was needed. In addition, on three occasions the participants felt that the feedback had helped them following a correct response. Given that 21 questions were answered correctly at the first attempt, this equates to 14.3%. While the figure may appear low, the elaborative feedback only assisted with comprehension for 13.3% of the questions answered incorrectly at the first attempt in Round 1, and provided no assistance at all for questions answered correctly.

With regard to Research Question 2, an analysis of the think-aloud sessions provide evidence that instruction in the use of elaborative feedback can increase its usefulness as an aid to reading comprehension. Whereas there were few instances of participants actually reading the elaborative feedback in the first round of think-aloud protocols, virtually all the feedback was read in its entirety in the second round. In addition, there was a marked increase in the number of occasions on which the feedback was deemed to have helped the participants to answer a reading comprehension question successfully, either through helping them with text comprehension or through clarifying the meaning of a question. An analysis of the occasions on which full, partial or no help was provided by the elaborative feedback will now follow.

In coding the instances where the elaborative feedback was utilized by the participants, the two categories that emerged from Round 1 were used as a starting point: location and rephrasing. Perhaps due to the limited number of questions types and the similarly limited types of support provided by the feedback, no additional categories emerged for the type of help provided by the elaborative feedback following an incorrect response. However, the higher number of both successful and unsuccessful uses of the feedback provided a greater variety of instances within each category. These are summarized below in Table 4.17.

*Table 4.17: Types and frequency of help provided following an incorrect response*

Category	No. Of Occasions EF Helped	No. Of Occasions EF Did Not Help
Rephrasing	7	4
Location	3	1
Total	10	5

From Table 4.17 above we can see that the elaborative feedback helped a participant to complete a comprehension question through rephrasing on seven occasions and through location advice on three occasions. Note that from Table 4.16 we saw that elaborative feedback helped on a total of eight occasions following an incorrect initial response to a question. The disparity is due to an item of elaborative feedback providing both rephrasing and location related assistance on two occasions. Equally, it can be seen that elaborative feedback provided rephrasing that was insufficient to enhance comprehension on four occasions, and location advice that was similarly ineffective on one occasion. Some key examples are presented below.

## **Rephrasing**

Extracts 7 and 8 below illustrate an example of elaborative feedback successfully assisting a participant to answer a comprehension question through rephrasing, or asking the question using different words. Extract 7 is an excerpt from the Round 2

think-aloud protocol transcripts, while Extract 8 is from the retrospective recall session with the same participant. This was held immediately after the completion of the think-aloud protocol. In determining whether the feedback was successful, a combination of researcher analysis and judgement, plus verification from the participant was utilised. If a participant was seen to read the feedback and then answer a question successfully but there was no clear evidence that feedback had aided comprehension, the feedback was deemed to be unsuccessful. In Extract 7 below, Student 4 attempts to answer Question 2, which has three potential answers, “True”, “False” and “Not Given”. He reads the relevant part of the text and firstly selects “False” as his response. On receiving the elaborative feedback, which he reads under his breath, he returns to the relevant part of Paragraph 1 and reads the appropriate sentence. He then selects “True” and receives elaborative feedback that confirms his correct response and states the reason for its correctness.

#### **Extract 7: Successful Rephrasing Think-aloud**

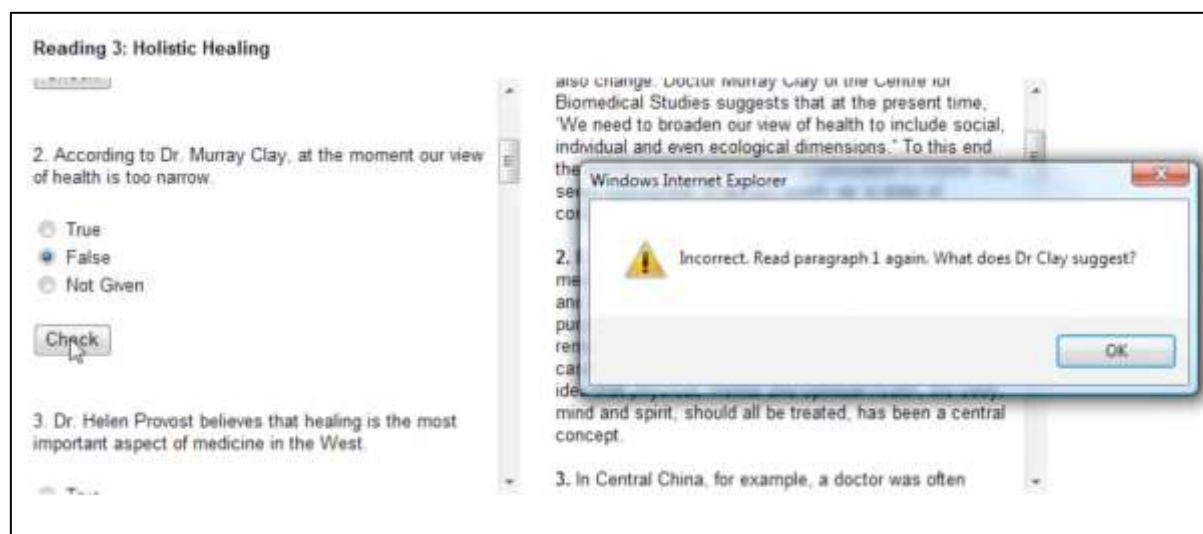
S4: *[Reads Question 2 aloud under his breath while moving the mouse pointer over the question wording] “According to Dr Murray Clay, at the moment our view of health is too narrow”. [Moves mouse pointer over Paragraph 1 and then the start of Paragraph 2. Selects the answer ‘False’ and clicks on ‘Check’ to bring up the following feedback for about 3 seconds, which he reads under his breath]:*

**“Incorrect. Read Paragraph 1 again. What does Dr Clay suggest?”**

*[Moves mouse over “Doctor Murray Clay” in Paragraph 1 and then over the relevant sentence, which follows while reading quietly under his breath. Selects “True” and receives the following feedback, which is visible for approximately 6 seconds and which he reads under his breath while moving the mouse pointer over the words.]*

**“Correct. In Paragraph 1 Dr Clay is quoted as saying “We need to broaden our view of health to include social, individual and even ecological dimensions.”**

The feedback, question and text discussed under Extract 7 are visible in the screenshot below in Figure 4.10. This was taken from the screen recording of the think-aloud session with Student 4.



**Figure 4.10:** Extract from screen recording showing elaborative feedback.

My initial interpretation, following an analysis of the interaction between Student 4, the text and the elaborative feedback, was that the rephrasing offered by the elaborative feedback enhanced his comprehension sufficiently to enable him to answer the question at the second attempt. This interpretation is supported by Extract 8 below, which provides the participant's recall of the same interaction.

From extract 8, evidence can be seen that the elaborative feedback helped Student 8 answer Question 2. He claims to have had difficulty understanding the text initially, which led to his incorrect first attempt at the question. He then claims that the feedback he received helped him to understand the text. When pushed to explain how it helped, he focuses on the word *broaden*, an understanding of which is key to understanding the question. He then suggests that the elaborative feedback helped him to guess the meaning of this previously unknown word and is able to provide a reasonable approximation of its meaning: "to make big so it means the opposite of narrow".



### Extract 8: Successful Rephrasing Recall

R: Okay and then you went to Question 2. First of all you put false. Why did you put false to begin with?

S4: Because when I read what Dr Murray Clay said I think that I don't see a word there so I put false. Because I didn't understand the... I didn't understand his text.

R: Okay so... and when you checked?

S4: So when I checked and I understand what.. what she said.

R: So how does... did you read the feedback there?

S4: Yes

R: And did it help you?

S4: Yes it's helped me.

R: How did it help you, because the second time you got the answer correct? How did it help you?

S4: When I read what Dr Clay suggest again and understand what she said I find the... I put "True".

R: So it says at the moment our view of health is too narrow. Where is the answer here? Where can you see it?

S4: Dr Murray Clay of the Centre for biomedical studies suggests that at the present time we need to broaden our view of health to include social individual.... I understand that the word 'broaden' is too big.. to make big so it means the opposite of narrow.

R: Did you know this before or not?

S4: I don't know the word broaden but I think that's the mean of the word.

R: So you guessed the word from the text?

S4: Yes

R: Now, did the feedback help you guess do you think?

S4: Yes, yes.

From an interactionist perspective, the interactions between Student 4 and the elaborative feedback shown in Extracts 7 and 8 above can be viewed as an example of modification of input, where a previously incomprehensible part of the text is rendered comprehensible. In this example, by assisting the participant to determine the meaning

of 'broaden', the feedback helps render a key part of the text comprehensible. Similarly, from a social-constructivist view, it could be argued that the elaborative feedback provided sufficient scaffolding to enable the participant to comprehend a part of the text that would have been beyond his ability level if unaided.

To illustrate this further, an unsuccessful interaction with the same feedback is shown in Extracts 9 and 10 below. In this example, Student 1 attempts to answer the same comprehension question that featured above. In Extract 9, Student 1 reads Question 2 aloud and then moves the mouse pointer directly to the part of the text containing the answer. He then appears to look briefly at the following paragraph. He selects an incorrect response at the first attempt and receives the elaborative feedback. Although he does not read the feedback aloud, it is visible for long enough to suggest that he does in fact read the feedback. He then chooses the correct answer at the second attempt.

#### **Extract 9: Unsuccessful Rephrasing Think-aloud**

S1: *[Reads Question 2 aloud under his breath while moving the mouse pointer over the question wording] "According to Dr Murray Clay, at the moment our view of health is too narrow". [Moves mouse pointer over second half of Paragraph 1 and stops on 'Doctor Murray Clay'. Hovers mouse over the key sentence containing the answer to the question and then scrolls the text window to briefly look at the beginning of Paragraph 2. Returns to the key sentence while reading inaudibly. Selects the answer 'Not Given' and clicks on 'Check' to bring up the following feedback, which is visible for about 3 seconds].*

**"Incorrect. Read Paragraph 1 again. What does Dr Clay suggest?"**

*[There is no audible evidence of reading the feedback and the mouse pointer moves directly to the 'OK' button, which he clicks to close the feedback. Moves mouse pointer back to the key sentence for about 8 seconds, then selects "True" and receives the following feedback, which is visible for approximately 3 seconds. He reads the first part aloud before closing the feedback.]*

**"Correct. In Paragraph 1 Dr Clay is quoted as saying "We need to broaden our view of health to include social, individual and even ecological dimensions.""**

As with Extract 7, my initial impression from analysing Extract 9 was that the rephrasing offered by the elaborative feedback had assisted Student 1 to comprehend both the question and the key part of the text sufficiently to enable him to answer Question 2 at the second attempt. However, on this occasion the evidence from the following recall session did not support my interpretation.

From Extract 10 below we can see that despite having read the elaborative feedback and having realised that understanding “broaden our view” was key to answering the question correctly, Student 1 was still unsure about the meaning of the word ‘broaden’. Whereas Student 4 felt that the feedback had assisted him in understanding the meaning of ‘broaden’, a word which he had previously not known, Student 1 was still unsure of its meaning. He admitted that he was unsure whether the correct response was “True” or “False” so resorted to guessing.

#### **Extract 10: Unsuccessful Rephrasing Recall**

R: Number 2. So first of all you put “Not Given”. Why did you put that?

S1: Well, first of all I didn't understand this sentence (indicating key part of text). So I thought it didn't mention anything about this because I didn't understand some words in this sentence so I just put “Not given”.

R: OK

S1: And when I checked [*showing the feedback*] “What does Dr play suggest?” So I try to understand what it mean and I see from “broaden our view” I think it's not... I wasn't sure if it was true or false but I try to give the... what it called meaning so I put “True” and when I checked [*shows “Correct. In Paragraph 1 Dr Clay is quoted as saying “We need to broaden our view of health to include social, individual and even ecological dimensions.””*]

R: And did you read this when you checked?

S1: Yes but even here I don't understand. And still I don't understand some words here [*hovering mouse over “broaden”*] so it doesn't help because it just say what it says in the paragraph.

From an interactionist perspective, the modification of input provided by the elaborative feedback was insufficient to render the key part of the text comprehensible to Student 1. Understanding of the word 'broaden' was key to this part of the text, and Student 1 was still unsure of its meaning after completing the exercise. Alternatively, from a social-constructivist perspective, insufficient scaffolding was provided to enable Student 1 to complete the task. It is likely that completing the task would have been within his reach, or within his *Zone of Proximal Development*, had the feedback contained explicit assistance to help him understand the word 'broaden'. Evidence for this comes from Extract 10, which shows that Student 1 was aware that the phrase "broaden our view" was key to answering the question. However, in this instance, the assistance necessary to help Student 1 was not available. With reference to Bernhardt's *Compensatory Model* (Bernhardt, 2005, 2010) it is interesting that Student 4 was able to draw on knowledge sources in addition to the feedback to compensate for a deficiency in L2 vocabulary, whereas Student 1 was not. The meaning of "broaden" was not given directly by the feedback, but from Extracts 7 and 8 we see that Student 4 was able to determine its meaning in order to answer Question 2. In contrast, although Student 1 answered the question correctly at the second attempt, this was due to guesswork. The combination of the elaborative feedback and his existing knowledge sources were insufficient to help him overcome the comprehension problem posed by the word "broaden".

## **Location**

As seen from Table 4.16 above, the feedback helped learners to answer a question correctly by assisting them in finding the location of the answer in the text on three occasions. An example of this is shown in Extracts 11 and 12 below, in which Student 1 successfully utilizes the elaborative feedback provided, when answering Question 6.

In Extract 11 below, Student 1 reads Question 6 and then carefully reads and rereads Paragraph 5 before selecting 'Not Given' at the first attempt. On reading the elaborative feedback he is surprised to discover that Paragraph 8 contains the information relevant to answering the question. He then carefully reads all of Paragraph 8 before successfully answering Question 6 at the second attempt.

### Extract 11: Successful Location Think-aloud

S1: *[Reads Question 6 aloud under his breath while moving the mouse pointer over the question wording] “A doctor following a pattern of holistic treatment will give a treatment that tries to strengthen the body’s resistance to disease and remove poisons from the body”. [Moves mouse pointer to the part of Paragraph 5 that contains information partly related to the question but not relevant to finding the answer. Some inaudible muttering under his breath as he reads the second half of the paragraph. Scrolls briefly down to Paragraph 6 then returns the mouse pointer to Paragraph 5. Selects ‘Not Given’ and then ‘Check’ to bring up the following feedback, which is visible for about 3 seconds]:*

**“Incorrect. Read Paragraph 8 again. What effects will the treatment prescribed by a holistic doctor have?”**

S1: Oh. Paragraph 8! *[Moves the mouse to Paragraph 8 and hovers the cursor over the entire paragraph as he reads quietly under his breath. Selects ‘True’ and then ‘Check’ to bring up the following feedback, which is visible for about 6 seconds and which he reads under his breath]:*

**“Correct: In Paragraph 8 the text states that the treatment prescribed by a holistic doctor “will strengthen the body’s natural healing resources and resistance to disease, and it will remove any harmful toxins.”**

S1: OK.

After analysing Extract 11, my initial impression was that the feedback had clearly helped Student 1 locate the portion of the text relevant to answering the question. He had read Paragraph 5 carefully, believing erroneously that it contained the information relevant to Question 6. On receiving the feedback he then read Paragraph 8 and was able to answer the question correctly. This interpretation is confirmed during the recalls session, as shown below in Extract 12. Extract 12 clearly shows that Student 1 was reading the wrong paragraph and prior to reading the elaborative feedback was unaware that Paragraph 8 contained the information required to answer the question correctly. Not only did Student 1 acknowledge that the feedback had helped him, he was able to highlight the key information in the text, indicating that his second, correct attempt at Question 6 had not been due to guesswork.

### Extract 12: Successful Location Recall

R: So Question 6, could you look at that please?

S1: Question 6?

R: Right, first of all you put 'Not Given'. Why did you put 'Not Given'?

S1: Because here. I read I start to read about the holistic healing [*indicating paragraph 5*]. I find that "doctors follow this approach believe that mind and body" so I start to read here and I don't read anything about this [*indicating question six*] and then I see that there are more paragraphs and I read Paragraph 6 and I see Dr Murray and I think they didn't talk about this. So I thought it's in this paragraph only [*indicating paragraph 5*] so I just put 'Not given'.

R: Then you checked.

S1: When I checked I didn't read what they talk about here [*indicating the second part of the elaborative feedback*] I just read "Paragraph 8".

R: Because you knew that you had read the wrong paragraph, yeah?

S1: Yes

R: Ok, and how did you find the answer?

S1: In paragraph 8 "the treatment will not" ... [*searching for the relevant part of the text*] "it will strengthen the body's natural healing resources and resistance to disease, and it will remove any harmful toxins that may have accumulated in the body". So it's true. [*Bringing up feedback*].

R: Did it help you at all, the feedback then, or not?

S1: Yes, very helpful.

## Confirmation

In addition to the location and rephrasing help that the elaborative feedback was seen to provide in the second round of think-aloud protocols, a new category emerged for the help provided by feedback following a correct response: confirmation. In Round 1 the participants did not read the elaborative feedback after a correct response, reading only "Correct". The fact that they read the feedback on virtually every occasion in the second round gave rise to the use of feedback to confirm understanding. This is exemplified below.

In Extract 13, Student 3 reads Question 2 under his breath and then reads the part of the text containing the answer for approximately 20 seconds before selecting the correct response at the first attempt. On checking, he reads the elaborative feedback under his breath before closing it. My initial interpretation was that the elaborative feedback was

not helpful as an aid to comprehension as it was not needed in this case. However, Student 3 suggested that the feedback had been helpful, as shown in Extract 14, which was taken from the follow-up recall session.

#### **Extract 13: Successful Confirmation Think-aloud**

*S3: [Reads Question 2 aloud under his breath while moving the mouse pointer over the question wording] “According to Dr Murray Clay, at the moment our view of health is too narrow”. [Moves mouse pointer over to the scroll bar and scrolls down to second half of Paragraph1, which contains the information relevant to finding answer. After approximately 20 seconds with no further mouse pointer movement or audible reading, moves the mouse pointer back to the question and selects ‘True’, and checks to receive the following feedback, which is visible for approximately 8 seconds and which he reads under his breath]:*

**“Correct. In Paragraph 1 Dr Clay is quoted as saying “We need to broaden our view of health to include social, individual and even ecological dimensions.””**

In Extract 14 below, we see that Student 3 feels that the elaborative feedback helped him to understand the text better by confirming his reason for selecting the correct answer. Although no additional linguistic information is provided by the feedback, Student 3 feels more confident about his choice after having it confirmed.

#### **Extract 14: Successful Confirmation Recall**

R: Right, can we go to Question 2 now, please? OK. You got this one correct first time, yeah?

S3: Yeah

R: OK. Now when you got it correct you, you read the feedback [*clicking ‘Check’ to show the feedback*]. Did you read all of it?

S3: Yeah?

R: Why did you do that?

S3: Because I want to confirm I understand the paragraph.

R: OK [*indicating feedback*]. Did this help you confirm?

S3: Yeah

R: How did it help?

S3: Because the answer is the same of the paragraph. There is a link between the feedback and the paragraph.

R: OK, and it helps you understand the text?

S3: Yeah

R: OK.

## 4.7 Discussion

With regard to Research Question 1, the quasi-experiment found no significant effect for feedback type, with the result of the ANCOVA producing  $F(1, 55)=2.11, p=.152$ . This lack of a significant effect is consistent with the findings of Clariana (2000), Mory (1994), and Murphy (2007), with the latter study being the most relevant to this thesis, given that it too was an investigation of the effect of elaborative feedback on L2 reading comprehension. As for Research Question 2, the second quasi-experiment found no significant effect for strategic instruction in the use of elaborative feedback on its usefulness as an aid to reading comprehension, with the resultant ANCOVA producing  $F(1, 54)=.163, p=.163$ .

One possible reason that the findings of the quasi-experimental designs were not significant was that the test items were too difficult, thus reducing the effectiveness of the feedback. Given that the texts for the practice stages and post-tests were the same, it is interesting that from Question 14 of both versions of Survey 2 (see Table 4.13 above) we see that the questions in the post-tests were seen as more difficult than those in the practice exercises by members of both TG2 and CG2. It may be that although the feedback helped with text comprehension, the test items themselves were beyond the level of some students. This would seem to be supported by the low average scores obtained by both the treatment and control groups in both post-tests, where the mean scores were approximately 50%.



Given the above, it may be that multiple-choice tests were not the best way to measure text comprehension. As we saw in 2.3 above, Brantmeier et al. (2011) suggested that recall tasks might be more sensitive to differences in meaning extraction than multiple-choice tasks. The qualitative analysis of both versions of Survey 2, in 4.6.2.4 above, found a distinction between text comprehension and task completion. The former suggested that elaborative feedback helped participants understand the text, while the latter indicated that it also helped to clarify the meaning of the associated questions, and helped with the location of the correct answers. In the matching question pairs design utilised in both quasi-experiments, it is possible that the students had difficulty in interpreting the meaning of the post-test questions, which prevented them from displaying their greater understanding of the text following the practice exercise containing elaborative feedback. Therefore, from a purely quantitative standpoint, both hypotheses can be rejected. However, a large amount of evidence from the supplementary data lends support to both the usefulness of elaborative feedback and to the importance of strategy instruction.

With reference to the first round of think-aloud sessions, the results of the first quasi-experiment are partially explained by the participants' limited use of the elaborative feedback. From 4.6.2.3 we saw that the students answered a total of 30 questions during the first round of think-aloud protocols, yet only read the elaborative feedback on 4 occasions. One student made use of the elaborative feedback on a single occasion, while another utilised it on three occasions. Given this situation, the elaborative feedback could only have had an effect on the reading comprehension of one third of the participants. What is interesting is that on the four occasions that the elaborative feedback was read, it was deemed by both the participant and by me as the researcher to have helped with text comprehension. This suggests that elaborative feedback can assist with reading comprehension if it is read. Reasons why the feedback was not read on many occasions prior to the strategy instruction sessions are discussed later in this section.

It is also interesting to note that the participant who scored higher on Pre-test 1 than the other five volunteers, and who had been selected as a higher ability student, made the most use of the elaborative feedback in the first round of think-aloud protocols. The only

other participant to make any use of the elaborative feedback was Student 4, who had the second highest score and who had also been selected as a higher ability student. This is perhaps not surprising, given the findings of Amer et al. (2010), Phakiti (2003), Purpura (1999) and Song (2005) amongst others, that higher and lower ability students differ with regard to strategy use, and those of Akyel and Ercetin (2009) and Konishi (2003), who found that while many of the strategies employed in an online environment mirror those used when reading printed text, additional strategies are also used as a result of the inherent properties of hypermedia.

The first round of think-aloud protocols and retrospective recall sessions suggest that higher-level readers were more likely to make use of the elaborative feedback than lower-level readers within the context of the current study. The scores on Pre-test 1, in combination with the findings from Survey 1 and the first round of interviews, provide some insight into the reading attitudes and ability levels of the participants.

As seen in 4.6.1.1 above, the participants were relatively low-level L2 readers. The mean score of the participants on Pre-test 1 ( $M=14.09$ ,  $SD=4.71$ ) indicates that the participants were, on average, modest users of English. Despite this, the results of Study 1 Survey 1 suggest a positive attitude towards reading in English and towards reading online. Unlike the participants in the studies by Annand (2008), Bodomo, Lam and Lee (2003), Hasaskhah (2013) and Tseng (2010), the participants in this study had an overall preference for reading online, rather than printed, materials. As in Cumaoglu et al. (2013), ease of access was seen as one of the benefits of electronic texts. However, in contrast to the findings of Cumaoglu et al., there was no difference in the perceived difficulty level of reading in the two media.

These same sources of data also illustrate the small amount of time that the respondents reported spending on reading in both English and Arabic. Only 24% spent more than 2 hours per week reading English online, with the figure equivalent for reading English from paper a mere 7.5%. The amount of time spent reading Arabic online was slightly higher, but very little Arabic reading was done from paper. These findings were not altogether unexpected, despite the fact that the participants were all full-time students in a tertiary-level institution. As mentioned in the introduction in Chapter 1, Donaghue and Thompson (2014) note the relatively low level of reading ability both in

L1 Arabic and L2 English of students at a tertiary institution in the UAE. This low level was also reflected in the country's population as a whole. We saw in 2.2.1 that the *Compensatory Model* of L2 reading (Bernhardt, 2005, 2010) stresses the importance of both L1 reading and L2 language knowledge as determiners of L2 reading. The cohort in this study had moderate levels of L2 reading ability and the relatively low amount of reading they reported undertaking in Arabic, alongside the findings of Donaghue and Thompson (2014), who studied a very similar student population, suggests that their L1 reading ability was also limited.

As a point of comparison, Grove (2012) reported that the average university student in the United Kingdom spent approximately 11.4 hours per week using online social networking sites, 8.6 hours per week studying online, and another 7 hours per week accessing sites for personal interest. Furthermore, an average of 4.9 hours per week was spent in the library. Like the participants of the current study, this would indicate that more time is spent reading online than from books or other paper-based materials. However, the UK students spent a far greater amount of time engaged in reading than the respondents in this study. This highlights the importance of context in studies of L2 reading. Had the participants in the current study had higher levels of reading ability in both their L1 and L2, might they have made more use of the elaborative feedback prior to strategy training? Murphy (2007) did not report any issues related to students ignoring the elaborative feedback despite the fact that only a brief overview of the materials was provided to the participants.

So, why did the lower-level participants in this study not make any use of the potential support provided by the elaborative feedback prior to the strategy instruction sessions? Ketabi et al (2012) found that learners may not take advantage of support features within hypertexts if they are unaware of the potential benefits offered, which lends support to the contentions of Anderson (2003), Hanson-Smith (2003) and Tseng (2010) that teachers need to guide students in the use of electronic texts, and to that of Leu (2002) that a simple transfer of strategies from a paper-based to an online environment cannot be assumed. As McNeil (2012) argues, the use of strategic knowledge to overcome comprehension difficulties is central to both the *Compensatory Model* (Bernhardt, 2005, 2010) and to his *Extended Compensatory Model* (McNeil, 2012). As many of the participants lacked the strategic knowledge or awareness to make use of the

elaborative feedback prior to instruction, it is perhaps not surprising that it had little effect on their reading comprehension. The second round of interviews highlighted the fact the participants in the current study were not aware of the potential usefulness of the elaborative feedback prior to the strategy instruction lessons.

Following the lessons on the use of elaborative feedback, the pattern of use in the second round of think aloud protocols was markedly different from that in the first round. In 4.6.2.6 we saw that the 6 participants answered a total of 34 questions and read all of the elaborative feedback on 33 occasions, with one of the participants reading part of the feedback on the other occasion. Furthermore, of the 13 questions that were answered incorrectly at the first attempt, the elaborative feedback was seen to assist the participants on 8 occasions. Therefore, not only was there evidence that the participants use of feedback changed dramatically as a result of the strategy instruction, there was also strong support for the effect of elaborative feedback on L2 reading comprehension. While it is likely that my presence influenced the behaviour of the participants, it was apparent that the elaborative feedback could enhance comprehension when used strategically. The feedback was shown to help learners to locate an answer via directive feedback, and to understand previously incomprehensible questions or parts of the text through rephrasing. In addition, following a correct response, the feedback also assisted comprehension through the provision of confirmation.

The findings from the think-aloud sessions were supported by those from the surveys. The high scores for elaborative feedback in Part 2 of both versions of Survey 2 (please see 4.6.2.4 above) have implications for Research Question 1, as students clearly felt the feedback was helpful, even if the findings from the quasi-experiments did not support this. Equally, for Research Question 2, it appears that students felt that the feedback was useful whether or not they received strategy instruction in its use. This might help explain the lack of effect found for strategy instruction from the second quasi-experiment conducted at the end of the study.

From Questions 20 and 21, we see that students in CG2 and TG2 liked the elaborative feedback, with virtually no suggestions for improvement. Reasons for liking the feedback were that it helped students to find the answer, showed them where to look for the answer or what to focus on without giving the answer, and also helped them

understand the text. With regard to Research Question 1, this would tend to suggest that elaborative feedback could play a role in improving reading comprehension. However, some limitations on the effectiveness of the feedback became apparent from the think-aloud sessions, and from the survey responses. For example, during the think-aloud sessions there were occasions when a participant was not helped even after having read the feedback, because insufficient scaffolding or modification of input was provided. Sometimes the vocabulary utilised in the feedback was not accessible to the students, as illustrated in 4.2.6.5, leading them in some instances to seek assistance from a friend. As Van den Branden (2000) found, the pre-modification of input may only help learners at a certain level, whereas the types of negotiation for meaning that may take place in discussions may be less sensitive to ability levels.

Overall, the findings from this study lend support to the use of elaborative feedback as an aid to reading comprehension, but only limited support for the usefulness of strategy instruction to train learners in its use. Although the findings from the quasi-experiments were not significant, the combined findings from the surveys, interviews and think-aloud sessions provide a large amount of evidence for the usefulness of elaborative feedback in enhancing reading comprehension. However, this depends on learners having both the strategic knowledge to make use of the feedback, and the motivation to do so.

With regard to strategy instruction, the study showed that the combination of access to online reading exercises and strategic instruction in the use of the elaborative feedback contained within them resulted in increased, more effective use of the feedback. However, it is possible that access to the materials alone might have provided similar results by promoting greater familiarity with the use of elaborative feedback. The responses to Study 1 Survey 2, in addition to the second round of think-aloud protocols and follow-up interviews, indicated that the strategy instruction lessons were considered useful by the treatment group and resulted in modified behaviour. However, the control group, who had been given access to the online exercises without receiving any strategic instruction, also reported finding the elaborative feedback useful. Therefore, no conclusive evidence for the effects of strategy instruction can be claimed.



## **Chapter 5: Elaborative Feedback and Computer-mediated Synchronous Discussion**

### **5.1 Introduction**

The motivation for the study undertaken in the current chapter is to investigate whether post-reading computer-mediated synchronous discussion (CMSD) activities that take place after L2 readers have completed an online reading exercise containing elaborative feedback can enhance reading comprehension. Such support could be useful for students studying away from the classroom, either in distance learning contexts or in more traditional contexts while working on homework or other assigned tasks.

The study undertaken in Chapter 4 indicated that elaborative feedback could act as a support to L2 reading comprehension but that there were limits to its usefulness. Firstly, it is vital that the reader has sufficient strategic knowledge in order to know how to utilize the feedback effectively. Secondly, the language and concepts contained within the feedback need to be accessible to the learner. Given the ability of CMSD to encourage negotiation for meaning, it is hypothesized that collaborative post-reading discussions may offer additional support in comprehending reading texts and in making more effective use of the elaborative feedback contained within reading comprehension exercises.

We saw in 3.4 above that text-based computer-mediated synchronous discussions (CMSD) have been shown to offer a number of benefits for SLA and L2 reading development. In addition to being more learner-centred and resulting in more equal participation levels (Chun, 1994; Warschauer, 1996a), CMSD activities can provide large amounts of meaning-focused reading practice (Kelm, 1992). However, the majority of L2-related studies of CMSD to date have focused on grammatical development, strategic competence and socio-cultural competence (Sauro, 2011). In comparison, far fewer studies have been undertaken on the use of CMSD to support L2 reading comprehension, despite the potential CMSD offers for promoting negotiation for meaning. Two studies of particular relevance are those of Fernandez Garcia and Arbelaiz (2002) and Murphy (2010), which were discussed more fully in 3.4.2 and 3.4.3 respectively.

Fernandez Garcia and Arbelaiz (2002) investigated the use of post-reading CMSD activities and found that all but one of the discussions produced instances of negotiation for meaning, with the vast majority being focused on lexical items. The study suggested that through the use of CMSD the learners had benefited from modified input that had resulted in previously incomprehensible parts of the text being rendered comprehensible. Murphy (2010) investigated the use of CMSD discussions in combination with reading comprehension exercises containing either elaborative or knowledge of response feedback. He found that elaborative feedback was an effective means of promoting negotiation for meaning, exploratory talk and quality interaction in CMSD dyads.

This current study differs from those of both Fernandez-Garcia and Arbelaiz (2002) and Murphy (2010) in several important ways. The quasi-experimental study described below tests for the effects on reading comprehension of a post-reading CMSD activity administered immediately after completion of a reading comprehension exercise. This contrasts with Fernandez-Garcia and Arbelaiz (2002), who examined discussion logs for evidence of negotiation for meaning without utilising an experimental design. In addition, their study included a delay between reading the text for homework and discussing the text in a follow-up CMSD activity. The current study also differs from Murphy (2010), whose quasi-experimental design compared the use of two feedback types (elaborative and knowledge of correct response) in combination with CMSD. In Murphy's study, all the participants took part in a CMSD dyad while completing an online reading exercise containing one of two feedback types. In the current study, all the participants first completed individually an online reading exercise containing elaborative feedback. Following this, the treatment group alone took part in a CMSD activity, while members of the control group were given additional time to work independently on the reading practice exercise.

In order to explore the effect on L2 reading comprehension of post-reading CMSD discussions, and to examine the usefulness of elaborative feedback as a support to these discussions, this chapter will investigate the following two research questions.

**Research Question 3: Do post-reading computer-mediated synchronous discussions assist learners with L2 reading text comprehension?**



Research Question 4: Is elaborative feedback a useful support to post-reading computer-mediated synchronous discussion in promoting L2 reading comprehension?

## **5.2 Method**

For Research Questions 1 and 2 in Chapter 4, a mixed-methods design was employed (see 4.2). I decided to follow a similar approach in addressing Research Questions 3 and 4, with the use of a quasi-experiment supported by questionnaires, interviews and online chat logs. However, given the lack of significant findings from the quasi-experiments in the previous chapter, I attempted to strengthen the design in the current study by increasing the sample size for the pre- and post-tests that formed the quasi-experiment. In addition, I elected to use reading tests of a lower difficulty level than those described in Chapter 4, in response to some of the concerns raised in 4.7 above with regard to the difficulty level of the tests used in the first study. While some more general concerns were also raised with regard to the ability of a multiple-choice test to measure reading comprehension, it is a widely used format and was selected again for this study due to reasons of practicality, and due to the fact that the participants are familiar with this test format.

## **5.3 Participants**

The participants for the main part of the study were 21 adult students of L2 English studying full-time in the second semester of a Higher Diploma/Bachelor's Degree program in Engineering at Ras Al Khaimah Men's College, one of the Higher Colleges of Technology in the UAE. At the time of the data collection period (March to May 2010), the students were all preparing for the IELTS examinations, which they would take at the end of semester 4 of their studies. They were required to obtain an overall band score of 5.5, with no score below band 5, in order to meet the Higher Diploma graduation requirement and progress into the final year of the Bachelor's program. The students were all members of a pre-existing class, 2TA.

In addition, 181 students of a similar profile from other pre-existing classes at Ras Al Khaimah Men's and Women's Colleges joined the members of 2TA in participating in the quasi-experimental study that took place in Weeks 1 and 2 of the data collection period. The male students were in semester 2 of a Higher Diploma/Bachelor's Degree program in Business, while the female students were in Semester 2 or Semester 4 of a Business, Education or Applied Media program at the same level. All the students agreed to take part in the study, but 11 were absent from Pre-test 3 and 44 were absent from Post-test 3.

In addition to my role as researcher, I was the Program Chair of General Education at Ras Al Khaimah Men's College and in that capacity I was responsible for the management of all English Language courses there. I was also teaching the students of 2TA for four hours per week.

### **5.3.1 Treatment and Control Groups**

Two groups were formed in order to investigate Research Questions 3 and 4. Treatment Group 3 (TG3) and Control Group 3 (CG3) were created by randomly assigning each of the 202 participants described above in 5.3 to one of the two groups. Members of TG3 were given access for 30 minutes to an online reading text containing elaborative feedback, which was followed by participation in a synchronous computer-mediated discussion about the text. In contrast, the participants in CG3 were provided with access to the same reading text and elaborative feedback for 45 minutes, without participating in a discussion. This assignment, along with a fuller description of the treatment and control conditions, is described in more detail in 5.5.1, and a summary of the groupings and the treatment and control conditions is provided in Table 5.1 below.

## **5.4 Instruments and Materials**

The use of a mixed-methods approach led to the development of a range of materials for use in the study. Some of the materials were developed to gather quantitative data only, such as Pre-test 3, which is described later. Others were designed to gather both qualitative and quantitative data, such as the surveys, which included both Likert-scale

and open-ended questions. All the materials used in the study are described below, along with a rationale for their design and use. An overview of the materials and assessments used and the types of data they were designed to gather is shown below in Table 5.1.

*Table 5.1: Materials and Assessments Used and Their Purpose*

<b>Week</b>	<b>Materials/Assessments/ Procedures</b>	<b>Purpose/Data Collected</b>	<b>Research Question (Q)</b>
1	Pre-test 3 (Treatment Group 3 and Control Group 3)	Pre-test scores for all students	Q3, Q4
	Study 2 Survey 1	Opinions about Reading and Chat (all participants)	Q3, Q4
2	Reading Practice Exercise 3 lasting 30 minutes with elaborative feedback (all participants) followed by:	Preparation for Post-test 3	Q3, 4
	Treatment Group 3: Post-reading computer-mediated discussion/Control Group 3: 15 minutes extra for individual reading	Chat logs	Q3, Q4
	Post-Test 3 (Treatment Group 3 and Control Group 3) based on text used in reading exercises.	Post-test scores for all participants	Q3
	Short survey Study 2 Survey 2 (Chat Version for Treatment Group 3, and No Chat Version for Control Group 3)	Attitudes to the reading practice exercise and feedback (all participants) and to the computer-mediated discussion session (Treatment Group 3 only)	Q3, Q4
3-6	4 sessions with Class 2TA: online reading exercises with elaborative feedback plus accompanying computer-mediated discussions sessions + post-tests	Computer-mediated discussion logs	Q3, Q4
		Classrooms logs/observations/recordings	Q3, Q4
7	Study 2 Survey 3	Study 2 Survey 3	Q3, Q4
	Interviews with 6 volunteer students	Participants' perceptions of elaborative feedback and computer-mediated discussions.	Q3, Q4

### **5.4.1 Pre-test 3**

In order to measure the participants' online reading ability at the start of the study, a 40-question online reading test was created. This was adapted for online delivery from O'Sullivan & Lindeck (2000, pp. 50-57) using the same procedures utilized to create Pre-tests 1 and 2 described earlier in 4.4.2. All the questions were multiple-choice items, which meant that automated scoring of responses could be undertaken using the quiz tool in *Blackboard Vista*.

The test was selected as, due to the significantly shorter texts it contained, it was considered to be easier than Pre-tests 1 and 2, which were both adapted from tests designed to offer practice for the IELTS Academic Reading Module. In contrast, Pre-test 3 was adapted from an IELTS General Training Reading Module practice test. Although the tasks were very similar in nature to those found in Pre-test 1 and 2, the texts were on general, non-academic topics. The three texts had a combined length of 1,246 words, as compared with 1893 and 2060 words for Pre-test 1 and Pre-test 2 respectively. The reasoning behind selecting a slightly easier test was to generate a broader range of scores that might help discriminate better at the L2 reading proficiency level of the students.

### **5.4.2 Reading Practice Exercise 3**

Reading Practice Exercise 3 was designed using the same methods and technologies used to create Reading Practice Exercises 1 and 2, described earlier in 4.4.3. It was based on one section of a published reading practice test for the IELTS General Training Module (Gould & Clutterbuck, 2005, pp. 34-38). 15 multiple-choice items were written to test the same parts of the text that would be assessed in Post-test 3, described below. In this way, the relationship between Reading Practice Exercise 3 and Post-test 3 was identical to the relationships between the reading practice exercises and post-tests described in 4.4.3 and 4.4.4 above. (See Appendix V for the complete list of questions from Reading Practice Exercise 3, and Appendix II for the questions from Post-test 3).

### **5.4.3 Post-test 3**

Post-test 3 was developed in the same manner as Post-tests 1 and 2 described in 4.4.4. It was adapted for online delivery from Gould & Clutterbuck (2005, pp. 34-38) and contained seven multiple-choice and eight short answer questions. The test was based on one reading text of 463 words that formed one section of a reading practice test for the IELTS General Training Module. This made the text significantly shorter than the 770-word and 656-word texts used in Post-tests 1 and 2.

### **5.4.4 Reading Practice Materials and Reading Practice Tests**

In addition to the tests above, use was made of Reading Practice Materials 1 to 4 and Practice Tests 1 to 3 (see 4.4.6). One further test was added, Practice Test 4, to assess the materials in Reading Practice Materials 4. These were uploaded to the Blackboard site to form the basis of the reading and chat sessions described below in the procedures section.

### **5.4.5 Study 2 Survey 1**

Study 2 Survey 1 was based on Study 1 Survey 1, described in 4.4.1 above. The aim of the original eight-item survey was to gather background information on the reading habits and attitudes to reading of the participants in Study 1 in Chapter 4. Four additional Likert-scale and two open-ended items were added to the survey to investigate the participants' attitudes towards, and use of, online chatting (CMSD). This resulted in a total of 11 Likert-scale and three open-ended items, which were uploaded to *Blackboard Vista* using the *Respondus* test and survey creation tool mentioned in 4.4.1. As with Study 2 Survey 2 and Study 2 Survey 3 below, the language of the new items was checked for ease of comprehensibility by 12 students with a similar linguistic profile to that of the participants in the study. On this occasion it was not necessary to make any changes to the survey items.

#### **5.4.6 Study 2 Survey 2 (Chat and No Chat Versions)**

Study 2 Survey 2 was produced in two versions, one for the treatment group, who participated in the chat session (Survey 2 Chat) during the quasi experiment, and one for the control group (Survey 2 No Chat). Survey 2 Chat contained three Likert-scale questions and nine open-ended questions designed to investigate the participants' attitudes to the reading practice exercises, the elaborative feedback within the exercise and the chat session. Survey 2 No Chat contained two Likert-scale question and six open-ended questions, as the items referring to the chat session were removed from this version.

#### **5.4.7 Study 2 Survey 3**

Study 2 Survey 3 contained eight Likert-scale and six open-ended questions and was administered only to the students who took part in the four lessons focused on the use of chat described below in 5.5. It was designed to investigate their opinions with regard to the elaborative feedback, the online reading exercises and practice tests, and the online chat sessions.

### **5.5 Procedures**

The following data collection procedures were used in order to address the two research questions. A timeline of the collection procedures is provided in Table 5.1 above. As with Study 1 in Chapter 4, a mixed methods approach was used. For greater clarity, the quasi-experimental procedures for Research Question 3 will be described first. This will be followed by a description of the supplementary data collection procedures that were designed to gather both qualitative and quantitative data.

### **5.5.1 Quasi-experimental Procedures for Research Question 3**

Research Question 3: Does post-reading computer-mediated synchronous discussion (CMSD) assist learners with L2 reading text comprehension?

#### **5.5.1.1 Sampling, Assignment and Pre-test**

202 students from 10 pre-existing classes at Ras Al Khaimah Men's and Women's Colleges agreed to take part in the study. During Week 1 of the study, I visited all the classes in order to administer Pre-test 3, which was delivered via *Blackboard Vista* following the procedures outlined for Pre-test 1 in 4.5.1.1. As with Pre-test 1, the exam had a 60-minute time limit, after which it was scored automatically. Of the 202 volunteers, 187 completed Pre-test 3.

#### **5.5.1.2 The Practice Stage: Treatment and Control Conditions.**

In Week 2, the students were randomly assigned to the treatment group (TG3) or the control group (CG3) using the random group feature in *Blackboard Vista*. Members of TG3 were then asked to select a slip of paper with a number on, it from a box. The number indicated the chat room they should enter later in the lesson. Both groups were given access to a Reading Practice Exercise 3, described above in 5.4.2, consisting of an IELTS-type reading text with accompanying comprehension questions. The materials were made available for 30 minutes in class, via *Blackboard Vista*. After 30 minutes, the members of TG3 were asked to enter their online discussion room within *Blackboard Vista* and discuss with their partner any difficulties they had experienced with the questions. Members of CG3 were given an additional 15 minutes to work independently on Reading Practice Exercise 3.

In order to standardize the experience as much as possible for all participants, I visited all the classes and demonstrated how to access and use the materials and the chat rooms. I also explained that a follow-up test (Post-test 3) would follow the practice exercise, and informed the participants that the test would be based on the same reading text that was used in the practice exercise. I was assisted by the class teacher of each

class to ensure that the participants were on task. With my own class, 2TA, I was assisted by a fellow instructor. For all classes, I personally assisted the members of TG3 to select a random number for the chat room and was available to deal with any technical issues.

### **5.5.1.3 The Post-test**

Immediately following the treatment stage, all members of TG3 and CG3 took Post-test 3, described above in 5.4.3, which was made available for 20 minutes via Blackboard Vista. 158 completed Post-test 3, seven of whom had also missed Pre-test 3.

### **5.5.1.4 Variables**

In this design the independent variable is 'participation in a post-reading chat session' and the two levels are 'participation' and 'no participation'. The dependent variable is performance on Post-test 3 and the covariate is performance on Pre-test 3. Among the possible confounding variables are time spent on the practice stage, attitudes to online reading, and degree of participation in the chat session.

## **5.5.2 Supplementary Procedures for Research Questions 3 and 4**

In addition to the quasi-experimental procedures outlined above, questionnaires, chat logs and interviews were used to collect supplementary data for both quantitative and qualitative analysis.

### **5.5.2.1 Surveys**

In Week 1, immediately following completion of Pre-test 1, all the participants were invited to respond to Study 2 Survey 1 described above. The survey was delivered via Blackboard Vista and the procedure followed was identical for that described for Study



1 Survey 1 in 4.5.3.1 apart from the fact that it was made available immediately after the pre-test. In total, 182 of the 187 participants who completed Post-test 3 responded to the survey.

In Week 2, Study 2 Survey 2 Chat was made available to TG3 immediately after they had completed Post-test 3. At the same time, CG3 were invited to complete Study 2 Survey 2 No Chat. The procedures followed were similar to those for Study 1 Survey 2 in 4.5.3.1 above. Of the 158 participants who completed Post-test 3, 47 completed Survey 2 Chat and 52 responded to Survey 2 No Chat.

In Week 7, the members of 2TA were invited to respond to Study 2 Survey 3, which was again made available via *Blackboard Vista*. 18 of the 21 participants completed the survey.

#### **5.5.2.2 Online CMSD Logs**

During Weeks 3 to 6, following the delivery of Post-test 1, students from Group 2TA were given additional online practice IELTS readings containing elaborative feedback (Reading Practice Materials 1 to 4), followed by CMSD activities in which they discussed the text and the exercises. The CMSD sessions were followed by post-tests (Practice Tests 1 to 4). The tests acted primarily as a motivational tool to encourage active participation in the CMSD sessions and the results were not analysed for statistical hypothesis-testing purposes. The CMSD sessions were logged and analysed in relation to Research Questions 3 and 4. In addition, some class time was used to discuss the use of the elaborative feedback and to talk about strategies that participants might use when exploiting it. However, no attempt was made to structure the CMSD sessions or to assign roles to the participants. As Beatty (2010) notes, there is some dispute over the extent to which collaborative activities should be structured by the instructor, and to the amount of training that should be offered. The aim of the current study, unlike the study in Chapter 4, was not to attempt to change behaviour via strategy instruction, but to explore the way CMSD was used by the participants without explicit instruction in its use.

### 5.5.2.3 Interviews

In addition to the surveys and CMSD logs, six students volunteered to be interviewed in Week 7 in order to offer their perceptions of the usefulness of the CMSD sessions, the reading materials and the elaborative feedback. Unfortunately, only four of the six were able to take part in the interviews, reducing the amount of data collected.

## 5.6 Data Analysis and Results

### 5.6.1 Research Question3: Does post-reading computer-mediated synchronous discussion (CMSD) assist learners with L2 reading comprehension?

#### 5.6.1.1 Quantitative Analysis: The Quasi-Experiment

##### Pre-test 3

Pre-test 3 was administered to 11 intact classes of Higher Diploma students, 3 from Ras Al Khaimah Men's College, and 8 from Ras Al Khaimah Women's College. Of the 202 students who agreed to participate in the study, 187 completed Pre-test 3 while 11 students were absent. Prior to the administration of the pre-test, the students were randomly assigned to either the treatment group (TG3) or the control group (CG3). From TG3, 96 out of 101 participants completed the test, while from CG3 the number was 91. The results of the 60-minute, 40-item online reading test were exported from *Blackboard Vista* and analysed using *SPSS*. The descriptive statistics for the test showing results by group are shown below in Table 5.2

Table 5.2: Scores on Pre-test 3 by Group

Group	M	SD	n
TG3	25.26	5.26	96
CG3	26.77	4.39	91
Overall	25.99	4.90	187

As can be seen from Table 5.2, the mean scores of the two groups appear similar, with TG3 scoring a mean of 25.26 and CG3 scoring 26.77. The mean for the two groups combined was 25.99.

Given the difference in the number of participants from the two groups who took Pre-test 3, it was decided that there was no basis on which to pair the scores from the treatment and control groups (Kinnear & Gray, 2006). A paired-samples t-test was therefore ruled out, even though the groups had been randomly assigned, and had yet to be exposed to either the treatment or control conditions. An independent samples t-test was therefore carried out to test the significance of the difference in the mean scores obtained on Pre-test 3. The independent variable was the group to which the participants had been assigned pre-treatment, with two levels, treatment and control. The dependent variable was performance on Pre-test 3. It indicated that there was a significant difference in the means between TG3 ( $M=25.26$ ,  $SD=5.26$ ) and CG3 ( $M=26.77$ ,  $SD=4.39$ ),  $t(185) = -2.123$ ,  $p < .05$ . However, the effect size was small ( $\eta^2 = .023$ ).

Given that there was a small but significant difference in the scores of TG3 and CG3 on Pre-test 3 despite the use of random assignment, it would be necessary to use an ANCOVA model to control for pre-existing differences in reading ability when analysing the results of the post-test, following the treatment.

### Post-test 3

Post-test 3 was completed by 158 participants from TG3 and CG3. The descriptive statistics for the 15-item test are shown below in Table 5.3.

Table 5.3: Scores on Post-test 3 by Group

Group	M	SD	n
TG3	5.71	2.51	81
CG3	5.62	2.68	77
Overall	5.67	2.58	158

As with Pre-test 3, the mean scores of the two groups appear to be very close, with TG3 scoring 5.71 and CG3 5.62. However, this time it was TG3 who scored higher. On Pre-test 3, CG3 had performed significantly better than TG3, although the difference in means appeared small.

In order to test for statistical significance, an independent samples t-test was performed on the results of Post-test 3. It indicated that there was no significant difference in the means between TG3 ( $M=5.71$ ,  $SD=2.51$ ) and CG3 ( $M=5.62$ ,  $SD=2.68$ ),  $t(156) = -.225$ ,  $p=.823$ . The effect size was very small ( $\eta^2=.00032$ ).

The results of the t-test lead us to reject Hypothesis 3, which states that participation in a post-reading CMSD has a positive effect on reading comprehension. However, despite the use of random assignment to the treatment or control groups, there was a small but significant difference in the pre-existing online reading abilities of TG3 and CG3, as measured by performance on Pre-test 3. In addition, only 151 of the participants completed both Pre-test 3 and Post-test 3. In order to control for pre-existing differences, an ANCOVA was conducted using SPSS.

The independent variable was the participation in a post-reading CMSD, with two levels, 'participation' and 'no participation'. The dependent variable was performance on Post-test 3, and the covariate was performance on Pre-test 3. There was a linear relationship between Pre-test 3 and Post-test 3 scores for both the treatment and control groups, as assessed by visual inspection of a scatterplot. A preliminary analysis was run to evaluate the homogeneity-of-regression assumption. This showed that the interaction between the dependent variable and the covariate was not significant in predicting the independent variable,  $F(1, 147)=1.454$ ,  $p= .230$ . In addition, the standardized residuals of Post-test 3 were normally distributed for both TG3 and CG3, and for the overall model, as assessed by the Shapiro-Wilk test ( $p > .05$ ) and the Kolmogorov-Smirnov test

( $p > .05$ ). There was homoscedasticity, as determined by the visual inspection of a scatterplot, and homogeneity of variances, as assessed by Levene's test of homogeneity of variance ( $p = .861$ ). The conditions for running an ANCOVA were therefore met. Three outliers were detected in the scores for Post-test 3, with three members of CG3 scoring more than 3 standard deviations higher than the mean score. An ANCOVA was therefore run twice, with and without the outliers scores included.

The initial ANCOVA, with outliers included, indicated that, after controlling for performance on Pre-test 3, no significant difference in mean scores on Post-test 3 existed between the TG3 ( $M=5.71, SD=2.55$ ) and CG3 ( $M=5.59, SD=2.72$ ),  $F(2, 148)=1.778, p = .185$ . The effect size was small (partial eta squared= .012), with only 1.2% of the variance in scores on Post-test 3 accounted for by the treatment condition (participation versus non-participation in a post-reading computer-mediated synchronous discussion).

The second ANCOVA, with outliers removed, indicated that, after controlling for performance on Pre-test 3, no significant difference in mean scores on Post-test 3 existed between the TG3 ( $M=5.71, SD=2.55$ ) and CG3 ( $M=5.31, SD=2.38$ ),  $F(2, 145)=3.684, p = .057$ . The effect size was small (partial eta squared= .025), with only 2.5% of the variance in scores on Post-test 3 accounted for by the treatment condition (participation versus non-participation in a post-reading computer-mediated synchronous discussion). However, following removal of the outliers, the result approaches significance.

The results of both the t-test and the ANCOVA reject Hypothesis 3, which states that post-reading computer-mediated synchronous discussions (CMSD) assist learners with text comprehension.

### 5.6.1.2 Supplementary Data Analysis

#### Study 2 Survey 1

Study 2 Survey 1 was administered to the participants in the first week of the study, immediately after they had taken Pre-test 3. It was used to find out about their reading and chatting habits and their attitudes towards reading online and from paper. From Table 5.4 below, it can be seen that 182 of the 187 participants who sat Pre-test 3 completed Survey 1, although one participant did not respond to Questions 4 and 13. From Questions 1 to 4, it would appear that most of the participants spend more time reading Arabic than English and more time reading online than from paper. These results are similar to those found in Chapter 4 in the previous study. With regard to online chatting, the participants again spent more time chatting in Arabic than English, with almost 40% of the participants reporting that they spent no time at all on the latter. As for attitudes towards reading and chatting, the majority of participants liked reading English, and despite spending more time reading online, a larger number of respondents preferred reading English from paper. This is perhaps partially explained by the fact that over half of respondents felt that reading English online was more difficult than reading from paper. These results are in contrast to Study 1 in Chapter 4, where a majority of the students preferred reading online, and where there was a balance between the number of those who felt online reading was more difficult and those who found reading from paper more challenging. Although we saw that many participants did not spend any time at all chatting in English, more than 83% were of the opinion that it could help them to improve their language skills, and nearly 64% thought it could help them improve their reading skills. This suggests a positive attitude towards the use of chat as a tool for language development.

*Table 5.4 Results of Study 2 Survey 1*

	<i>M</i>	<i>SD</i>	<i>N</i>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Q1	3.55	.95	182	15.4%	39.0%	34.1%	8.8%	2.8%
Q2	2.69	1.26	182	10.4%	16.5%	24.7%	28.0%	20.33%
Q3	2.55	.92	182	9.3%	42.9%	35.2%	8.8%	3.9%
Q4	3.27	1.17	181	7.2%	19.9%	28.7%	27.6%	16.6%
Q5	2.39	.97	182	17.0%	41.2%	30.8%	7.7%	3.3%
Q6	2.77	1.13	182	11.5%	33.5%	30.2%	15.4%	9.3%
Q7	3.32	1.33	182	22.5%	29.1%	18.7%	17.6%	12.1%
Q9	2.11	1.19	182	39.6%	30.8%	13.7%	11.0%	5.0%
Q10	3.51	1.37	182	10.4%	15.9%	20.3%	19.2%	34.1%
Q11	4.32	.93	182	55.5%	27.5%	12.6%	2.2%	2.2%
Q13	3.75	1.11	181	29.3%	34.3%	24.3%	6.6%	5.5%

Questions 1, 2, 7, 11 and 13 used a Likert-scale: Strongly Agree=5, Agree =4, Neither agree nor disagree=3, Disagree=2, Strongly Disagree=1.

Questions 3, 4, 5, 6, 9 and 10 used a 5-point scale: None=1, Less than 1 hour=2, 1 to 2 hours=3, 3 to 5 hours=4, More than 5 hours=5

#### **Questions**

Q1. I like reading English.

Q2. I like reading English online more than reading from paper.

Q3: On average, how much time do you spend each week reading English online?

Q4: On average, how much time do you spend each week reading Arabic online?

Q5: On average, how much time do you spend each week reading magazine, newspapers or books in English?

Q6: On average, how much time do you spend each week reading magazine, newspapers or books in Arabic?

Q7. I find reading English online more difficult than reading from paper.

Q9. On average, how much time do you spend each week chatting online in English?

Q10. On average, how much time do you spend each week chatting online in Arabic?

Q11. I think chatting online in English can help me improve my language skills.

Q13. I think chatting online in English can help me improve my reading skills.

In addition to the Likert-scale items analysed below, three open-ended questions (8, 12 and 14) were included within Survey 1 to explore the reasons behind the participants' responses to Questions 7, 11 and 13.

## Questions

Q8. Please explain your answer to Question 7 (I find reading English online more difficult than reading from paper).

Q12. Please explain your answer to Question 11 (I think chatting online in English can help me improve my language skills).

Q14. Please explain your answer to Question 13 (I think chatting online in English can help me improve my reading skills).

## Relative Difficulty of Online and Paper-based Reading

In examining the perceived differences in difficulty between reading online and from paper, the responses to Question 8 were coded using the categories that had emerged from the analysis of the same question in Chapter 4 in both Study 1 Survey 1 and in Part 1 of Study 1 Survey 2. These were accessibility, comfort, strategy use and motivation. While no additional categories emerged from the analysis, new aspects related to each category did appear and are discussed below.

### Accessibility

In the previous chapter, two main aspects related to accessibility that were seen to have an impact on the relative difficulty of reading in online and paper-based environments emerged: the ease of accessing texts in the first place, and the accessibility or difficulty level of the language within them.

Study 2 Survey 1 above drew some responses that were related to the former point, ease of access, which did not arise in Chapter 4. These were related to problems associated with Internet technology that can have a direct impact on a reader's ability to access a text.

One respondent noted "*most of the time I have technical problems with using the computer*" (sic), while another stated that "*reading english online difficult because some websites are hard to find the informations and some pages are slow*" (sic).



The first quotation above is a general reference to technical problems, an issue that can be faced by students and teachers alike when using computer-assisted technology for language learning purposes. In contrast, paper-based texts are more predictable. The second response refers to slow loading web pages, which can be an issue both on campus and at home. Although Internet speeds are normally very fast on both campuses featured in this study, access speeds can be affected by fluctuations in the demand on the network. Similarly, access speeds in students' homes can vary greatly, with a resultant impact on their ability to access online texts.

## **Comfort**

As in the previous chapter, responses to Study 2 Survey 1 suggested that physical factors, such as fatigue and eyestrain, along with the degree of familiarity with paper-based or online reading, affected readers' comfort levels in the two media. In addition, the ability to concentrate in one or other medium was mentioned by a number of participants.

Several respondents to this survey noted that they struggled to concentrate when reading online. One noted that online reading was more challenging *"Because it is difficult to concentrate and it damages my eyes"*. In a similar vein, another stated: *"I hate reading online Because I feel difficulty to consenrate on screen"* (sic).

Others felt that concentrating was easier online. For example, one student wrote: *"I think reading online is better as I can concentrate more because I like to work on the computer for long hours and if I read from the papers it will confuse me"* (sic). While the physical factors such as fatigue and tiredness seem to be linked to inherent properties of the two media, familiarity and concentration seem to be more closely linked to individual learner differences.

## **Strategy Use**

The findings from Study 2 Survey 1 related to strategy use when reading in the two environments mirror those from Chapter 4 in many respects, although the balance was

different. Whereas the participants in Study 1 were split evenly in terms of the numbers feeling that reading online or from paper was more difficult, the majority of respondents in the current study found online reading more challenging. This was reflected in the comments they made.

The ability to highlight, underline or circle portions of the text was seen to be an advantage of reading from paper. As one commented:

1. *"With papers i can use a pencil, highlights the important points and erase what ever I want unlike the online reading" (sic).*

Another noted a preference for using a hand or pencil to aid reading:

2. *"Because I like top follow the words by my hand or a pencil. Sometimes I like to hilighte some of the words that I read. I don't like to watch the computer screen a lot" (sic).*

However, some still stated a preference for reading online, where rapid access to online translation tools, thesauruses and dictionaries was possible. For example, one student commented:

3. *"When I read online and I don't understand some words I can translate it fastly and know the meaning at the same time" (sic).*

As with comfort, while there are inherent differences between the two media in terms of the affordances they bring, personal preference and strategic knowledge appear to affect what is viewed as important in determining the use of reading strategies.

## **Motivation**

The responses that fell within the category of motivation contrasted somewhat with those that emerged in Chapter 4, where many participants considered online reading more interesting than paper-based reading. We saw from Question 2 (see Table 5.4

above) that more participants in the current study preferred to read from paper. This is reflected in some of the comments to Question 9a. One respondent stated:

1. *"Also, I feel that bored when I read English online" (sic).*

Although some reported choosing to read online under certain circumstances, they did not always enjoy the experience:

2. *"Also, there is one case that I read online when I don't have the magazine or newspaper but actually I get boring. In general I don't prefer reading online" (sic).*

However, others felt that interest levels depended more on the subject matter than the medium:

3. *"I think it depends in the online text that we read it online because if it's about my favourite subjects I will find it easy but, if it's complicated subject it will be boring and difficult" (sic).*

The responses to Question 8 support the finding from Chapter 4 that four key factors contribute to differences in difficulty between reading online and reading from paper: accessibility, comfort, strategy use and motivation. The responses to Questions 12 and 14, which look at the participants' perceptions of the usefulness of online chatting for developing language and reading skills, are examined below.

### **The Perceived Usefulness of Online Chatting**

The responses to Questions 12 and 14 were coded and recoded in a largely bottom-up manner, although my coding was undoubtedly influenced by previous studies that mentioned opportunities for meaning-focused reading practice (Kelm, 1992) and opportunities for review and error correction (Beauvois, 1992). Ultimately, the opinions of the participants with regard to the usefulness of online CMSD to help the development of reading and other language skills fell into five categories: language, practice, collaboration, communication and motivation. These are discussed in turn below. The

terms 'chat' and 'chatting' will be used interchangeably with CNSD, as these are the terms used by the participants.

## Language

Given that over 83% of the respondents felt that chatting could improve their language skills, it was not surprising to find numerous positive comments on the benefits of chatting for language skills development. A large number felt that chatting could assist with vocabulary and grammar acquisition, as in the first comment below, and with the improvement of reading and writing skills, as in the second. Several respondents pointed to the importance of a chat partner who was a native or high-proficiency user of English from whom they could learn. This is exemplified in the third comment.

1. *"Chatting online in English will improve my vocab, spelling and grammar which are my three big problems" (sic).*
2. *"it is a good practice to read what your friends write to you and by that your reading skill will improve but not as much as your writing will improve" (sic).*
3. *"That's because sometimes I speak with someone who is in an better level than the one that I have so I gain new English words. Then i start to use which make my English sounds excellent" (sic).*

However, some felt that the register used in online chat rooms would have a detrimental effect on its usefulness. The fourth comment below illustrates how one respondent felt that the abbreviations used in chat rooms would prevent it being a beneficial tool for language learning.

4. *"the most chatting is about private thing and it will not help you to improve your reading skills and they use special letters for chatting like.. u mean you.. brb etc."(sic).*

Several others felt that there was no relationship between chatting and reading, which could help explain why fewer participants felt online chatting could help with reading skills development. The fifth comment below stress this opinion quite strongly:

5. *"In my opinion chatting in English dose not help me in reading skills and it is a poor way to improve my reading English!" (sic).*

Overall, CMSD was viewed as a useful tool for language development, particularly when the chat partner produced quality language.

## **Practice**

Online chat was viewed a useful arena for language practice, providing opportunities to read, write and interact with others while practising the language learnt both inside and outside the chat room, as illustrated by the first comment below. One of the benefits of practice cited for reading skills development was faster reading, as noted in the second example. However, in response to Question 5 of this survey, over 39% of the respondents stated that they never chatted in English, meaning that for many this opportunity did not exist, as we can see from the third comment below.

1. *"because we can practice our english from the chatting in English and learn from our mistake" (sic).*
2. *"It helps you practice and by time read faster as you will be used to reading English more" (sic).*
3. *"It may help but, I dont have anyone who like to practice English they all prefere chatting in Arabic" (sic).*

## Collaboration

Several respondents referred to the opportunities to “*learn from others*”. This can occur through sharing language knowledge, as in the first comment below, or through correcting others, as in the second example. These examples fall neatly with a social-constructivist or sociocultural view of learning.

1. *“we will learn other useful word that we didnt know and i can share with my friend any other vocabulary” (sic).*
2. *“Because when I chat in English I might learn new vocabulary and it also helps to improve my reading and writing skills. Furthermore, I might correct other mistake and might learn from my mistake when somebody correct for me” (sic).*

## Communication

Online chatting was seen as a useful means of communication with others, and especially with native speakers. The first comment below shows how one participant draws a distinction between a language skill, writing, and communication. The second highlights the importance attached to communicating with a native speaker, which was mentioned by a number of respondents.

1. *“it helps to develop writing and communication skills” (sic).*
2. *“it allows me to talk and communicate with the english speakers which is the best way to learn the language in my opinion” (sic).*

## Motivation

As with online reading, chatting was seen as an interesting activity by some respondents, but as boring by others. Some were of the opinion that the very fact that

chatting was interesting could be beneficial to language learning in general, as in the first example below. The second example shows that chatting can motivate a student to read more because of his positive attitude towards it. Finally, the third positive example shows how the chat partner can generate an interest in the discussion, making it relevant and useful.

1. *"Becouse it will improve my reading and writing skills. and that becouse chatting online is an interesting way to learn english" (sic).*
2. *"Thats can help me to read english more in way which I intersted in and I like it" (sic).*
3. *"because it is interesting to read what they wrote,so it is helpful" (sic).*

Despite the generally positive attitude towards chat, some did not like chatting at all, as in fourth example below. Others, as in the fifth example, noted that the types of conversation that take place in chat rooms may be of little interest, rendering it of little value for language development.

4. *"I am not fond of chatting as I mentioned Before" (sic).*
5. *"because in chatting many people talk in not intresting subjects that why it is not good"*

In summary, Study 2 Survey 1 found that the respondents had a largely positive view of CMSD for language learning, feeling it provided exposure to language and opportunities to practice while communicating with others. However, not all participants felt that it had relevance to reading skills development. Its use as a means of collaborating with other was valued, and many saw it as an interesting tool for language learning.

Opinions of online reading and CMSD will be further explored in Study 2 Survey 2 below, which was administered after TG3 and CG3 had completed the reading practice exercise followed by Post-test 3. TG3 had also taken part in an online chat session as part of the reading practice exercise.

## Study 2 Survey 2 (Chat and No Chat Versions)

Study 2 Survey 2 was administered to the participants in the second week of the study, immediately after they had taken Pre-test 2. Questions 1 and 2 were posed to all participants in TG3 and CG3, and were designed to find out whether the reading practice exercise and the elaborative feedback within it were seen as useful. Only members of the treatment group, TG3, were asked to respond to Question 3, which focuses on the post-reading CMSD session.

From Table 5.5 below, it can be seen that both the reading practice exercise and the elaborative feedback were very highly rated by the participants. Almost 75% felt that the practice exercise helped them to prepare for the test. The ratings for the elaborative feedback were even higher; almost 88% reported that the feedback had helped them understand the reading text on which both the practice exercise and Post-test 3 were based.

*Table 5.5: Results of Study 2 Survey 2 (Chat and no-chat versions)*

	Treatment Group			Control Group			Combined		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Q1	4.00	1.00	47	4.02	1.04	52	4.01	1.02	99
Q2	4.60	.77	47	4.46	.90	52	4.53	.84	99
Q3	3.45	1.25	47	-	-	-	-	-	-

Questions 1, 2 and 3 used a Likert-scale: Strongly Agree=5, Agree =4, Neither agree nor disagree=3, Disagree=2, Strongly Disagree=1.

### Questions

Q1. The online practice exercise helped me prepare for the test.

Q2. The feedback (help) in the practice exercise helped me understand the reading text.

Q3. The online chat session helped me understand the text.



With regard to between-group differences, an independent samples *t*-test was carried out to compare the mean scores of the two groups' responses to Questions 1 and 2. There was no significant difference in the mean scores on Question 1 of TG3 ( $M=4.00$ ,  $SD=1.00$ ) and CG3 ( $M=4.02$ ,  $SD=1.04$ ),  $t(97)=.094$ ,  $p=.925$  (two-tailed). The effect size was very small ( $\eta^2=.00009$ ), with the grouping variable accounting for only .009 per cent of the variance in scores on Question 1.

Equally, there was no significant difference in the mean scores on Question 2 of TG3 as determined by an independent samples *t*-test: ( $M=4.60$ ,  $SD=.77$ ) and CG3 ( $M=4.46$ ,  $SD=.90$ ),  $t(97)=-.801$ ,  $p=.425$  (two-tailed). The effect size was very small ( $\eta^2=.007$ ), with the grouping variable accounting for only .7 per cent of the variance in scores on Question 2.

The chat session ( $M=3.45$ ,  $SD=1.25$ ) was not considered by TG3 to be as useful an aid to text comprehension as the elaborative feedback ( $M=4.60$ ,  $SD=.77$ ). However, approximately 53% of TG3 felt that the chat session, which was held immediately following the reading practice exercise, and which gave them the opportunity to discuss with a partner any difficulties they had faced, had helped them to understand the reading text.

The reasons behind the participants' responses to Questions 1 to 3 were explored by three open-ended questions, with Question 3a presented only to the treatment group.

### Questions

- 1a. Please explain your answer to Question 1 (The online practice exercise helped me prepare for the test).
- 2a. Please explain your answer to Question 2 (The feedback (help) in the practice exercise helped me understand the reading text).
- 3a. Please explain your answer to Question 3 (The online chat session helped me understand the text).

In addition, all the participants were asked to answer Questions 4 to 7 below to gather further insights into their opinions of the reading practice exercise and the elaborative

feedback it contained. The treatment group (TG3) were also asked to respond to Questions 8 and 9, which focused on the online chat session.

#### **Questions**

4. What did you like about the reading practice exercises?
5. What would you like to change about the reading practice exercises?
6. What did you like about the feedback?
7. What would you like to change about the feedback?
8. What did you like about the online chat session?
9. What would you like to change about the online chat session?

#### **Reading Practice Exercise and Elaborative Feedback**

The responses to Questions 1a and 2a, and to Questions 4 to 7 above were related to the reading practice exercise and the elaborative feedback contained within it. They were coded and recoded, with the starting point being the four categories that emerged from an analysis of similar questions from Study 1 Survey 2 and Survey 2 Taught in Chapter 4: text comprehension, task completion, reading skills and motivation. On this occasion, three additional categories emerged: strategy use, comfort and accessibility. These same three categories had arisen from the analysis of differences between online and paper-based reading in Study 2 Survey 1 above, and earlier in Chapter 4.

The analysis of the think-aloud protocols that featured in Chapter 4 found that the elaborative feedback had assisted participants with text comprehension and task completion in three ways: through rephrasing, by indicating the location of a key word or part of the text, and through confirming the reason for an answer. These were all evident again in the responses received to this survey.

As in Chapter 4, the participants received the elaborative feedback very positively; with many comments suggesting it had helped them with both task completion and text comprehension. The first example below shows how the rephrasing questions that appeared in the feedback after an incorrect response were considered to be a useful aid to text comprehension by one respondent. While several other participants indicated

that rephrasing had been helpful, the majority of positive comments related to both task completion and text comprehension focused on how the guidance provided by the feedback had helped them locate the relevant part of the text. This is exemplified in the second example below. In addition, a few comments suggested that the feedback had been helpful in confirming the reasons for a correct response, as evidenced in the third quotation below.

1. *"it tell us which topic should we look for and help to handerstand the topic by giveing the question" (sic).*
2. *"because it help me where is the right answer is .also help me to understand the article" (sic).*
3. *"Its show is why this is right when we got the right answer" (sic).*

As in the previous study, the elaborative feedback was also considered to aid the development of reading skills, such as skimming and scanning. One participant wrote the following on how the feedback had helped him understand the text:

4. *"Clarify the question and give you an idea of the subject as it helps the student to identify the location of the answer and thus earning the student skill of the scaning & skimming" (sic).*

The use of technology was motivating to some, who felt that benefits could be gained from the reading practice exercise and also found the experience enjoyable.

5. *"When I am take some the online practice exercise makes me enjoy learning more because it uses advanced technology and makes you get out of routine and boredom. A good way to prepare for the exam. Earns the student reading skills quickly" (sic).*

However, despite the majority of comments being positive, there were some negative comments related to motivation and strategy use. One respondent who was not motivated to complete the practice exercise, wrote:

6. *“actually, it’s a great idea but I didn’t give it that effort”*

We saw in Chapter 4 that one possible reason for the ineffectiveness of the elaborative feedback at the beginning of the study was that many of the participants did not read it. This problem was partially solved through strategy training after which the learners’ engagement with the feedback was much greater. The same issue surfaced in the current survey, with several students noting that they had not used the feedback strategically to complete the exercise. For example, one noted that the feedback had not helped with text comprehension but had helped superficially with task completion:

7. *“not really! to be honest, it helped me to find the correct answer by clicking on all of the answers!!” (sic).*

Several others suggested that it would be better to have the feedback presented at the end of the exercise

8. *“it was useful but in some question i didnt work well to find the answer i just check the answer. i think it will be better to check the answer at the end of the test” (sic).*

The above examples show how strategy use and motivation are strongly linked. Even where participants have the necessary strategies to make good use of the feedback, they are unlikely to do so if they are not motivated to complete the task.

Another aspect of strategy use that was commented on by the participants was the screen layout, which ensured that the feedback, questions and reading text were viewable at the same time. This had been an intentional feature of the web-page design in order to reduce the load on working memory. However, this relied on an appropriate use of online reading strategies in order to exploit this benefit successfully. As one student stated:

9. *"i like it because the check and the feedback it give to us to explain the answer we have chose and it easy to read the text and the question on the same page and scroll up and down" (sic).*

With regard to accessibility, some participants noted that the language in the feedback was accessible to them, which is vitally important given that the aim of many of the elaborative questions and statements within the feedback was to rephrase either the question or the text in a simpler way.

10. *"It is clearly and easy to understand" (sic).*

While the language within the feedback was regarded as accessible, some participants found some of the vocabulary in the text more challenging. Asked what he would like to change about the reading practice exercise, one participant wrote:

11. *"The kind of words because they were very difficult and I did not understand most of them" (sic).*

Finally, with regard to comfort, several participants noted that they found it difficult to concentrate while reading online, as in Response 12 below, while another found it challenging to complete an online reading test. Response 13 is not surprising, given that most of the participants had taken the majority of their assessments in a paper-based format.

12. *"actually it is great idea but i cant focus in on line reading like in paper" (sic).*

13. *"nothing because I find it diffecult to do a reading test online, I prefer to do it on paper" (sic).*

In summary, the responses to Study 2 Survey 2 indicate that the participants felt that the elaborative feedback had helped them to understand the reading text and to answer the questions within the practice exercise through rephrasing and simplification, through

guiding them to the key part of the text relevant to a question, and by helping to confirm their understanding. While the language within the feedback was accessible, some found the language in the text quite challenging and valued the support provided by the feedback. Some participants found the practice exercise motivating, while others elected to click on the feedback without interacting with the text, due to a lack of motivation rather than a lack of strategic knowledge. Still others found the experience of taking a reading test online uncomfortable, perhaps due to a lack of familiarity in some cases, but in others due to an inability to focus when reading online.

### **Online Chat Session**

We now turn to an analysis of Questions 3a, 8 and 9, which examine the attitudes of the treatment group (TG3) to the 15-minute online chat session that took place immediately after they had completed the reading practice exercise, prior to taking Post-test 3.

3a. Please explain your answer to Question 3 (The online chat session helped me understand the text).  
8. What did you like about the online chat session?  
9. What would you like to change about the online chat session?

The responses related to the online chat session were coded and recoded. Although the analysis was intended to be bottom-up, I was influenced by the categories that emerged above. Three of these categories emerged from the analysis: text comprehension, task completion and motivation, in addition to a fourth category: collaboration.

### **Text Comprehension**

As we saw above, around 53% of TG3 reported that the chat session had helped them to understand the reading text and several of their responses were related directly to text comprehension. The opportunity to receive help from a partner was seen as particularly useful in this regard, highlighting the usefulness of scaffolding or the negotiation of meaning to render input comprehensible.

1. *"my other firends help in understanding some phrases in the text that was not clear to me and this made me to understand the text much more" (sic).*

Whereas the first example above referred to "understanding some phrases", the majority of comprehension-related comments referred to individual vocabulary items. The second comment below is an example of a participant referring to the vocabulary-related help that can be provided by a peer. However, the chat sessions were not viewed as facilitating comprehension in all cases. For instance, Example 3 below illustrates that when both chat partners were unclear about the meaning of a word, they were not in a position to help one another. Conversely, Example 4 shows how the chat was not seen as valuable when at least one of the chat partners experienced little or no difficulty in comprehending the text.

2. *"I agree with it, because if I don't understand some words, I can ask my classmate".*
3. *"The online chatting help me but not very much because we both didn't understand some of the hard vocabs" (sic).*
4. *"because my partner find all the qusetion easy ... so she did not ask any thing" (sic).*

Other comments focused on the help the chat session had given them in understanding ideas or information from the text, indicating that working with a partner in a chat room had also helped the participants to comprehend parts of the text beyond the level of phrases or single vocabulary items.

5. *"i can understand the easy and hard area of the reading practice exercise . and maybe i can get some information from the other person that i didn't notice before" (sic).*

The very act of discussing the text was also seen as valuable in deepening understanding, perhaps due to the necessity it created to reflect on the meaning of the text.

6. *"When we talk about the text it make me underestand it more" (sic).*

## **Task Completion**

The online chat session was considered to have helped the participants to complete the reading comprehension task they were assigned in several ways. Like the elaborative feedback, the chat session was regarded as useful in clarifying the meaning of the questions within the practice exercise, as shown in Example 1 below. Example 2 shows that it was also considered helpful in understanding the task in more general terms, but only if the chat partner was in a position to help.

1. *"in my opinion it is very useful because it help us to understand the questions in another meaning" (sic).*
2. *"it's good to have someone to help you understand the task, but if they understand it" (sic).*

However, some respondents noted that their chat session had not been focused on task completion, which is exemplified below in Example 3. Another participant noted the importance of focusing on the text rather than simply having fun, if the chat session is to be valuable. This is shown in Example 4.

3. *"well we weren't chatting much about the test- only how was it and all"*
4. *"Chating is very nice method and help us to understand the text but on the condition that their use is well away from the fun and enter the heart of the matter" (sic).*

## **Motivation**

The notion of fun occurred in several other responses from participants who did not see the relevance of chat as an educational tool, as exemplified in Example 1 below.

However, others found the fun aspect of chat motivating without detracting from the



task at hand. Example 2 below suggests that chat sessions can add variety to the language-learning process, while Example 3 indicates that enjoyment does not need to prevent an activity from being beneficial.

1. *"I think chat is only for have fun".*
2. *"can refresh my mind a little bit. so its not going to be boring" (sic).*
3. *"Having fun chatting with someone at the mean time having some information" (sic).*

The above examples suggest that chat is seen as a fun activity, which is not surprising, given that many of the participants chat regularly in Arabic. However, the link between fun and focus is important if the activity is to prove useful.

### **Collaboration**

Collaborating with a colleague was seen as a real benefit of the online chat session, with an emphasis on sharing ideas or information and on working together to find a solution. One participant felt that working together with his partner in the chat session had helped his understanding of the text.

1. *"it help to share our answer and find the best soulution" (sic).*

Similarly, Example 2 shows that the opportunity to discuss any difficulties encountered with a partner was seen as useful. However, this does rely on collaborative behaviour from both chat partners.

2. *"it gave us a chance to discuss the difficulties with our mates" (sic).*

In summary, the post-reading online chat session was regarded as valuable by a majority of the treatment group, as it helped with text comprehension and with clarification of individual questions and the task requirements in general. However, its usefulness was

seen to depend on the participants behaving collaboratively and focusing on the task at hand. While some enjoyed the activity and found it useful, others saw little relationship between chatting and reading. In order to further explore these ideas, the responses to Study 2 Survey 3 are examined below.

### Study 2 Survey 3

Survey 3 was administered to Class 2TA at the end of the study, after they had taken part in 4 lessons containing chat activities as a follow-up to an online reading exercise.

From Table 5.6 below, it can be seen that the reading exercises, elaborative feedback and chat sessions were all considered valuable. Of particular interest is the fact that the elaborative feedback ( $M=4.72$ ,  $SD=.57$ ) was rated more highly as an aid to reading text comprehension than the online chat sessions ( $M=3.83$ ,  $SD=.86$ ). The feedback was also viewed as a useful support during the chat sessions.

*Table 5.6 Results of Study 2 Survey 3*

	<b><i>M</i></b>	<b><i>SD</i></b>	<b><i>N</i></b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Q1	4.39	.61	18	44.4%	50%	5.6%	0%	0%
Q2	4.72	.57	18	77.8%	16.7%	5.6%	0%	0%
Q3	3.83	.86	18	22.2%	44.4%	27.8%	5.6%	0%
Q4	3.89	.90	18	27.8%	38.9%	27.8%	5.6%	0%
Q5	3.28	1.23	18	11.1%	38.9%	33.3%	0%	16.7%
Q6	3.17	.71	18	0%	16.7%	50%	33.3%	0%
Q7	2.67	.84	18	16.7%	5.6%	72.2%	5.6%	0%
Q8	3.33	.69	18	0%	11.1%	44.4%	44.4%	0%

Questions 1 to 5 used a Likert-scale: Strongly Agree=5, Agree =4, Neither agree nor disagree=3, Disagree=2, Strongly Disagree=1.

Questions 6 to 8 used a Likert-scale: much too difficult=5, too difficult=4, at my level=3, too easy=2, much too easy=1.

### Questions

- Q1. The reading exercises helped me to improve my online reading skills.
- Q2. The guided feedback in the practice exercises helped me to understand the reading texts.
- Q3. The online chat sessions helped me to understand the reading texts.
- Q4. The guided feedback helped me in the chat sessions.
- Q5. I preferred to complete the reading exercises alone without asking for help.
- Q6. The questions in the practice exercise were:
- Q7. The explanations and questions used in the guided feedback were:
- Q8. The questions in the online tests were:

In addition to the Likert-scale questions above, six open-ended questions were used to gather information about the participants' impressions of the reading practice exercises, the elaborative feedback, the online chat sessions and the lessons. These questions are listed below.

### Questions

- Q9. What did you like about the reading practice exercises?
- Q10. What would you like to change about the reading practice exercises?
- Q11. What did you like about the guided feedback in the reading practice exercises?
- Q12. What would you like to change about the guided feedback in the reading practice exercises?
- Q13. What did you like about the chat sessions?
- Q14. What would you like to change about the chat sessions?

The majority of the responses to above questions were very short, often one to three words in length, with little explanation offered. In analysing the responses to Questions 9 to 12, they were initially coded using the four categories that emerged from both versions of Survey 2 in Chapter 4, which included these same questions. The categories were text comprehension, task completion, reading skills and motivation.

With regard to the reading practice exercises, six of the respondents reported that they liked the feedback, with one noting how it helped him to complete the reading tasks.

1. *"the feedback that help me to understand my mistake" (sic).*

Others noted it helped with their reading skills development, either through learning new strategies or through improving their vocabulary knowledge.

2. *"I like many thing for inctance, how to use the technique to find the answer" (sic).*

3. *"Know many knew words" (sic).*

The exercises were also considered useful as an aid to text comprehension.

4. *"It help me to improve my reading and understand what the reading is talk about" (sic).*

Finally, the topics were considered motivating by some of the participants, although as with most of the responses, little explanation was offered:

5. *"the new topic for me".*

The majority of respondents had no suggestions for improving the exercises, although one wished to change the topics and another would have preferred to read from paper. Interestingly, one suggested that the feedback should appear at the end of the exercises, rather than at the end of each question.

6. *"if we make mistake better if they give us the correct answer after the exercises" (sic).*

The feedback was viewed favourably, with only three suggestions for improvement. Two respondents agreed with Comment 6 above that the feedback should appear at the end of the exercises, while another suggested that the answers should be highlighted in the text. The third suggestion was that the feedback should be easier. Although only one respondent indicated that the language of the feedback was too difficult in response to Question 7 above, it does highlight the importance of making the feedback accessible if it is to act as a support.

Several respondents liked the way the feedback helped them to understand their mistakes and find the correct answer, suggesting again that it can assist with both text comprehension and task completion:

7. *"help me to understand my mistake" (sic).*

8. *"It tells me where the answer" (sic).*

The responses to Questions 13 and 14 were also very short, with very little variety in the responses. Several noted that they liked the fact that the chat session gave them the opportunity to collaborate by discussing the questions with their friends:

9. *"that we can help each other if we don't know other question" (sic).*

10. *"every one give his idea and solve the questions" (sic).*

Others noted that the chat session had helped them to find and understand the answers to the questions.

11. *Help me to know and understand the answer" (sic).*

With regard to improving the chat sessions, two students noted that not everyone had taken the chat session seriously, with the first also suggesting that expanding the groups to include people from other institutions would be beneficial.

12. *"It is bettere if the student be more seriouse. Also it is better to chat with other students from other colleges" (sic).*

13. *"to use it more dead earnest" (sic).*

In summary, the reading practice exercises, the elaborative feedback and the chat sessions were all considered to be useful supports by the students. The elaborative feedback in particular was seen to help the participants with text comprehension and task completion. While the chat sessions were also seen as valuable, especially as they offered the opportunity to collaborate with others, they were not always taken seriously by all participants.

## Interviews

The interviews with four members of 2TA took place in Week 7 of the study, after the participants had completed four lessons involving the use of reading practice exercises containing elaborative feedback, followed by online chat sessions in which the questions and text were discussed. Each lesson had then culminated in a practice test based on the same reading text.

The responses were coded using the categories that emerged from the analysis of Study 2 Survey 2 above: text comprehension, task completion, reading skills, motivation, strategy use, comfort, accessibility and collaboration.

As with previous surveys, the reading practice exercises and elaborative feedback were received favourably, with the four participants all indicating that the elaborative feedback had assisted them text comprehension and task completion, as in Example 1 below.

1. *"Yes it is helpful for us because the feedback gives you the point of the answer and the paragraph" (sic). [Student 3]*

The online exercises and chat sessions were both considered useful for improving reading skills generally, not only in an online environment. However, according to Student 3 in Example 2 below, this depended very much on motivation. In his opinion, the fact that the tests given following the chat sessions did not count as coursework marks affected the students' level of motivation to complete the exercises seriously. Student 4 stated in Example 3 that the timed tests had also helped him improve his reading skills and time management strategies, whereas before he had lacked the motivation to focus on these areas.

2. *"Because it is the same if you are reading from the paper or online because you are reading from the Internet it is the same language. As I said the students should be serious with it. if it is only take one exercise for the example and without the answer get the students to discuss the answer together. If they are serious they will sit together discussing about the answer. At the end of the lesson give a printout for*

*this one and check it and do it again and it will be marked, it will be marked for the semester maybe. They will be more serious but for example when you said to them there is no mark they will go "aah". They will go only by chance just check, check, check, and go just want to finish. This is the problem" (sic). [Student 3]*

3. *"I can read carefully, search, scan sometimes. Before we get the exam without time because we are lazy or bad. When we have a serious time it help us like when we had the exam we have 60 minutes, that's all. So you should finish your test we should manage our time, it help us in the practice or exam to manage my time. I have 20 minutes I should manage my time in 20 minutes" (sic). [Student 4]*

Student 4 also noted that the chat sessions could help with text comprehension, but only if the activity was taken seriously by the participants.

4. *"It's useful if the right, if the guys with me in the room chat did the work correctly not playing or joking. If they take that thing seriously it will be very helpful in my opinion. That question is wrong because of that, this opinion is true because of that, so we can discuss what our opinions and we can get a good result" (sic). [Student 4]*

The collaborative nature of the chat session was valued, as it provided additional support for the learners. While the feedback was considered helpful, the extra support provided by the post-reading chat sessions sometimes helped clarify matters further, with the feedback itself being discussed. As Student 1 commented:

5. *"When I get the mistake my friend correct me, and sometimes I get the wrong paragraph and my friend told me what is the correct paragraph for the questions... At first we talk about the correct answers and if there are mistakes we talk about why are there mistakes and we talk about this feedback" (sic). [Student 1]*

However, Student 2 reported that he had not discussed the elaborative feedback in his chat sessions, despite the fact that he had reported having a very positive attitude towards the feedback.

6. *"The feedback, no we didn't discuss about feedback. I can't remember" (sic). [Student 2].*

While the varying motivational levels of the students were seen a hindrance to the success of the chat session, two of the interviewees suggested making the elaborative feedback more accessible by making it simpler. For example, Student 4 stated:

7. *"I think it's okay and if we can make the feedback simpler it will be... Simple I think make it easy words. You know we have students in the class of different levels. Maybe I understand different from other students, my friend didn't understand" (sic). [Student 4]*

Overall, all the interviewees regarded the elaborative feedback and reading practice exercises very favourably. They also saw the potential usefulness of the online chat sessions, but they felt that the motivation or engagement level of the participants was key to the success of the sessions. While some use of the elaborative feedback in the chat sessions was reported, one interviewee stated that he had made no use at all of the feedback while chatting.

The chat logs from both quasi-experiment and the weekly lessons were analysed in order to corroborate the findings from Study 2 Surveys 2 and 3 and the interviews.

## **CMSD Logs from the Quasi-experiment**

The analysis in this section was influenced by three studies that were discussed in detail in Chapter 3, and that investigated the use of collaborative discussions alongside reading activities. Fernandez-Garcia and Martinez-Arbelaiz (2002) (see 3.4.2) investigated negotiation of meaning in post-reading computer-mediated synchronous discussions (CMSD), while Murphy (2007) (see 3.3.2) investigated the use of paired oral discussions in combination with elaborative feedback within online reading comprehension exercises. Murphy (2010) (see 3.4.3), in a study that resembles the current study most closely, investigated the use of elaborative feedback in combination with CMSD while students completed an online reading comprehension exercise.



The chat logs from the CMSD sessions were analysed for evidence of negotiation for meaning, the importance of which was discussed earlier in 3.2 and 3.4. In doing so, I followed Fernandez-Garcia and Martinez-Arbelaiz (2002) in using the ‘trigger, indicator, response, reaction’ pattern (Varonis & Gass, 1985) as a guideline when evaluating the interactions. In addition, following Murphy (2007, 2010), the logs were examined for exploratory talk (Mercer, 1995; Wegerif, Mercer & Dawes, 1998), which is characterised by “the sharing of relevant information, reaching agreement, expecting reasons and challenges, discussing alternatives and encouraging peers” (Murphy, 2007, p. 109).

While looking for evidence of the above in order to help answer Research Question 3, evidence of the elaborative feedback enhancing the online discussions was also sought in order to answer Research Question 4.

Extracts from the post-reading CMSD (chat sessions) that took place following Reading Practice Exercise 3 and immediately prior to Post-test 3 are discussed below.

#### **Extract 1: Negotiation for Meaning**

<b>Turn</b>	<b>Time</b>	<b>Student</b>	<b>Comment</b>
5	11:58 AM:	<b>Student 2:</b>	what about Q2
6	11:59 AM:	<b>Student 1:</b>	in Q2 mention old people but in the text they mention the age only...
7	12:00 PM:	<b>Student 2:</b>	yes and my answer was wrong because the question is not clear
8	12:01 PM:	<b>Student 1:</b>	i think you miss under stand the Q,, it says the old people no need to be vaccinated?
9	12:02 PM:	<b>Student 2:</b>	what is vaccinated, i didnt understand this word
10	12:03 PM:	<b>Student 1:</b>	look at the text and you will find the sentence (( While certain students may be exempt because of age )) it dose not talk about the old people, it is only about the age ..
11	12:03 PM:	<b>Student 1:</b>	Vaccinated mean :::: تطعيم
12	12:04 PM:	<b>Student 2:</b>	aha now i understand
13	12:06 PM:	<b>Student 1:</b>	I think Q3 is not evident ( clear) ??
14	12:08 PM:	<b>Student 2:</b>	yes i think that
15	12:09 PM:	<b>Student 2:</b>	i think the questions and the passges is difficult to

16	<div>understand it</div> <div>12:10 PM:      <b>Student 1:</b>      From this Q you can see how to use the key word to assist you for finding the answer and i think the key word is (before registering. )</div>
----	---

In Extract 1 above, we see a clear example of negotiation for meaning. The students are discussing Question 2, which asks whether the statement “Very old people do not have to be vaccinated” is true, false or not given according to the reading text. The key to the answer relies on understanding the following portion of the text:

“While certain students may be exempt because of age, medical reasons, or religious belief, they must submit documentation of exemption before registering.”

From Turns 5 and 7 we see that Student 2 is unsure about the reason for the answer being “not given”, whereas Student 1 demonstrates his understanding of the reason in Turn 6, where he correctly points out that there is no mention of a specific age group in the text.

In Turn 7 Student 2 seems frustrated that his answer was wrong due to the question being unclear, but Student 1 focuses his attention on the fact that the question specifically mentions old people (Turn 8). Turn 8 also acts as the trigger, as Student 1 uses the word ‘vaccinated’. In Turn 9 Student 2 indicates that he does not know this word, to which Student 1 responds by supplying the Arabic translation in Turn 11. Student 2 then reacts by indicating his comprehension in Turn 12.

In addition to this being an example of negotiation for meaning, the behaviour exhibited by Student 1 in sharing a strategy in Turn 16 shows collaborative behaviour that is not tied solely to the comprehension task. Also of interest in Extract 1 is that it appears likely that Student 1 used the elaborative feedback indirectly to help him support Student 2. Although this is not immediately apparent, his advice in Turn 10 is very similar to the guidance given by the elaborative feedback following a correct response:

*“Correct. Paragraph 1 tells us “certain students may be exempt because of age...” but it does not tell us what age groups are affected.”*

While Extract 1 showed an example of negotiation for meaning that followed the ‘trigger, indicator, response, reaction’ pattern, far more examples of negotiating the meaning of a vocabulary item occurred in which the ‘trigger’ was an unknown word in the reading text, rather than a word used within the online chat session. An example of this is shown in Extract 2 below.

### Extract 2: Negotiation for Meaning

Turn	Time	Student	Comment
9	8:38 AM:	Student 5:	ok .. so let us think about the questions
10	8:38 AM:	Student 6:	okey
11	8:39 AM:	Student 5:	the 1st one .. did u face any problem to solve it ?
12	8:39 AM:	Student 6:	yes
13	8:39 AM:	Student 6:	what does this word mean (immunisation)
14	8:40 AM:	Student 5:	i didnt sriuos problem
15	8:40 AM:	Student 5:	it means like protection i think
16	8:41 AM:	Student 5:	like when we take some pills to protect rm a disease ?
17	8:41 AM:	Student 5:	i think so
18	8:41 AM:	Student 6:	okey
19	8:41 AM:	Student 6:	thanks

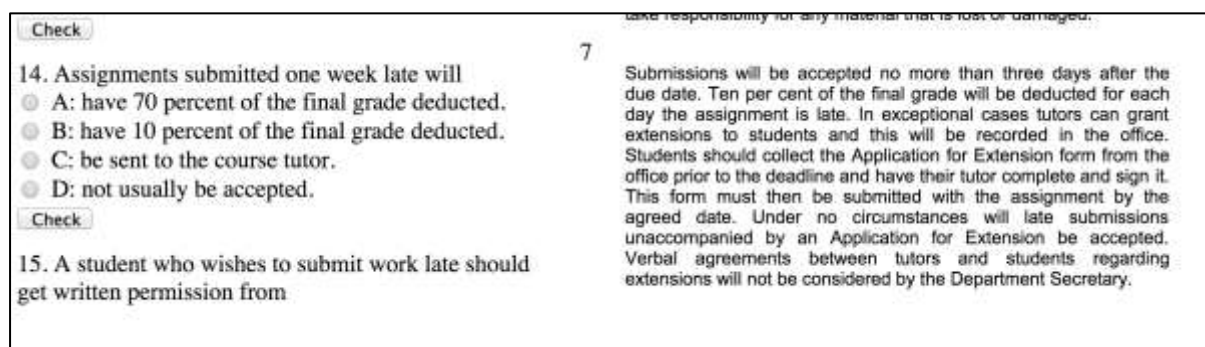
In Extract 2 above, Student 6 indicates lack of understanding of the word “immunisation” from the reading exercise in Turn 13. However, the trigger for this is the question posed by Student 5, where she asks if her partner faced any difficulties in answering Question 1. The response is then offered by Student 5 in Turns 15 to 16, where she explains the meaning of the word, and in Turn 17 where she hedges by saying “i think so” (sic). Student 6 then follows up by acknowledging the response and thanking her partner in Turns 18 and 19.

### Extract 3: Exploratory Talk

Turn	Time	Student	Comment
11	2:36 PM:	Student 4:	Do you have any question abot the task ??
12	2:37 PM:	Student 3:	Q14 I dont understand why they chose the last answer
13	2:37 PM:	Student 4:	ok .. wait just a minute to check the question
14	2:37 PM:	Student 3:	I do think that the first answer is the most suituable answer for me
15	2:38 PM:	Student 4:	Submissions will be accepted no more than three days after the due date.
16	2:38 PM:	Student 4:	this the answers ,
17	2:38 PM:	Student 3:	ya I kown but
18	2:39 PM:	Student 3:	see that
19	2:39 PM:	Student 3:	Submissions will be accepted no more than three days after the due date. Ten per cent of the final grade will be deducted for each day the assignment is late
20	2:40 PM:	Student 4:	in this sentence she / he talks about what will happen if he / she sumbit the assignments after 3 days
21	2:40 PM:	Student 4:	when he / she late
22	2:40 PM:	Student 3:	oh
23	2:41 PM:	Student 3:	ok thanks
24	2:41 PM:	Student 4:	you are welcome any time
25	2:41 PM:	Student 3:	do you have any other question

Extract 3 above shows several of the characteristics of exploratory talk. Firstly, we can see from Turns 11 and 25 that each participant is keen to encourage the other to participate, with Student 4 asking Student 3 if she has any questions related to the task at the beginning of the extract, and Student 3 initiating a further exchange at the end. In Turn 12 Student 3 indicates a difficulty understanding the reasoning behind the answer to Question 14, which is shown in the screenshot in Figure 5.1 below, alongside the paragraph containing the information needed to answer the question. Student 4 responds in Turns 13 and 15 by firstly offering to look for the answer, and then by quoting the elaborative feedback in stating "Submissions will be accepted no more than three days after the due date", which is an excerpt from the text. Student 3 accepts this partially in Turn 17, but challenges the assertion in Turns 18 and 19, as she is confused

by the sentence that follows. In this way, the students are sharing information in order to arrive at a common understanding. Student 4 then assists with further clarification in Turns 20 and 21, after which Student 3 acknowledges her assistance and thanks her in Turns 22 and 23.



**Figure 5.1:** Screenshot showing Question 14 alongside Paragraph 7.

Of interest in the above exchange is the collaborative behaviour exhibited by both participants and the acceptance that their partner can challenge their reasoning. This was essential for the success of the exchange. What is also interesting is that the elaborative feedback appears to help Student 4 explain to Student 3 the reason for the answer being what it is. With regard to Research Question 4, this provides evidence for the support that elaborative feedback can provide within post-reading CMSD.

While the above excerpts illustrate that negotiation for meaning and exploratory talk did occur in the online CMSD sessions, providing support for the notion that online chat can encourage both language acquisition and enhance reading comprehension, this was not always the case. 37 chat sessions took place as part of the quasi-experimental procedures, with 34 dyads and three triads. Of these 37 chat discussions, nine showed little evidence of the participants collaborating on the task of understanding the text, and of clarifying any difficulties with the questions in the practice exercise. The CMSD logs from the four regular classes with 2TA will now be examined to see whether the interactions in a normal classroom setting differed from the tighter, quasi-experimental context that produced the logs discussed above.

## CMSD Logs from the Weekly Classes

The four weekly lessons produced a total of 26 CMSD sessions, of which 15 produced examples of collaboration between the participants that was focused on the reading comprehension task. These sessions all showed some evidence of negotiation for meaning and exploratory talk, similar to the excerpts shown above. In addition five showed some attempt at collaboration that did not go beyond sharing the answers to the questions, an example of which is shown in Extract 4. Six sessions were not focused on the task at all and showed no evidence of either exploratory talk or negotiation for meaning.

### Extract 4: Low-level Collaboration

Turn	Time	Student	Comment
8	10:24 AM:	Student 7:	about Q2 what is your answer
9	10:26 AM:	Student 8:	because it said in the paragraph less than 3% of water is fresh and only the third is accessible
10	10:26 AM:	Student 8:	What you think about question 7 and why
11	10:27 AM:	Student 7:	answer is C
12	10:27 AM:	Student 8:	write the answer and why
13	10:27 AM:	Student 7:	because it talks about the misuse of water
14	10:28 AM:	Student 8:	what about question 9

Extract 4 above shows evidence of low-level collaboration, with some characteristics of cumulative talk, wherein Students 7 and 8 discuss the questions without challenging one another or building on the information provided by the elaborative feedback. In Turn 7 Student 7 encourages Student 8 to participate by asking about the answer to Question 2. In Turn 9 Student 8 responds by giving the answer to Question 1, rather than 2, and giving the reason provided by the elaborative feedback following a correct response to that question, with only slight rephrasing. The original feedback is shown below:

*“Correct. Paragraph 3 states that less than 3% of water is fresh, and that only a third of that is accessible.”*

At no point does Student 7 challenge Student 8 about the fact that he has supplied the answer to the wrong question. Student 8 then asks about Question 7 in Turns 10 and 12. Once the answer is provided, they move on to the next question. Again, there is some evidence that the feedback is used to provide a reason for the answer, with Student 7's explanation in Turn 13 being a paraphrase of the elaborative feedback, which is shown below.

*"Correct. The 2nd, 3rd and 4th sentences of the paragraph talk about our misuse of water and the reason for it."*

Although the discussion is focused on the task and there is evidence that the students referred to the elaborative feedback, the degree of collaboration is much lower than in Extracts 1 to 3 above, with no real evidence of negotiation for meaning, and no attempt to explore the reasons behind the answers to the questions. The result is less interaction with both the text and the feedback. A more successful example of collaboration in which two students work together to support a third is shown below in Extract 5.

#### **Extract 5: Exploratory Talk**

<b>Turn</b>	<b>Time</b>	<b>Student</b>	<b>Comment</b>
28	12:02 PM:	<b>Student 3:</b>	Lads be serious and start discassion about Q 1 & Q 6?
29	12:03 PM:	<b>Student 3:</b>	Q1, Not Given ,,,
30	12:03 PM:	<b>Student 10:</b>	why??
31	12:04 PM:	<b>Student 9:</b>	does not mention any link between the two organisations.
32	12:05 PM:	<b>Student 10:</b>	Q6, true
33	12:05 PM:	<b>Student 9:</b>	why
34	12:05 PM:	<b>Student 10:</b>	because in text 8It will strengthen the body's natural healing resources and resistance to disease, and it will remove any harmful toxins that may have accumulated in the body.
35	12:07 PM:	<b>Student 9:</b>	i dont andrastand
36	12:07 PM:	<b>Student 10:</b>	what you don't understand
37	12:07 PM:	<b>Student 9:</b>	the answer
38	12:08 PM:	<b>Student 9:</b>	because of what
39	12:09 PM:	<b>Student 3:</b>	Q6. You sould look for the key word in the Qustion to help you to find the answer ,,,

40	12:11 PM: <b>Student 3:</b> I thnik the key word is (( of holistic treatment will give a treatment that tries to strengthen )) and the text mention about this strengthen in paragraph 8 in the line 8 ...
41	12:15 PM: <b>Student 10:</b> he saud in qustion (it will remove poison) and in text it will remove any harmful toxins

In Extract 5 above, evidence can be seen of participants sharing information, expecting reasons and encouraging peers, which are all typical of exploratory talk. In the exchanges, Student 3 and Student 10 collaborate in assisting Student 9, who is having difficulty understanding the reason why the answer to Question 6 is 'True'. In Turn 33, Student 9 indicates his lack of understanding. Student 10 then provides assistance by indicating the portion of the text that contains the answer. This is the same portion of the text included in the elaborative feedback in response to a correct answer. In Turns 35, 37 and 38 Student 9 again indicates his lack of understanding and seeks further help and clarification. Following this, Student 3 provides additional support in Turns 39 and 40 by linking the question to the text. Student 10 then provides more guidance by underlining the fact that poison and toxin are synonyms. Of note is that Student 3 draws the participants together in Turn 28, prior to which they were engaged in off-task chatting and joking.

The elaborative feedback was used as the basis for some parts of the discussions, as a support used by participants when providing chat partners with assistance. Extract 6 below shows an example of CMSD in which the feedback is integrated into the discussion. However, the lack of engagement of the chat partners reduces the effectiveness of the discussion for Student 11.

#### Extract 6: Use of Elaborative Feedback

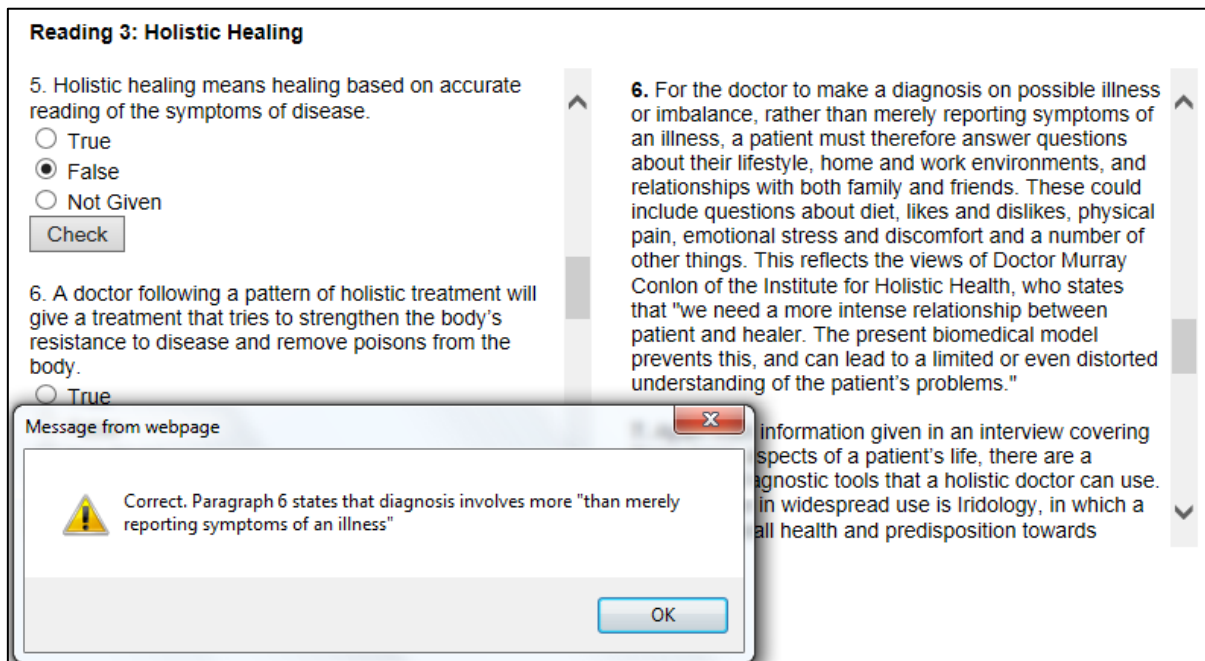
Turn	Time	Student	Comment
9	12:01 PM:	<b>Student 11:</b>	A*** & M*** what the suitable answer for Q5 and why???????
10	12:02 PM:	<b>Student 11:</b>	Paragraph 6 states that diagnosis involves more "than merely reporting symptoms of an illness"
11	12:02 PM:	<b>Student 11:</b>	this the feedback
12	12:03 PM:	<b>Student 11:</b>	where are you ^ ^
13	12:03 PM:	<b>Student 11:</b>	ping



14	12:03 PM: <b>Student 12:</b> hlla
15	12:03 PM: <b>Student 12:</b> the answer for Q5 is b
16	12:04 PM: <b>Student 11:</b> what the suitable answer for Q5 and why?
17	12:04 PM: <b>Student 12:</b> b
18	12:04 PM: <b>Student 11:</b> why
19	12:04 PM: <b>Student 13:</b> let me answer first :P
20	12:04 PM: <b>Student 11:</b> i think Holistic healing means healing based on accurate reading of the symptoms of disease
21	12:05 PM: <b>Student 11:</b> this answer is false
22	12:06 PM: <b>Student 11:</b> because Holistic healing that diagnosis involves more
23	12:06 PM: <b>Student 12:</b> i think your answer is wrong because the feedback describe Paragraph 6 states that diagnosis involves more "than merely reporting symptoms of an illness"
24	12:07 PM: <b>Student 13:</b> ya u all right
25	12:07 PM: <b>Student 11:</b> when we see paragraph 6 we ses "than merely reporting symptoms of an illness"
26	12:07 PM: <b>Student 12:</b> ok

In Extract 6 few of characteristics of exploratory talk can be seen. In Turn 9 Student 11 invites Students 12 and 13 to discuss Question 5. He then pastes the elaborative feedback into the chat session in order to start the discussion in Turns 10 to 12. Student 12 provides the answer, stating 'b' rather than 'false' in Turns 15 and 17. However, Student 11 is not satisfied and asks again for an explanation, challenging Students 12 and 13 to respond. Student 11 then effectively offers his own explanation, with no input from Student 13 and only minor input from Student 12. Although Student 12 appears to challenge Student 11 in Turn 23, he is merely repeating the elaborative feedback.

The question, relevant part of the text and the elaborative feedback are shown below in Figure 5.2.



**Figure 5.2:** Screenshot showing Question 5 alongside Paragraph 6 and the associated elaborative feedback.

Overall, the CMSD sessions showed large amounts of evidence of negotiation for meaning and exploratory talk, in addition to evidence that the elaborative feedback was used as a support to the discussions. However, the lack of engagement or task-focus evident in some discussions had a detrimental effect on their value.

## 5.7 Discussion

With regard to Research Question 3, the quasi-experiment found no significant effect for post-reading computer-mediated synchronous discussions (CMSD) on L2 reading comprehension, with the resultant ANCOVA producing  $F(2, 148)=1.778, p=.185$ . However, following the removal of three outliers, the result of the ANCOVA approached significance, producing  $F(2, 145)=3.684, p=.057$ .

From a purely quantitative standpoint, the hypothesis that post-reading CMSD can enhance L2 reading comprehension can be rejected. However, the mean score of the treatment group on Post-test 3 was higher than that of the control group, even though

the control group had scored significantly higher on Pre-test 3, which was used to control for online reading ability, perhaps the most important confounding variable in the design. While the findings of the ANCOVA were not significant, the results do suggest that the post-reading CMSD discussion may have had an impact on reading comprehension.

Despite the inconclusive findings from the quasi-experiment, findings from the supplementary data analysis lend support to the use of CMSD within certain contexts. When interpreting the findings from the various instruments used, it is important to keep in mind the context of this particular study. Although Study 2 Survey 1 in 5.6.1.2 uncovered a positive attitude to online chatting, almost 40% of the respondents reported that they never chatted in English, with some noting that they did not have the opportunity to do so. This suggests that the participants might not have had the strategic knowledge to take part in effective post-reading discussions without training. However, they felt that chatting in English could help improve their language skills, offered opportunities for practice, communication and collaboration, and was motivating. These findings were supported by the results of Study 2 Survey 2.

From Study 2 Survey 2, an analysis of the open-ended responses provided by members of the treatment group suggested that the CMSD session had helped them with text comprehension and with comprehending and answering the questions. While some of the respondents found it interesting and motivating, others did not appreciate its educational value and viewed it simply as a fun activity. The opportunity to collaborate with a partner was appreciated, but this depended on the partner acting collaboratively.

The interviews conducted in Week 7 at the end of the study suggested that the chat sessions had been valuable on occasion, but that the motivational levels of the participants had been an issue. Some of the comments suggested that several members of the class had not taken the chat sessions seriously, and there are numerous examples within the chat logs to substantiate this claim. Given the importance of learners being actively engaged in discussions in order for them to be beneficial (Van den Branden, 2000), the attitude of some of the participants towards the tasks appeared to have a detrimental effect on their usefulness as a language learning exercise.

The discussion logs themselves showed evidence that post-reading CMSD can aid reading comprehension. There were numerous examples of negotiation for meaning and exploratory talk, and of the modification of input. These findings are in line with those of Fernandez-Garcia and Arbelaiz (2002) and Murphy (2010). Like Blake (2000) and Lee (2001, 2002), the learners in this study negotiated more for meaning than for form. As in Bower and Kawaguchi (2011), the current study found that the synchronous discussions did generate instances of corrective feedback from one learner to another, but instances of negotiation for meaning were far more numerous. Furthermore, in contrast to Bower and Kawaguchi's findings, the instances of corrective feedback in this study were related to the misinterpretation of comprehension questions rather than to grammatical accuracy.

The findings from the CMSD logs, surveys and interviews help explain why the results of the quasi-experiment were not significant. Of the 37 discussions that took place in the quasi-experiment, nine showed little evidence of the participants focusing on the task and working collaboratively. This meant that almost one quarter of the discussions had little chance of enhancing the participants' comprehension of the text.

With regard to Research Question 4, the chat logs and interviews provided evidence that elaborative feedback can act as a useful support to CMSD in generating negotiation for meaning and exploratory talk. This finding is similar to that of Murphy (2010). However, context would again seem to be an important factor in determining the outcomes of the investigation. We learnt from Study 2 Survey 1 in 5.6.1.2 that the participants had an overall preference for reading from paper rather than online. They also reported finding online reading more difficult. Despite this, Survey 2 showed that 88% of the respondents felt that the elaborative feedback had helped them understand the reading text in Reading Practice Exercise 3, prior to taking Post-test 3. Considering that no training had been provided in the use of the feedback, this suggests that the participants already had enough strategic knowledge for it to be useful. In comparison, 53% of the treatment group reported that the chat session had helped them with text comprehension. In Study 2 Survey 3, which was administered after the 4 lessons featuring online chat sessions in which the reading practice exercises and feedback were discussed, almost 95% of the respondents from 2TA reported that elaborative feedback had helped them understand the reading texts. In comparison, two-thirds thought that the feedback had helped them

in the chat sessions, the same proportion of respondents that reported that the chat sessions themselves had been useful.

From the CMSD logs there are numerous examples of the feedback acting as a support to the discussions. However, in many instances where the feedback was discussed, the participants were citing it verbatim, without building on the support provided by the feedback. It may be that the very fact that the feedback had been targeted at their level in order to assist with comprehension meant that little additional support was needed. However, it may also be the case that comprehending the modified input thanks to the scaffolding provided by the elaborative feedback was within their *Zone of Proximal Development*, but that paraphrasing or expanding on the elaborative feedback was not.

Another possible reason was the design of the task. As Yilmaz and Granena (2010) noted, the structure of a task can have an impact on the types of interactions that result. The structure of the tasks in the current study differed from those utilised by Murphy (2010) in that they involved the use of post-reading CMSD following exposure to an online reading comprehension exercise. In Murphy's study, the synchronous discussions took place while readers completed a similar exercise together. In addition, the elaborative feedback in Murphy's study was delivered at the end of the comprehension exercise, rather than being available after each question, and in three stages, with more information being offered each time an answer was incorrect. It would be interesting to compare the two approaches with the same group of students, especially as one of the few suggestions for improving the elaborative feedback in Study 2 Survey 3 was to deliver it at the end of the exercise.

In summary, the quantitative and qualitative analyses of the chat logs, surveys and interviews lend support to the use of post-reading computer-mediated synchronous discussions as an aid to reading comprehension. This is despite the lack of a significant effect from the quasi-experiment. Equally, the CMSD logs suggest that elaborative feedback can act as a useful support to the discussions by helping to generate exploratory talk and negotiation for meaning.

## Chapter 6: Conclusions

This thesis investigated the use of two types of support that were provided to learners via a VLE with the aim of enhancing L2 reading comprehension. These two supports differed in an important way. The provision of elaborative feedback embedded within online reading programs was an example of the use of the computer as a *tutor* (Levy 1997), wherein the computer assumed the role of instructor in delivering learning materials to learners. In contrast, the use of computer-mediated synchronous discussions (CMSD) involved the application of a computer-based *tool* (Levy, 1997) containing no inherent underlying pedagogy, which necessitated a careful focus on task design rather than on materials development (see 3.5.1 for a discussion of this). The differences between the two supports have implications for both future practice in language teaching, and for our understanding of second language reading theory in both paper-based and computer-mediated contexts. These will be discussed after a summary of the findings from this research.

### 6.1 Summary of the Findings

The findings from Chapter 4 lend support to the use of elaborative feedback within online reading exercises as an aid to L2 reading comprehension. Although the quasi-experimental design for Research Question 1 found no significant effect for elaborative feedback when compared with knowledge of response feedback, this finding was partly explained by the finding that very little use was made of the elaborative feedback prior to the strategy instruction lessons. The results of the think-aloud sessions, interviews and surveys indicate that the majority of the participants read only the “Correct” or “Incorrect” statement and did not engage with the elaborative feedback; this is the equivalent of receiving knowledge-of-response feedback alone. On the few occasions when use was made of the elaborative feedback in the first round of think-aloud protocols, it was seen to assist the reader with text comprehension and/or with answering a comprehension question.

Of interest were the insights provided by the think-aloud sessions into the way L2 readers interact with elaborative feedback while working independently to answer

online reading comprehension questions. Previous studies had looked at oral interactions among learners around a computer while utilising elaborative feedback (Murphy 2010) and at interactions between a reader and a text while reading online (Akyel & Ercetin, 2009; Ketabi et al., 2012; Konishi, 2003). Van der Linden (1993) used think-aloud protocols to investigate learner-computer interactions while participants worked on grammar exercises containing elaborative feedback, but no studies to date had utilised think-aloud protocols to investigate the independent use of elaborative feedback while completing online L2 reading comprehension exercises. The findings suggest that elaborative feedback can assist the L2 reader through rephrasing, which acts as a form of input modification, through guiding the reader to the part of the text relevant to a comprehension question, and through helping to confirm his understanding.

Research Question 2 examined the effect of strategy instruction on the use of elaborative feedback. No previous studies had investigated the changes in the use of elaborative feedback within online reading comprehension exercises as a result of such instruction, and the findings from this research provide some evidence for the positive effects of strategy instruction within the context of the study. Following the lessons, the second round of think-aloud protocols showed a dramatic contrast in the use of elaborative feedback, with all participants from the treatment group making some use of it on every occasion. Under these conditions, the feedback was seen to aid reading comprehension on the majority of occasions. However, it should be noted from the results of Study 1 Survey 2 (see 4.13) that the control group, who were given independent access to the online reading materials but who received no strategy instruction, also rated the elaborative feedback highly as an aid to text comprehension. It is therefore possible that regular access to materials containing elaborative feedback may result in learners developing their own effective strategies for its use, reducing, or even obviating, the need for strategy instruction. This would help explain the lack of significant findings from the second quasi-experiment (see 4.6.1.2). In other words, while it was shown that the combination of access to the materials and strategy instruction resulted in greater, more successful use of the elaborative feedback, similar results may have been achieved through the provision of access to the materials alone. This could be explored through further research and will be discussed in 6.4 below.

The findings from Chapter 5 supported the use of CMSD as an aid to L2 reading comprehension. With regard to Research Question 3, although the quantitative analysis showed no significant effect for post-reading CMSD on L2 reading comprehension, the result did approach significance ( $p=.057$ ). Furthermore, analysis of the questionnaires, chat logs and interviews lent support to the findings of Murphy (2010), who found such discussions to be beneficial for enhancing L2 reading comprehension. Evidence of negotiation for meaning and exploratory talk was evident in the chat logs, while the interview and survey data also suggested that the discussions had assisted with reading comprehension. Concerning Research Question 4, evidence from these same sources suggested that the elaborative feedback was a useful support to the discussions, often being utilised by one chat partner in order to assist his colleague. This finding is also consistent with that of Murphy (2010). Motivation and engagement were found to be important factors in determining the success of individual chat sessions. Some of the CMSD logs showed little evidence of attempting to address the reading tasks, while the interviews and surveys suggested that some chat partners had not acted in a collaborative manner, electing instead to joke or otherwise fail to take the task seriously. This also helps to partially explain why the results of the quasi-experiment were not significant, despite the findings from the qualitative analysis, which indicated that the CMSD sessions could enhance comprehension.

## **6.2 Limitations of the Study**

The first study, reported in Chapter 4, was perhaps limited by the tests used for the quasi-experiments. Although high quality pre-tests were used, they were based on the IELTS reading exam, which is designed to measure across a broad range of ability levels. By selecting a single section of a similar test for the post-tests, the accuracy of the test for discriminating between the ability levels of the participants may have been further affected. In order to strengthen the quasi-experimental designs, future research could utilise pre-tests of a similar quality to the pre-tests used in this study, but designed to measure across a narrower range of L2 reading ability levels.

The texts and questions used for the post-tests might also be more tightly linked to the language ability of the participants in future studies. For example, the Council of



Europe's Framework of Reference for languages (Council of Europe, 2014) could be used to inform decisions about the complexity of the texts written for such tests with regard to the grammatical structures included. The same resource could also inform decisions made when writing the practice questions and feedback designed within reading practice exercises. In addition to more focused testing instruments, the study could have used immediate recall techniques to assess the participants' understanding of the texts under the treatment and control conditions. Such techniques have been suggested by both Bernhardt (2010) and Brantmeier et al. (2011), with the latter arguing that recall techniques might be more sensitive to meaning extraction than multiple-choice tasks, which were used in this study.

A further limitation of the first study was the fact that the surveys, think-aloud protocols and follow-up interviews were all conducted in English. While every attempt was made to ensure that the survey questions were unambiguous and easy to understand, the open-ended responses might have been richer if the participants had had the option of responding in Arabic. Likewise, the responses to the retrospective recall and interview questions might have been more valid if they had been conducted in Arabic. Furthermore, given the importance of L1 reading as a determiner of L2 reading (Bernhardt, 2005, 2010; McNeil, 2012), it would have been preferable to allow the participants to think aloud in either Arabic or English while completing the online reading exercises during the think-aloud protocols, especially as the cognitive load of such an activity is relatively high. Unfortunately, the use of L1 Arabic was not possible. As the researcher, my own knowledge of Arabic was very limited. In addition, I did not have access to translation services that might have allowed me to interpret data in Arabic.

The second study, featured in Chapter 5, was also perhaps limited by the choice of tests used for the quasi-experiment, and this weakness could be addressed in the way described above. However, the use of tests of a lower level of difficulty than those used in the first study did appear to be successful in discriminating more effectively between higher and lower levels of L2 reading ability.

## 6.3 Recommendations for Practitioners

Consideration of context is vital when evaluating the significance of the findings of this thesis for teaching and learning situations beyond those of these two studies. While the use of elaborative feedback can be recommended as a support mechanism for L2 readers reading online, particularly in situations where a relatively homogeneous cohort exists with regard to L2 reading ability, the degree to which strategy instruction is necessary will vary. In contexts where readers are at a higher proficiency level, such instruction may be superfluous, although it might still be advisable to present an overview of the benefits of the feedback and how it can be exploited. With learners of a lower proficiency level, or with lower levels of strategic knowledge, a certain amount of strategy instruction would appear to be effective in increasing the use of elaborative feedback by raising learner awareness of its potential benefits. Recommendations concerning the use of CMSD as a support to L2 readers working away from the classroom will also depend on the context in which they are to be utilised. If they are to be used with less motivated learners, a form of extrinsic motivation, such as the awarding of coursework marks for completing discussion sessions appropriately, might be advised.

For teachers and administrators who are tasked with making effective use of a VLE to support the delivery of their language programs, CMSD would appear to be an efficient means of enhancing instruction. The teaching and learning context featured in this thesis was one in which the use of a VLE was strongly encouraged, and in some instances mandated. Such an environment may place great stress on instructors, who may already be under pressure due to heavy workloads. In such contexts, practical, time-efficient solutions can prove highly valuable. The availability of online discussion tools within certain VLEs, such as Blackboard, provides teachers with a means of supporting reading instruction without the need for high-level technical skills, and without requiring large amounts of development time. By encouraging learners to work together collaboratively while completing reading tasks, opportunities for negotiation for meaning can be provided, potentially enhancing the learners' comprehension of L2 reading texts. What is more, the instructor is not required to predict in advance the areas of difficulty that the learners will encounter. By acting collaboratively, learners can, potentially, assist one another with text comprehension, as and when difficulties are encountered. As Van

den Branden (2000) argues, the negotiation for meaning that can occur within CMSD may be less sensitive to ability levels than the pre-modification of input. In contrast, elaborative feedback constitutes pre-modified input, and therefore its design must be carefully planned.

The provision of elaborative feedback within online L2 reading exercises can be recommended in teaching contexts where adequate resources and development time are available. Although high-level programming skills are not a pre-requisite for the creation of such exercises, their development does require large amounts of both time and knowledge. For example, time must be devoted to predicting which areas of the selected reading texts are likely to provide potential readers with comprehension problems. This will then inform the writing of appropriate comprehension questions. At this point, the development of effective elaborative feedback will involve careful consideration of vocabulary choice and of the linguistic complexity of the questions and hints to be provided in the feedback. This will help ensure that the feedback is accessible to the targeted learners. Once the feedback has been written, an appropriate software package needs to be utilised in order to incorporate the questions and feedback into Web pages for delivery via a VLE. Given the time, effort and expertise required to create online reading exercises containing elaborative feedback, I would recommend their use in contexts with large numbers of students with similar levels of L2 reading ability.

While there is no necessity for online reading exercises to be delivered via a VLE, such a means of delivery can facilitate access to these materials and other related resources. In particular, online reading exercises and related synchronous discussions can be hosted together in a VLE, obviating the need for students to jump from one resource to another. In this way, CMSD can be used to encourage collaboration and negotiation for meaning in a way that may help overcome some of the limitations of the independent use of elaborative feedback. For example, where the support provided by an item of elaborative feedback is not accessible to one learner, perhaps due to the difficulty level of certain vocabulary items contained within it, additional support could be provided by a peer in a related online discussion.

## 6.4 Theoretical Interpretations and Recommendations for Future Research

Three theoretical perspectives informed this thesis: the *Compensatory Model* of L2 reading (Bernhardt, 19991, 2005, 2010; McNeil, 2012); the interactionist approach to SLA (Gass, 1997; Long, 1996; Pica, 1994, 1997) and to CALL (Chapelle, 1997, 1998, 2001); and the sociocultural and social-constructivist notions of *scaffolding* and the *Zone of Proximal Development* (Commander & Guerrero, 2013; Ghafar Samar & Dehqan, 2013; Vygotsky, 1978; Yang & Wilson, 2006; Wilhelm, 2001). The findings of the two studies presented in Chapters 4 and 5 will be examined in relation to each of these perspectives in turn.

The results from both studies lend support to the *Compensatory Model* of L2 reading, which predicts that 50% of the variance in L2 reading performance can be explained by L1 literacy and L2 language ability, with the remainder being determined by other factors, such as comprehension strategies, background knowledge, engagement and motivation. In addition, it predicts that weaknesses in one knowledge source can be compensated for by drawing on other knowledge sources when comprehension difficulties arise. In the first study, the elaborative feedback was designed to assist L2 reading comprehension by providing additional knowledge, in the form of hints and guidance, to help compensate for weaknesses in existing knowledge sources. Equally, the CMSD tasks featured in the second study were designed to provide additional knowledge, both from an interlocutor and from elaborative feedback, in order to compensate for weaknesses in pre-existing knowledge, and thereby enhance L2 reading comprehension. While the results of the quasi-experiments showed no significant effect for elaborative feedback on L2 reading comprehension, the think-aloud protocols, retrospective recall sessions, interviews and surveys all lend support to the ability of such feedback to enhance comprehension in a compensatory manner. The feedback was shown to help readers locate sections of the text in order to answer questions, and, through the rephrasing of questions, to comprehend parts of the text that had previously presented difficulties. Assistance with locating the relevant parts of the text drew on aspects of L1 literacy, such as the knowledge of text structure, while rephrasing within the feedback items was designed to enhance L2 language knowledge by providing

assistance with challenging structures and vocabulary items. In 4.6.2.6 we saw several examples of the successful use of elaborative feedback by the participants. What was particularly interesting with regard to the *Compensatory Model* of L2 reading was the role of strategic knowledge, particularly in the first round of think-aloud protocols in 4.6.2.3. Prior to the strategy instruction lessons, it was the higher-ability students that made greater use of the elaborative feedback, while the lower-ability students made no use at all, largely because they did not think it would be helpful. This is consistent with the findings of Amer et al. (2010) and (Phakiti, 2003), who argue that higher- and lower-ability students differ with respect to strategy use, and with those of Ketabi et al. (2012), who found that learners may not exploit hypertext features if they are unaware of their potential benefits. It also lends support to McNeil (2012), whose *Extended Compensatory Model* predicts that strategic knowledge is the greatest predictor of L2 reading performance in higher-level learners, whereas its predictive power for lower-level learners is relatively minor. Given the moderate level of L2 reading ability of the majority of participants in Study 1, it is perhaps not surprising that the second quasi-experiment (see 4.6.1.2) showed no significant effect for strategy instruction on the usefulness of elaborative feedback as an aid to L2 reading comprehension. Both the original *Compensatory Model* (Bernhardt, 19991, 2005, 2010) and the extended model (McNeil, 2012) predict that L1 literacy and L2 language ability would outweigh the relatively modest impact of strategic knowledge on L2 reading performance among learners at this level. In other words, although elaborative feedback has the potential to assist L2 reading comprehension to some extent, strategic instruction in its use may not yield significant results with participants who have a moderate level of L2 reading ability. This may be even more likely, given the limited number of strategies required to make use of the feedback.

The findings from the use of CMSD tasks in the second study also offered support for the *Compensatory Model* of L2 reading. Just as the elaborative feedback discussed above was intended to enhance comprehension by providing additional knowledge, and thereby assisting compensatory processing, the CMSD activities were designed to add further support. The instances of negotiation for meaning that occurred in the CMSD discussions showed evidence of learners comprehending vocabulary items, portions of the text, or questions that they had previously been unable to comprehend. The difference with the first study is that this time they were able to draw on the knowledge sources of others,

in addition to their own knowledge sources and those provided by the feedback. Furthermore, they were able to resort to the use of L1 Arabic in order to seek clarification. This combination of elaborative feedback and CMSD expanded the range of knowledge sources available to the participants, increasing the potential for compensatory processing to result in enhanced comprehension.

As we saw above, the *Compensatory Model* of L2 reading acknowledges the importance of *other* factors such as motivation, engagement and level of interest, although it does not predict their relative contributions to L2 reading performance. The results of the second study, reported in Chapter 5, clearly demonstrated the importance of these factors. For instance, nine of the 37 synchronous discussions that took place during the quasi-experiment showed little or no evidence of the participants being engaged in the task, nullifying the potential for the discussions to have an impact on participants' comprehension of the reading text.

The interactionist account of SLA is useful in interpreting the results of both studies. In particular, it helps in explaining the differences between the types of support that elaborative feedback and CMSD provided, and the extent to which they were effective. Elaborative feedback was intended to enhance comprehension by modifying input, in the form of L2 reading texts, in order to render them more comprehensible to the reader. While findings from the think-aloud protocols, interviews and surveys suggested that elaborative feedback could enhance reading comprehension, there were limits to its usefulness. For example, if the reader chose not to read the elaborative feedback at all, it was impossible for the feedback to help modify input in any way. Furthermore, the language contained within the elaborative feedback needed to be accessible to the learner in order for the feedback to be of assistance. If the reader was unable to understand the feedback, no further support was available to him, and the input remained unmodified. This latter point clearly poses a problem for the teacher or course designer. It is necessary to predict the difficulties that readers will encounter when reading a text, and it is important to finely tune the support provided so that input modification can render previously incomprehensible parts of a text comprehensible, thereby enhancing overall text comprehension.

The use of CMSD, in addition to elaborative feedback, helps solve some of the issues related to use of elaborative feedback alone. Firstly, the CMSD tasks seemed to encourage the use of elaborative feedback. This is apparent from the CMSD logs in Chapter 5, in which the elaborative feedback is used by some of the participants to enhance the discussions, even though no prior training was given in how to use the feedback. Secondly, CMSD provides additional support, and enables the participants to negotiate for meaning in a manner that is not possible in the more limited human-computer interactions that take place when a learner completes an online reading exercise while working alone. Where a learner has encountered difficulty in understanding certain parts of the text, or in understanding the hints provided in the elaborative feedback, he can receive further support by working collaboratively with his peers. This not only provides further opportunities for the input to be modified, it also provides opportunities for modified output, seen by many as a necessary condition for L2 acquisition (Chapelle, 1997, 1998; Long, 1996, Swain, 1995). From this perspective, the long-term use of CMSD in conjunction with elaborative feedback might provide more of the conditions necessary for the development of improved L2 reading ability than the use of elaborative feedback alone. Potentially, all seven of Chapelle's (1997) hypotheses for the development of CALL materials and tasks (see 3.2.1) can be addressed through the combined use of elaborative feedback and CMSD. However, while the chat logs in 5.6.1.2 showed evidence of modified input, negotiation for meaning, and modified output, the quality of the interactions and the extent to which the elaborative feedback was discussed was clearly dependent on the level of engagement and the degree of collaboration between the participants. In other words, while the conditions for SLA and for enhancing L2 reading comprehension might be met by such a combined approach to instruction, contextual factors such as learner motivation and level of engagement will play a role in determining eventual success.

A similar argument can also be made from a social-constructivist or sociocultural perspective. The elaborative feedback and CMSD tasks in Chapters 4 and 5 were both designed to provide *scaffolding* in order to enable learners to perform at a level within their *Zone of Proximal Development* (see 2.4). In this way, it was intended that the participants would be able to comprehend reading texts, or parts of texts, that would be beyond their comprehension if reading unaided. Yang and Wilson (2006) note the importance of an instructor setting a task that is sufficiently challenging to maintain the

learners' interest and motivation, while at the same time ensuring that adequate support is provided in the form of *scaffolding*. In the studies featured in Chapters 4 and 5, it is clear from the results of the post-tests that, for most participants, the reading tasks set were sufficiently challenging. However, the findings from the think-aloud protocols, interviews and surveys in Chapter 4, in addition to the CMSD logs in Chapter 5, illustrate that elaborative feedback alone often provided insufficient *scaffolding*. The provision of CMSD offered additional support through the opportunity to work collaboratively with others. In particular, the CMSD logs showed evidence of successful collaboration, where a learner was able to understand part of a text following discussion with a peer that he had been unable to comprehend with the support of elaborative feedback alone.

In summary, from all three perspectives, the combination of elaborative feedback and post-reading CMSD would seem to offer greater potential to enhance L2 reading comprehension than the use of either support in isolation. Firstly, from the perspective of the *Compensatory Model* of L2 reading, such a combination provides the learner with access to more additional knowledge sources to enhance compensatory power. Secondly, from an interactionist standpoint, the combined approach offers more opportunities for modified input and output, and for negotiation for meaning to occur. Finally, from a sociocultural/social-constructivist stance, the use of both elaborative feedback and CMSD provides more scaffolding than either support can provide alone.

With regard to future research, the claim made above that the combination of elaborative feedback and CMSD is superior to the use of either support in isolation should be tested more rigorously. A study in which each support in isolation is compared with the combined support would help confirm or reject this hypothesis. The effects of strategy instruction on the use of elaborative feedback for enhancing reading comprehension are also worthy of further investigation. The study in Chapter 4 showed a dramatic change in the use of elaborative feedback following a focused program of strategy instruction. However, it remains unclear whether it was the strategy instruction itself, exposure to the materials, or a combination of the two, that resulted in this change. A follow-up study might utilize think-aloud protocols, interviews and screen recordings to investigate the use of elaborative feedback before and after access to a bank of online reading exercises containing elaborative feedback. Changes in the use of the feedback by participants who had received either explicit strategy



instruction or no instruction could be explored. A related topic for future research could be strategic instruction in how to participate effectively in CMSD. Whether such instruction could affect the usefulness of post-reading CMSD would provide valuable guidelines for using CMSD in L2 reading programs.

One final finding of relevance to future research was the relative success of the mixed-methods designs employed in these studies. In Chapter 4, the lack of significant findings from the quasi-experiments were partially explained thanks to the rich data provided by the supplementary data collection procedures. In particular, the first round of think-aloud protocols and retrospective interviews helped demonstrate why the elaborative feedback had had no significant effect in the first quasi-experiment: it was simply not being read on most occasions due to a lack of learner awareness of its potential benefits. Likewise, although the second quasi-experiment showed no significant effect for strategy instruction, the second round of think-aloud protocols showed that all six participants were able to benefit from the elaborative feedback when using it strategically. Similarly, in Chapter 5, the CMSD logs helped explain why the results of the quasi-experiment found no significant effect for post-reading CMSD on reading comprehension: nine of the of 37 discussions were not focused on the task.

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Pages 273-292 (Appendices I-VI - Appendix I: Questions from Reading Practice Exercise 1; Appendix II: Questions from Post-Test 1; Appendix III: Questions from Reading Practice Exercise 2; Appendix IV: Questions from Post-test 2; Appendix V: Questions from Reading Practice Exercise 3; Appendix VI: Questions from Post-test 3) of this thesis have been removed as they contain copyright material.

## Appendix VII: Final Ethics Approval

From: **Ethics Secretariat** <[ethics.secretariat@mq.edu.au](mailto:ethics.secretariat@mq.edu.au)>  
Date: 13 January 2015 at 10:54  
Subject: Re: ethics amendment approved for HE28MAR2008-D05699  
To: FoHS Higher Degree Research <[fohs.hdr@mq.edu.au](mailto:fohs.hdr@mq.edu.au)>  
Cc: "[andrew.bown@students.mq.edu.au](mailto:andrew.bown@students.mq.edu.au)" <[andrew.bown@students.mq.edu.au](mailto:andrew.bown@students.mq.edu.au)>

Dear Sir/Madam,

This email is to confirm that the following ethics application/s cited below received final approval from the Macquarie University Human Research Ethics Committee:

**Chief Investigator: Mr Andrew Bown**

**Ref:** HE28MAR2008-D05699

**Date Approved:** 17 March 2008

**Title:** *'Using a Virtual Learning Environment for the Development of L2 Academic Reading'*

Please do not hesitate to contact me if you have any questions.

Yours sincerely,

Director, Research Ethics & Integrity,  
Chair, Human Research Ethics Committee (Human Sciences and Humanities)

--

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