Promoting Critical Thinking in Language Learning
Through Computer-Mediated Collaborative Learning:
A Preliminary Investigation

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DECLARATION

Except where due acknowledgement has been made in the text to other material, I certify that I am the sole author of this thesis submitted, entitled:

**PROMOTING CRITICAL THINKING IN LANGUAGE LEARNING THROUGH COMPUTER-MEDIATED COLLABORATIVE LEARNING: A PRELIMINARY INVESTIGATION**

The length of this thesis, exclusive of the abstract, the preface, acknowledgements, tables, figures, references, and appendices, is less than 70,000 words.

Signed  

Janpha Thadphoothon  

August 2005
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ABBREVIATIONS

The following abbreviations are used in this study:

CI   Coordination Index
CL   Cooperative/Collaborative learning
CLT  Communicative Language Teaching
CMC  Computer-Mediated Communication
CMCL Computer-Mediated Collaborative Learning
CT   Critical Thinking
DPU  Dhurakijpundit University
ELICOS English Language Intensive Courses for Overseas Students
EFL/ESL English as a Foreign/Second Language
ELT  English Language Teaching
GFI  Gunning Fog Index
ICT  Information and Communication Technology
TESOL Teaching English to Speakers of Other Languages
TTR  Type-Token Ratio
UC   University of Canberra
ZPD  Zone of Proximal Development
ABSTRACT

This thesis proposed a framework for conceptualizing critical thinking in language learning. A learning environment where collaborative learning and network technology were combined – computer-mediated collaborative learning (CMCL) – was set up. The main aim was to study the potential of the learning environment in promoting critical thinking (CT) in language learning. The proposed framework of CT in language learning had three aspects: (1) communication, (2) reasoning, and (3) self-reflection.

The study was a qualitative one that took place between June 2003 and January 2004. Three case studies were undertaken that involved up to 90 participants, comprising students, teachers, volunteers, and the researcher. All were members of an online learning community, the Bamboo Enterprise. Students worked in groups that investigated environmental problems. The student projects were grouped into three case studies: (1) Using Collaborative Environmental Projects to Promote Communicative Language Learning and Computer Skills, (2) Using Environmental Themes in Computer-Supported Cooperative Learning to Prepare ESL Students for Academic Study in the Australian University Environment, (3) Promoting Communicative Language Learning Through Computer-Supported Cooperative Learning. Findings were based on analyses of five sources of data: (1) interviews with the student participants; (2) teachers’ comments and opinions; (3) questionnaires; (4) students’ overall group work; and (5) online discussions.

The investigation found that, overall, the CMCL environment with its particular framework had the potential to promote CT in language learning. However, it had both strengths and weaknesses. The strengths were that it promoted the communicative use of English, encouraged critical thinking in action, and extended the students’ potential to learn a second language. It also encouraged the appropriate use of technology. More importantly, this CMCL environment showed itself to be a viable method of learning and one in which both students and teachers can be empowered. However, along with these advantages, some avenues for improvement were evident. The study found that the students’ grammatical accuracy was low, despite their rich vocabulary and ability to use complex language structures. Some
students found working in groups challenging and some never acquired the necessary web skills. Access to the Internet was not always adequate for this type of project. In sum, the students needed more support, especially at the task level, when using this method of language learning.
CHAPTER ONE
INTRODUCTION

1.1 Overview
This section gives an overview of the thesis. It starts by describing how Information and Communication Technology (ICT) has pervaded every aspect of modern life and describes how ICT is widely used in education in general, and in language education in particular. Attention is then drawn to the significance of critical thinking as an aim in education and language education. Finally, there is an introduction to the contemporary understanding and practice of teaching critical thinking skills in second language education.

1.1.1 Growth of Information and Communications Technology

ICT has become a global phenomenon and its impact is expanding into almost every sphere of human activity. A recent significant development of ICT is Internet technology. In a developed country such as Australia, for example, according to the Australian Bureau of Statistics (2004), the percentage of households with access to a computer at home has increased from 44% in 1998 to 61% in 2002. Australian households with Internet connection at home were only 16% in 1998, but that number had increased to 46% by 2002. The trend is similar in most countries, both developed and developing. The Internet is, according to Matsuda, Canagarajahb, Harklauc, Hyladd and Warschauer (2003), “the fastest spreading technology for communication in human history (p. 162).”

1.1.2 The Internet in Education

It seems that Internet technology has been embraced by most fields of education; and, this is so despite many concerns about its negative effects on language, individual and group psychology and pedagogy (Wallace, 1999;
Baron, 2000; Green, 2001; Schneider & Weiss, 2001; Brabazon, 2002). Online learning is growing significantly. At present, there are more than one million courses available on the Internet. Google reports about 24,800,000 items for the term “online courses.”

1.1.3 Computer Technology and Collaborative Learning

The Internet has features and functions that facilitate collaboration and these can be used extensively where collaboration is required. This comes as no surprise, as the Internet originated from the need for people to communicate with one another. Communication technologies, such as mobile phones and the Internet, are means of bringing people together. Gate (1995), for example, predicts that the Internet will not isolate students, but will enhance CL. He writes: “One of the most important educational experiences is collaboration. In some of the world's most creative classrooms, computers and communications networks are already beginning to change the conventional relationships among students themselves, and between students and teachers, by facilitating collaborative learning” (p. 200). The marriage between the computer and collaborative learning has resulted in a new paradigm of learning. Koschman (1996) has coined the term “computer-supported collaborative learning” to describe that paradigm.

1.1.4 The Internet and Language Education

Networked computers are widely used in language education. Many of the Internet’s features and functions are conducive to collaborative language learning because Internet communications can be text-based, and time and place independent. Also, they can be distributed easily via hypermedia links from many to many, over long distances (Warschauer, 1997). EFL/ESL teachers are using computers to enhance their work performance. In addition, the Internet is an ideal means of conducting distance education. In the language learning and teaching context, Warschauer (1997) has coined the term “computer-mediated collaborative learning” (CMCL) to represent the
use of such a combination of computing and language education in the learning process. The use of CMCL is growing quickly both in popularity and variety of applications in every corner of the globe.

### 1.1.5 Significance of Critical Thinking

Throughout history, humans have used tools to alter nature in order to enhance their performance. However, in this digital age, even with new technology, many aims of education remain unchanged. One such aim is developing the ability to think critically. Critical thinking remains highly valued in all fields of study. Societies generally, but especially those in the West, would like their educational institutions to produce individuals with critical thinking abilities. Most educators regard critical thinking as a primary aim of education. Concern with critical thinking in its broad sense is not new. Burbules and Ruperk (1999) have said that critical thinking has been an important element in the Western tradition of education. An ancient Greek scholar Socrates (470-399 BCE) sought to develop critical thinking skills when he used his method of questioning to develop human thought; he sought to make his students more reflective about their lives. Critical thinking is highly valued in other parts of the world also, in the south and the east of Asia for example.

The decision to believe, or not to believe, requires critical thinking ability. In his book, *How We Think*, Dewey (1933) writes that learners should be reflective about their learning and thinking. Dewey proposes that critical thinking or ‘reflective thinking’ be one of education’s principal aims. Passmore (1974), Ennis (1962), Paul and Elder (2002), Siegel (1990), Lipman (2003) and McPeck (1981) also are scholars associated with the tradition of using reflection for training in thinking. According to this tradition, educational institutions should not primarily provide students with facts and specific systems of knowing or meanings. Students should be equipped with skills and knowledge, so they can become critical language
learners who are cooperative, open-minded, reflective, and autonomous. Most educationists seem to agree that there is more than one system of meaning, and many ways to teach learners to think and reason well. Similarly, there is more than one way to express the same illocutionary force. All agree too that thinking, although significantly pre-determined by initial genetic make up, can be learnt.

1.1.6 Critical Thinking and Second Language Learning

The main aim in language education is to produce successful communicators, that is, students who understand linguistic conventions and are capable of delivering them to suit particular situations and contexts (Butt et al., 2000). Such students are effective language learners and users. Most language educationists today would agree that a focus on the forms of language, for example by emphasizing pattern drilling, is inadequate. Grammar learning and translation are not sufficient for successful communication. With English as a universal language, in the context of TESOL there is a crucial need for students to be critical in their language learning as well as in their language use. In the ELT context, when students express their ideas or feelings through English (exercise their critical thinking skills), they need to consider lexico-grammatical and a myriad of socio-cultural aspects. In recent decades, TESOL educators have implemented the communicative approach to language learning and teaching. The communicative language learning movement focuses more on language in use than on rigid pattern drilling, and it is less teacher-centred than was previously the case. The main purpose of using this approach is to equip students with a competence to communicate (Widdowson, 1978; Canale & Swain, 1980; Savignon, 1983; Brumfit, 1984, 1988). In CLT, learners are invited to exercise their thinking ability, for when they use the language they have to take into accounts factors such as the audience and the setting when they communicate.
This study is situated within the broad approach of communicative language teaching and learning. Many current methods of teaching fall into this category: The Natural Approach, Cooperative Language Learning, Content-Based Instruction, and Task-Based Language Teaching (Richards & Rogers, 2001; Jacobs & Farrell, 2003). The communicative approach invites learners to be more critical when they learn and when they use the language for communication. It is argued that the transition from the audio-lingual method to the communicative approach marks the beginning of the reflective era of English language teaching and the introduction of critical thinking elements to the field. Chapter 2 will discuss this issue at length. Factors promoting the growth of the communicative approach are: (1) the popularity of English as a global means of communication (Crystal, 1997b, 1997a, 2001); (2) the humanistic movement in education (Nunan, 1992b); and, (3) the importation and integration of other disciplines such as sociology and anthropology, into traditional linguistics (e.g. Luke, 2004). The globalization of English, fuelled by global trade and new communication technologies, means more users, more differences and more varieties of English, as well as more discourses or critiques on its roles (Phillipson, 1992; Luke, 2004). As there are more factors for consideration, EFL/ESL learners in particular, in order to become effective communicators of English as a global language, need to be critical language learners and users.
1.2 Computer-Mediated Collaborative Learning and Critical Thinking in Language Learning

1.2.1 Collaborative Learning and Critical Thinking

Long before the introduction of computers in education, collaborative activities were used for developing learners’ critical thinking (Sharan, 1980). General education studies report that collaborative learning fosters, among other things, learners’ thinking skills (e.g. Johnson & Johnson, 1994). Recent research findings, including results of brain research, confirm that cooperative activities give what human brains are constantly seeking, namely, social stimuli. Citing studies conducted by Brothers (1997) and Carter (1999), Kagan (2001) has asserted that human brains “to a remarkable extent, are social organisms”. He suggests that teachers structure their courses and organize learning activities in ways enable learners “to interact regularly over academic content — having them discuss, debate, and work together on the content”. CL is indeed a viable means to encourage critical thinking.

1.2.2 Critical Thinking in Second Language Learning

What is critical thinking? Many definitions of the term have been proposed. At the broadest level, critical thinking is about humans and the judgments they make based primarily on reason. Critical thinkers usually do not take things for granted. They base their decisions on objective criteria and recognize their own bias and prejudice. They often rely on scientific inquiry, another form of critical thinking. According to Lipman (2003), people’s efforts to improve their quality of thinking are “probably coextensive with human history itself” (p. 206). It should be mentioned here that this study positions itself with utilitarianism, and a belief that critical thinking is neutral. Logically, a clever or smart person does not have to be a moral one.
Even though there are numerous ways of talking about critical thinking, there are some common threads in evidence. First, many definitions focus on human cognitive ability; that is, the ability to make sense of the data or information, and appropriately use reasoning to do so. Secondly, most prefer individuals to be active rather than passive thinkers when it comes to inquiring. In other words, there is a dispositional aspect to critical thinking. Thirdly, in terms of education, most scholars agree that critical thinking can be acquired, through formal as well as informal learning. Finally, every definition relies heavily on language, verbal and non-verbal, to provide the main evidence of the presence of critical thinking.

Most studies define critical thinking as the basic dispositions and skills that a person has and uses to help make better decisions or better solve problems. In this study a model of critical thinking (CT) in language learning is proposed, specifically for ELT situations. Critical thinking in this context has three components: communication, reason and self-reflection. Critical language learners communicate and use reason to form their ideas. They also use their metacognitive ability for self-reflection about their own learning. Chapter 2 will discuss the proposed framework in detail.

Why do L2 learners need critical thinking? In the field of language studies, many proponents of critical theory would like learners to be more active and critical when they attempt to make sense of text or discourse, rather than be passive consumers of texts (Kanpol, 1990; Kress, 1990; Phillipson, 1992; Hood & Joyce, 1995; Pennycook, 1996b; Penneycook, 1997; Luke, 2004). Even though different approaches to critical thinking have been widely discussed and implemented in general education and first language settings, it only became part of the ELT discourse during the last decade of the 20th century (Atkinson, 1997; Davidson, 1998; Thompson, 2002; Day, 2003). There have been many debates on what critical thinking means and how best it should be taught. The debates make it evident that there are differences of opinion, but they also show there is significant agreement on one thing:
critical thinking is important for language students. The remaining questions are primarily regarding how it should be taught and learnt

Why does critical thinking matter for a language learner? Does a person’s ability to think critically help an individual learn? Does it help one learn a language? These questions and more should occur to us when trying to make sense of a text. In this study, it is assumed that a person thinks critically when he or she uses appropriate language, applies logical reasons, and reflects on his or her learning of the language.

1.2.3 Collaborative Learning as a Means to Promote Critical Thinking

All else being equal, both quantitatively and qualitatively, collaboration allows learners to have access to more sense data, and sense data is pivotal to effective language learning (Long & Porter, 1985; Long, 1996; Brown & Rodgers, 2002). Long (1997) notes one of the weaknesses of teacher-centred, lock-step instruction, “whereby the teacher presents and practices the same material in the same way to and with all the learners simultaneously”. He suggests the use of group work as an alternative, noting that learning together with peers and others allows learners to have access to more sense data or stimuli.

Meaningful interaction is a crucial factor in language learning. It can improve learners’ experiences in a variety of ways. As early as the 1960s, Finocchiaro (1969), discussed the need to bring the school and community closer together for the benefit of the students, in an ESL context in the U.S. For her, the school and community can benefit from their cooperation in a variety of ways. Resources available in the community make valuable teaching materials, and community support helps make local schools strong. She believes that, in the context of general education, schools and communities should cooperate wherever appropriate, in order to enrich the students’ learning experience. Ingram (1978, 2002) suggests that learning a language should extend beyond the classroom, and learning activity should
take the community into account. He goes on to say that, through community involvement, “learners are given continual opportunities to interact with speakers of the target language and to use it for real communicative purposes and for normal social interaction, whether that is face-to-face or over the web.” A recent report shows that input from the community can play a major role in improving learners' achievements. In an L1 context, Tapu school students in New Zealand, for example, significantly benefited from the support of their community. Their reading comprehension and vocabulary levels were significantly raised ("Community Works on Literacy" reported in Hauraki Herald, December, 2002).

1.2.4 Collaborative Learning on the Internet

As noted earlier, learning communities have blossomed on the Internet. Thousands of online groups and websites are created everyday. As there is a positive correlation between English and the language of the majority of Internet providers, the growth of the Internet has reinforced the phenomenon of “English as a global language” (Crystal, 1997b; Warschauer & Meskill, 2000; Crystal, 2001). In becoming a global means of communication, English has become more ‘flexible and more open’, mainly to accommodate differences in its users and settings (Crystal, 1997b, 1997a, 2001; McKay, 2002; Bragg, 2003; McArthur, 2003). It has become more open and flexible in the sense that new words, jargon, or metaphors have to be invented to communicate new concepts. Indeed, the English language has been influenced by various languages. Even though its pronunciation, grammar and vocabulary differ from one dialect to another, sometimes substantially, its users, native and non-native, have only minor problems communicating with each other. Because of its global status, English language learners have to be able to function as socially responsible global citizens as well as local ones. To do so, they need to be equipped with critical thinking skills and critical thinking dispositions.
1.2.5 CMCL as a Vehicle to Promote Second Language Learning

Being able to think critically and reflectively is a desirable outcome of learning. However, rhetoric from many educationists and policy makers around the world is similar. It is said that students, despite their basic schooling, do not seem to have the level of thinking skills and the type of thinking dispositions deemed necessary for the new world. Matthew Lipman (2003), an American professor of philosophy, thinks there must be something wrong with the present educational practice if the low level of thinking skills is the quality of the product.

In addition to their discussions of its possible meanings and structure, educationists have suggested ways to teach critical thinking. Some doubt if critical thinking can be explicitly taught at all (Atkinson, 1997; Ramanathan & Atkinson, 1999). However, in numerous books and articles it is reported that CL can promote critical thinking, particularly in general education. Johnson & Johnson (1994), for example, declare that cooperative learning (learning together) is a crucial element in successful learning. For the Johnsons (ibid.) CL is “indicated, whenever learning goals are highly important, mastery and retention are important, a task is complex or, conceptual problem solving is desired, divergent thinking or creativity is desired, quality of performance is expected, and higher-level reasoning strategies and critical thinking are needed” (p. 38). They quote several studies in support of their argument that CL is effective in fostering benevolent conditions for critical thinking:

Cooperative learning promotes a greater use of higher-level reasoning strategies and critical thinking than do competitive and individualistic learning strategies.
(p. 57)

Jacobs (2001) summarizes ten studies that consider the relationship between CL and thinking. He concludes that most studies he reviewed point in one direction: CL is more effective than other modes of instruction for higher-level tasks. However, Jacobs (ibid.) records also that only certain types of
CL techniques enhance higher-order thinking. One such is called ‘cooperative controversy’ – different views foster cognitive development by causing disequilibrium – a concept introduced by Johnson & Johnson (1992, cited in Jacobs, 2001). Similarly, Dees (1991) suggests that dealing with controversial issues might be an essential element of CL in promoting thinking skills. It is worth noting here that other findings seem to support this view. There is, for example, Friedrich Frobel’s notion of contrasts, the idea of the reconciliation of the opposites. More recently, Carl Sagan (1980, quoted in Bielaczyc & Collins, December 2002) attributes the creativity of the ancient Greeks (or the Ionian civilization during the 6th century BC) to their freedom to ask questions, their ability to use writing as a thinking tool and, their attempts to reconcile different perspectives.

1.3 Statement of the Problem
Though many studies have found a relationship between CT and CL, most research (Sharan et al., 1984; Johnson & Johnson, 1994; Jacobs, 2001) has been carried out on the traditional face-to-face context. Research into CT within the context of language teaching and learning is very new. The Routledge Encyclopedia of Language Teaching and Learning (2004) does not give any direct reference to the term critical thinking. In addition, in that work CL is conceptualized as group work and pair work, and is discussed within two short paragraphs.

Wider contexts of use and usage may demand broader perspectives among the users of English. English as a lingua franca, especially in its context of online use, has been a matter of concern for many, especially applied linguists. Some think that English will be a runaway language (Baron, 2000). Today learners are confronted with different types of ‘Englishes’ that are being used by a diversity of people who can be using it for quite different purposes. For example, it is used in a multiplicity of ways on the Internet. Part of the EFL/ESL teachers’ task is, therefore, to prepare students to communicate successfully in many contexts. The students need to be able to
communicate appropriately with other users of English, be they native or non-native speakers. As Crystal (2001) points out, the majority of English language users are non-native speakers. CMCL in the sense suggested here, should offer beneficial communicative opportunities for users and learners of English from different cultural backgrounds. It addresses the need to reconcile differences in order to get messages across successfully, and it recognizes that reconciliation may be a greater challenge for learners than the problems they face when communicating with learners from their own culture.

In the face-to-face learning context, CL activities provide more interaction for both teachers and students than is possible in the whole-class approach (Sharan et al., 1984; Nunan, 1992a; Jacobs & Hall, 2002). Nunan (1992a) points out five obvious benefits of CL activities, suggesting that they would stimulate learners:

- To learn about learning and, therefore, learn better;
- To increase a learner’s awareness about language, and about self, and hence about learning;
- To develop, as a result, meta-communicative as well as communicative skills;
- To confront, and come to terms with, the conflicts between individual needs and group needs in social and procedural terms, as well as in linguistic content terms; and,
- To recognize the decision-making tasks themselves as genuine communicative activities.

(p. 3)

However, Nunan (ibid.) recognizes that there are certain difficulties involved in the collaborative efforts of learners, teachers, and curriculum specialists. He suggests that this methodology is a complex one, involving unpredictable factors, so that implementation may require greater effort from all parties involved. Mainly because of these unpredictable factors that are associated with its implementation, the collaborative approach to language learning has not been widely practised despite its many potential benefits. This is especially so in Asia (Jacobs, 2002, email communication).
Implementation is even more complex when it comes to online situations. Warschauer and Whittaker (2002), recognizing the new challenge, suggest that teachers should think carefully about how to integrate ICT into their existing courses. They also warn that any attempt to integrate online teaching needs to show awareness of the complexity of implementation. They describe some of the problems that may occur with online collaborative teaching in the following brief extract on exchanges between classes:

Exchanges between classes are even more complex. The partner class might have absent students, or might not meet in a particular week because of holidays or other activities in that location. The partner teacher might not have the same understanding of the nature of the exchange, and working through differences can cause further delays. The students might have differences in background, language, and experience which can cause further complications. (p. 370).

Many variables are involved when it comes to the online collaborative situation. Nonetheless, to regard collaboration as a theme in education, where teachers and students collaborate for mutual benefit, is a viable and useful concept. Online implementation where learners function within an open collaborative context is perhaps a feasible learning environment.

If properly utilized a complex environment, such as that found online, can support learners’ critical thinking in language learning. There are more things for them to experience than in the normal classroom. Above all, they need to be critical about the information available. Determining whether any given information is relevant is a signpost to critical thinking. Such a complex condition may be a platform for developing learners’ awareness, which is in line with Friedrich Frobel’s law of growth and education. This states: “The human organism developed itself by activity, by varied activities, by contrasting activities”. The reconciliation of these contrasts is part of human developmental experience; therefore, education should provide the challenge of such contrasts (quoted in Curtis & Boulwood, 1964, p. 126-127). Conflicts are not always destructive; they can be creative and constructive. In fact, controversial issues have been widely used as a
means to promote students’ critical thinking skills (Johnson et al., 1986; Johnson & Johnson, 1989; Johnson et al., 1991; Johnson & Johnson, 1994). This study regards collaboration, the genesis of CL, as being not just a method, but also a possible theme in education (Jacobs, 2002, personal communication).

In light of the influence of computer technology on education in general and ELT in particular (Warschauer & Whitaker, 2002), and the prominent role of critical thinking in language learning, the relationship between CMCL and critical thinking in language learning as it has been described here merits investigation.

1.4 Significance of the Study
This study is significant for two reasons. First, it proposes a new model of CT within second language learning. CT, like CL, is a concept originating within L1 contexts. However, this study presents a model that extends to EFL/ESL contexts. Serious discussions of CT within ESL/EFL contexts began only in the 1990s but, in the short time since then, numerous researchers and practitioners have discussed many important issues relating to CT in ESL/EFL contexts (Atkinson, 1997; Gieve, 1997; Hawkins, 1997; Atkinson, 1998; Davidson, 1998; Day, 2003; Atkinson & Kaplan, March 1994). In particular, there are discussions about ways to promote critical thinking skills in ESL/EFL learners effectively. Despite some variations in the definition of CT, the question has moved from whether or not CT should be introduced in second language learning contexts (Atkinson, 1997), to how can CT be effectively integrated into ELT practices (Davidson, 1998; Day, 2003). The concepts discussed to date, including those raised by ELT writers and researchers (Ballard & Clanchy, 1988; Benesch, 1993; Gajdusek & Van Dommelen, 1993; Fox, 1994; Ballard, 1995a, 1995b; Moham & Van Naerssen, 1996; Atkinson & Kaplan, March 1994) can be seen as having three identifiable aspects: (1) communication, (2) reasoning, and (3) self-reflection. These are the basis of the model of CT used in the present study.
The proposed model of CT in language learning is not simply about critical thinking; it is a model that is designed to ensure that language learners experience all the elements of critical thinking.

The second reason for the study is that, significantly, it moves the boundaries of CMCL in the sense that CMCL now includes both online and offline contexts – blended CMCL. Its use of global topics gives meaningful content to CMCL. In this sense, CMCL has both pedagogical and social goals.

It is expected that this study will contribute to the ongoing research in the area of CMCL. At present there are very few completed studies that concern CMCL in ELT, and this is especially so if one considers studies that specifically address issues relating to CT. A framework for understanding and analyzing CT in language learning is proposed and tested; and the boundaries of CMCL are expanded by mixing online with offline communications and regarding global topics as viable and desirable content.

1.5 Use of Terms

1. This study uses the term ‘collaboration’ in its broader sense, entailing cooperative learning and collaborative learning (Jacobs, 2002, personal communication). The abbreviation CL is used to refer to both terms. CL also refers to group activities. This study regards collaboration as a possible theme in education; it is considered a teaching methodology as well.

2. This study views computer-mediated collaborative learning or CMCL in its broader sense as entailing both face-to-face and online communication (Warschauer, 2003, personal communication). In this blended CMCL, the students attend their normal classes (meet face-to-face with each other and their teacher) and use the Internet to communicate inside and outside of class.
3. CT in language learning is a proposed construct that has three components: (1) appropriate communication, (2) appropriate reasoning and, (3) self-reflection on language.

5. The Bamboo Enterprise is an online learning community that was created to support the students’ CT in language learning. It was created using Yahoo Groups, an advertisement sponsored service provided by www.yahoo.com. The technology was chosen because of its sociability, usability, and practicality.

6. ‘Research participants’ refers to (1) teacher participants, (2) student participants, (3) online-only-student participants, (4) volunteers, and (5) the researcher. Thus, this study falls within the sphere of participatory classroom research.

### 1.6 Research Questions

The study develops a framework for analyzing CT in language learning and sets up a CMCL environment. The main aim is to analyze the potential of CMCL in promoting CT in language learning.

This thesis asks one basic question: What is the potential of the created learning context, using a specified framework, for promoting CT in language learning? In answering the research question, the researcher proposes a model of CT in language learning. The model entails the three aspects of CT language learning: communication, reasoning and self-reflection. The students’ behaviour is evaluated during the exercise, using the following criteria:

1. **Use of linguistic conventions**
   - Do the students use linguistic conventions appropriately?

2. **Audience**
   - Do the students communicate with their audience appropriately?

3. **Aims**
   - Do the students attain their aims in communication?
4. **Reasoning**
   Is the students’ reasoning appropriate?

5. **Self-reflection in language learning**
   Does the learning environment encourage them to be self-reflective in their learning?

The learning environment that is set up implements the proposed framework. This especially created learning environment, with its particular features, allows for the analysis and assessment and of its potential to foster CT in language learning.

### 1.7 Limitations of the Study

There are three main limitations. First, since the study used case studies as its main methodology, generalizations from its results are limited. Secondly, the data used for the analyses is limited to those students who were available for data collection. As their written reflections and answers to the questionnaires were not obligatory, only some of them gave their reflections and questionnaires to the researcher. Lastly, the students’ overall work reflected their final-stage production. The processes of their work were accessible through their self-reflections, the teachers’ observations and comments.

This study’s aim was not to determine or demonstrate whether this approach to CMCL is more effective than other methods. It was an exploratory study that endeavoured to address one set of phenomena: What happens when the intervention is put in place? In this study, the ‘what’ of the research was the students’ critical thinking in language learning.

These limitations reflect the nature of most collaborative studies. However, in spite of the constraints, this exploratory study was expected to yield some practical and theoretical benefits for teachers and researchers in their approaches to critical thinking in language learning.
1.8 Structure of the Thesis

This thesis has seven chapters:

Chapter 1, *INTRODUCTION* starts with the study’s background, followed by a statement of the problem and a discussion about the significance of the study. It explains why this preliminary investigation is worth doing. It then provides definitions of the terms used, an explanation of the purpose of the study, and a review of the structure of the thesis.

Chapter 2, *CRITICAL THINKING IN LANGUAGE LEARNING*, begins with a brief introduction to the chapter, followed by a discussion on thinking and critical thinking (CT) in language learning. In this chapter, a particular model of critical in language learning (ESL/EFL) is proposed.

Chapter 3, *PROMOTING CRITICAL THINKING IN LANGUAGE LEARNING THROUGH COMPUTER-MEDIATED COLLABORATIVE LEARNING*, defines what collaborative learning (CL) is and describes its essential characteristics. It then presents some concepts supporting the use of CL to promote CT, namely: Vygotsky’s zone of proximal development, observational learning, input and output hypotheses, and humanistic movements in education and psychology. Next, it reviews previous research on the relationship between collaborative learning and critical thinking within the context of general education and also that of ESL/EFL. Project-based language learning, another type of CL, is proposed as a specific approach to be employed in this study.

Chapter 4, *METHODS AND PROCEDURES*, begins with an introduction to the case study and a description of the research participants. It describes the Bamboo Enterprise as a learning community and the procedures of the research. Then, the chapter presents two sources of data the study draws on to determine or substantiate the learners’ critical thinking in language learning: (1) learners’ self-report on their performance, and (2) teachers’ opinions and comments. Next, it explains why the projects are classified into
three case studies. The case studies have the titles: (1) *Using Collaborative Environmental Projects to Promote Communicative Language Learning and Computer Skills*, (2) *Using Environmental Themes in Computer-Supported Cooperative Learning to Prepare ESL Students for Academic Study in an Australian University Environment*, (3) *Promoting Communicative Language Learning though Computer-Supported Collaborative Learning*. Finally, ways to determine the potential of this type of CMCL are identified.

Chapter 5, *RESULTS*, presents the results of the study. It begins with an overview of the chapter and then presents the results case by case. Each case study addresses five areas of CT component: linguistic conventions, audience, aims, reasoning, and self-reflection.

Chapter 6, *EVALUATING THE POTENTIAL OF THE LEARNING ENVIRONMENT*, describes and discusses the strengths and weaknesses of the learning environment to which students were exposed.

The last chapter of the thesis, Chapter 7, *CONCLUSION*, begins with an overview of the complete research project, followed by a discussion of the potential of the learning environment, considering the three aspects: (1) the students’ communicative use of English; (2) the students’ CT in language learning; and (3) the students’ self-reflection in their language learning. The matter of the viability of the proposed model is also addressed. The researcher then reflects on the impact of the study, on himself as well as on the teachers. Next the limitations of the study are identified and the conclusion and the implications of the findings are presented. Lastly, based on the results and emerging themes, recommendations for future research are offered.
CHAPTER TWO

CRITICAL THINKING IN LANGUAGE LEARNING

Introduction
This chapter presents a model of critical thinking in language learning in an ESL/EFL context. The model does not aim to teach students critical thinking directly, but rather seeks to provide a learning environment in which students can experience critical thinking as they learn another language.

2.1 Defining Critical Thinking
Critical thinking is defined in many ways. The renowned educationist John Dewey (1859-1952) refers to critical thinking as ‘reflective thinking’, and proposes that it be one of the aims of education. One of the most frequently referred to definitions of critical thinking is one used by Ennis, who has similar views to Dewey. Ennis defines critical thinking as “reasonable reflective thinking that is focused on deciding what to believe or do” (1987, p. 10). Norris (1985) in much the same vein, defines critical thinking as: “deciding rationally what to or what not to believe”. For Dewey, Ennis, and Norris, critical thinking is about being careful and reflective when making decisions to believe something or do something.

A more recent perspective on critical thinking involves the use of intellectual standards. Paul and Elder (2002), for example, define critical thinking as being the “disciplined art of ensuring that you use the best thinking you are capable of in any set of circumstances. The general goal of thinking is to ‘figure out the lay of the land.’ We all have choices to make. We need the best information to make the best choices” (p.7). Paul and Elder believe that critical thinkers have a basic ability to take charge, to develop intellectual standards, and to apply them to their own thinking. They suggest there are nine criteria generally used: Clarity, Relevance, Logicalness, Accuracy, Depth, Significance, Precision, Breadth, and Fairness. Critical thinkers should apply these criteria as minimal requirements when they reason (ibid.).
Other educationists consider critical thinking to be about scepticism. McPeck (1981), for example, suggests that the essence of critical thinking is “the propensity and skill to engage in an activity with reflective scepticism” (p. 8). Similarly, Sofo (2004) believes that thinking critically is about doubting and stopping to reconsider what we normally take for granted. Sofo sees critical thinkers as people who evaluate their habits to improve the way they do things. They are people who are open-minded and who take into consideration other perspectives.

While critical thinking has been defined in terms of making decisions on the basis of reflection, using criteria and standards, and being sceptical, this study argues that critical thinking, like communication, is also about being appropriate. For a philosopher such as Siegel (1988), a critical thinker is a person who is “appropriately moved by reasons: she has a propensity and disposition to believe and act in accordance with reasons; she has the ability properly to assess the force of reasons in the many contexts in which reasons play a role” (1988, p. 23). According to McPeck (1981), critical thinking is “the appropriate use of reflective scepticism”. Simply raising questions is not a reliable sign of a critical thinker; a person needs to think critically in action. Citing John Passmore, the Australian philosopher, McPeck (ibid.) writes: “We can imagine someone who was so drilled that to any assertion he responded with ‘I question that!’ however inappropriate the response in relation to its association. Such a person might be said to have formed a habit of questioning, but he would certainly have not learned to be critical” (p.7). It is evident from the above that McPeck, Passmore and Siegel agree that, for critical thinking to take place, thinking power has to be used appropriately.

Despite the diversity of views, most scholars seem to agree that critical thinking is about using thinking ability. It is also thought to embody the dispositions or formed habits. Critical thinkers apply a particular quality of thought; they have the ability apply it appropriately under given conditions
and to be objective and open-minded in the process. Researchers generally agree that critical thinking can be taught, by either formal or informal means or both. It can be argued, then, that learning environments should aim to enable learners to perform acts of critical thinking.

Humans rely on the medium of language to manifest their thoughts. In other words, we think using the medium of language. Language and thought may appear almost indistinguishable. However, according to Vygotsky (1935), for young children language and thought are two separate entities. He claims that for human infants thought and language are two independently functioning systems. Infants use language as a tool of thinking (Vygotsky, 1935; Luria, 1971). Then, gradually, as children develop, the two systems seem to merge into what Vygotsky calls “verbal thought”; that is, thought that is manufactured by words and shaped by one’s history.

Thinking needs language and communication. Directly observing how and what people think is not yet possible, so researchers who study thinking must rely on observations of overt behaviour and talking (Smith, 1992). Even though there are other semiotic systems such as traffic signals or Morse code, we usually rely on the human communication that takes place by means of language. It is arguable, however, that not every element of thinking can be represented by language no matter how broad the definition used. In language learning, simply uttering words or asking questions is not enough; the learner needs to take into consideration other aspects of appropriacy such as the audience, his or her intentions, and the cultural conventions or norms.

Unlike the L1 context, communicating in L2 means taking into account more considerations, which is challenging for most non-native speakers. ESL/EFL students need to use linguistic conventions, which vary from those of their L1, to make meanings that suit their aims, situations, and contexts. Soter (1985) compares writing in L2 to writing in ‘a third language’. Problems
faced by earners in learning another language are also mediated by their language limitations (Connor, 1984; Soter, 1985; Maier, 1992).

In the next section, a model of critical thinking for ESL/EFL learning contexts is proposed.

2.2 Critical Thinking in Second and Foreign Language Teaching and Learning

The term ‘critical thinking’, as Day (2003) notes, began to appear in TESOL literature in the 1990s. However, a discussion of aspects of critical thinking in language learning probably started earlier than that, in the late 1970s when the communicative approach was introduced to the field of English language teaching.

Critical thinking in the ELT literature may have emerged, at least partially, from the fact that there are now large numbers of international students studying in English speaking countries. In Australia (Wilson, 1998a; Thompson, 2002), as in North America and the United Kingdom (e.g. Briggs, 1999), international students need a high level of language proficiency, but they also need to adjust their discourse style to suit their new situations and cultural contexts. They need to apply their critical thinking in new and different ways.

With more linguistic and rhetorical conventions to consider, the use of L2 to communicate can be very challenging for students. English teachers often hear international students complain that they know what to say but cannot put it into English. The students may have a wide vocabulary and theoretical knowledge but they may not be able to construct grammatically correct sentences. This seems to be primarily a linguistic problem. When students have to use L2 to present their ideas and feelings, as they do when undertaking a number of the tasks that are required of them in an academic context, they need to use the ability to think critically as well as their
linguistic skills. While developing their L2 competency, students face tremendous challenges in exercising critical thinking in L2. From the sociocultural perspective, when learners express their thoughts in L2, either through spoken or written language, they are not only translating their thoughts from L1 to L2, but also redefining their identities (Lantolf, 1993; Kramsch & Lam, 1999). Expressing one’s critical thinking in L2 may require that one adjust one’s ways of saying things. In short, it requires both lexico-grammatical competence and socio-cultural competence, which is in accordance with the aims of CLT.

Three major research areas contribute to our assessment of the significance of critical thinking in language learning. These are communicative language teaching, metacognitive learning strategies, and L2 writing research, especially in reference to academic writing.

1. Communicative Language Teaching (CLT)

The communicative movement in ELT has been practised in Australia since the 1970s (Kerr, 1977; Khyat, 1977). Not long after Hymes (1962), Rivers (1964) and Widdowson (1978) published their seminal works, Nunan (1981) described some characteristics of communication in the real world as follows:

First, individuals communicate for many reasons, to find out information, give vent to their emotions, describe their world, get things done and so on. Very rarely do they communicate to display their linguistic or rhetorical virtuosity. In other words they communicate to fulfil certain needs, and this is achieved, partly through linguistic and partly through non-linguistic means. Another consideration is that the communicative act is intimately tied to its setting.

Nunan (ibid.) recognizes that there are at least three elements involved in the communication process: the audience, the communicative aims of the speaker, and language forms. Similarly, Littlewood (1981) talks about two types of communicative activities: functional and social interaction activities. He suggests that language educators should devise communicative activities that will enable learners: (1) to use the language they know in order
to get meanings across as effectively as possible; and (2) to use the language in a way that is appropriate to the social setting in which the communication takes place.

The teaching of English for communication necessarily includes many elements of critical thinking because it focuses on form as well as meaning. Jacobs and Farrell (Jacobs & Farrell, 2003), propose a model of communicative language teaching that consists of a number of interconnected aspects, among them the social nature of learning and thinking skills. In other words, the communicative language learning environment can provide a useful venue for students to gain and use thinking skills. Group activities within the communicative language learning environment require students to communicate with their peers, to provide each other with help and constructive criticism, and to challenge each other's views. In short, critical thinking is an integral part of communicative language teaching.

2. Metacognitive Learning Strategies
Studies in the psychology of learning also address issues relating to critical thinking in language learning. Students can be trained to use learning strategies that are helpful to language learning, and there are many types of strategies that are thought to be useful (Wenden, 1985; Wenden & Rubin, 1987; Oxford & Nyikos, 1989; O'Malley & Chamot, 1990; Oxford, 1990; Chamot, 1995; Chamot & O’Malley, 1996). Metacognitive learning strategies, if used properly, enable students to become reflective learners. In general, such strategies involve three steps: (1) planning, (2) monitoring, and (3) checking outcomes (Wenden, 1985). Oxford and Nyikos (1989) note that successful language learners take several steps in managing their own learning and each step requires that learners be critical thinkers.

Metacognitive strategies are generally self-reflective activities. Poor performance may result from lack of self-monitoring and proper planning. Many studies have suggested that language students should learn how to use
such strategies. Students who are active users of metacognitive strategies, therefore, are likely to be more effective learners and good critical thinkers.

3. Research on L2 Writing
In an ESL/EFL context, the four macro skills, listening, speaking, reading, and writing, all require students to perform complex tasks that demand the use of cognitive and metacognitive skills. L2 academic writing, in particular, requires that the students exercise a great deal of critical thinking and this process has proven to be very challenging for most students (Atkinson & Kaplan, 1994; Atkinson & Ramanathan, 1995; Pennycook, 1996a; Atkinson, 1997, 1998; Wilson, 1998a; Briggs, 1999; Thompson, 2002). Asian international students in such places as Australia, have been cited as either failing to use critical thinking or employing different and inappropriate styles of logic in their writing (Ballard & Clanchy, 1988). Some authors claim that, because critical thinking is culture-specific, it is very difficult to get students’ from some cultures to become critical thinkers in the western sense (e.g. Kramsch, 1993; e.g. Pennycook, 1996a, 2001, 2002). Stereotypical belief is that Asian students do not think critically, a view perhaps supported by the evidence of their writing. Yet, some commentators, for example Briggs (1999) and Carnarajah (2002), argue that such international students are as capable of demonstrating CT as native speakers. It is simply the case that these international students have a rhetorical style that is different from the host culture, and that they have to learn this new style along with the language.

2.3 Proposed Model of Critical Thinking in Language Learning
From the literature reviewed above it is possible to draw out a notion of critical thinking in language learning that has three major aspects: (1) communication, (2) reasoning, and (3) self-reflection

The figure below depicts the three aspects in the model of critical thinking being proposed in this study.
The model includes the principal relevant elements from the three research fields discussed earlier, namely, the communicative approach to language learning and teaching, metacognitive learning strategies, and L2 writing. The three aspects of the proposed model were translated into five elements. For practical reasons, some elements are sub-headings in the diagram (under Communication) and others (reasoning) are headings.

From the figure above, it is evident that five key elements are considered essential to critical thinking in language learning in this study: linguistic conventions, audience, aims, reasoning, and self-reflection.
2.3.1 Linguistic Conventions

In the proposed model of critical thinking in language learning the place of grammar and vocabulary is crucial. Together these two elements of language are used to provide form and meaning to language that can then be employed in various contexts (Butt et al., 2000). Widdowson (1978) has made the distinction between ‘use’ and ‘usage’ and has suggested that they complement each other. He has argued that knowledge of grammatical rules (usage) is not adequate for effective communication. Competent communicators need to use such knowledge in communicative context appropriately. The use of incorrect forms may result in a failure to convey meaning and then a breakdown of communication. In this study grammar and vocabulary are referred to as syntax and lexis, respectively, or the term ‘lexicogrammar’ is used (Butt et al., 2000). In this study too, it is accepted that form and meaning are equally important to language use. L2 learners need to observe linguistic conventions in regard to form in order to express themselves appropriately.

2.3.2 Audience

Widdowson (1978) has written that composing a correct sentence is just the beginning, that is, knowing a language requires the knowledge of language usage and language use. According to the Longman Dictionary of Language Teaching and Applied Linguistics (1992), an utterance should be both grammatically correct and appropriate to a particular situation and culture. In communicative language teaching, the emphasis is on use as well as usage, and learners realize that whether or not language is meaningful largely depends on the audience. According to Brown (2000), when we use a language it is the audience that largely determines the register. Speakers must have in mind addressees, the circumstances and cultural context in every exchange (e.g. Levinson, 1983). Therefore, understanding the audience is a crucial aspect of successful communication.
2.3.3 Communication Aims

People use language to serve their communicative aims. Language learners can use critical thinking to decide how to use language most effectively to achieve their desired communicative aims. Utterances are successful when the aim of having the audience properly understand the intended messages is achieved. When using L2, students need to have knowledge and understanding of the audience, and they need to use linguistic conventions appropriately. Above all, however, they must be able to present language communications in such a way as to achieve the desired ends.

2.3.4 Reasoning

Thinking critically in language learning is about using L2 to make meaning; this includes using L2 to explain, reason, or argue. In this study it is thought that reasoning or arguing is appropriate if it satisfies two basic criteria: it is logical and ethical. Any text is logical when its sentences are coherent, usually signalled by cohesive devices. It is ethical when it shows that its author is open-minded, that is, objective and takes into account other points of views. Appropriate reasoning means there is a balance between logic and ethics. Figure 2.2 shows two planes for considerations: logical, which serves as the lower plane of an argument, and ethical, which serves as the higher one.
Language is used to reason and also to express the reasoning process. L2 learners need to be able to use linguistic conventions to communicate their reasoning process to their audience in a way that allows the audience to recognize the logical expression of ideas. Logical reasoning demands the use of appropriately organized information as well as appropriately connected sentences and paragraphs. In addition to its context, logical connectedness of a particular text is achieved by the use of cohesive devices. The presence of such devices can help make the text structurally logical (Halliday and Hasan, 1976; Hatch, 1992; Paltridge, 2000).

In this study, in addition to logical considerations, appropriate reasoning entails ethical considerations. Ethical reasoning, according to Goodman (1984), is reasoning within the higher plane (Figure 2-2). For Dewey (1993), self-reflection allows one to take into consideration conventions as well as morality and values, in addition to pure logic. For this research, being ethical means that one is objective and open to other perspectives. However, it
should be noted here that, as mentioned elsewhere, critical thinking is culturally bound, so that what is considered logical or ethical in one culture or context, is not necessarily considered logical or ethical in another. Thus, different languages and cultures differ in their approaches to reasoning and learners of English, especially international students from Asia attending universities in western countries, are required to express their thoughts and feelings in English in a formal academic style, reasoning with a western approach to logic.

2.3.5 Self-Reflection in Language Learning

Most educators consider self-reflection an important element in learning. For Dewey (1993), being self-reflective allows us to be more objective and open-minded. Surely, we learn through doing or observing and then reflecting on what has taken place. Frequently, we reflect before we apply ourselves. Killon and Todnew (1991) refer to this activity as “reflection-for-action.” Self-reflection in the present research entails what Dearn (2003) refers to as reflective learning. Following Dewey (1993), he urges students to be more reflective in their learning. However, educators, he says, should play a part in this, by designing courses that make students think about their learning, because it is very difficult for students to be reflective by themselves. He believes that every course should have reflective elements. To be constructively reflective, learners should be reflective about their own performance, their learning experience, and their methods or strategies of learning.

Communicative language activities provide students with opportunities to test their ideas and reasons in order to determine their positions (Jacobs & Farrell, 2003). According to Sofo (2004), group activities commonly employed in CLT can bring out many facets of thinking in students: mental-total awareness, observation skills, how differences are valued, capacity for
empathy, openness to new ideas and values and ability to balance emotion
and cognition.

This study figures the three components of the proposed critical thinking
model as five aspects of the students’ language learning in a CMCL
environment. They are:

1. Linguistic Conventions: Do the students use linguistic conventions
   appropriately?
2. Audience: Do the students communicate their ideas and feelings with
   their audience appropriately?
3. Aims: Do the students attain their communicative objectives?
4. Reasoning: Is the students’ reasoning appropriate?
5. Self-reflection in Language Learning: Does the environment encourage
   students to be self-reflective in their language learning?

In sum, the study approaches critical thinking in language learning from a
holistic viewpoint, proposing three related aspects: communication,
reasoning, and self-reflection. Critical thinkers are effective communicators
who understand their audience and use linguistic conventions appropriately.
In this model, meaning and form are equally important to communicators.
Also, communicators consider their means and aims in their
communications. They apply appropriate reasons. Above all, they are
objective and open-minded and use self-reflection in their language learning.

Chapter Summary

Critical thinking is not new. It is about using thinking ability as well as
having dispositions for critical thinking. This chapter gave reasons why
learners need to think critically in language learning and it described what
critical thinking means in this study. Critical thinking is considered to have
three major aspects: communication, reasoning and self-reflection.

The next chapter will discuss collaborative learning (CL), and provide
insight into its essential characteristics. It then describes the learning
environment, one that is project-based and collaborative, and this is what
will be evaluated.
CHAPTER THREE

PROMOTING CRITICAL THINKING IN LANGUAGE LEARNING THROUGH COMPUTER-MEDIATED COLLABORATIVE LEARNING

Introduction
The main aim of this chapter is to discuss the relationship between CMCL and CT in language learning. It will begin by defining CL and describing its essential characteristics. A discussion of some concepts that support the use of CL to promote CT in language learning follows, and then there is a discussion of the benefits of interdependence between computer technology and CL. Finally, a summary of the previous research on the relationships between CT elements and CL activities is provided.

3.1 Collaborative Learning
There are many ways to promote CT in language learners. This study is based on the belief that CT is promoted when students work in small groups on inquiry-based projects, over an extended period, supported by the computer. It focuses on real-world issues, and aims to encourage communication skills, reflection and CT. But what is CL?

3.1.1 Defining Collaborative Learning
The idea of CL is not new in education. Johnson, Johnson & Holubec (1986) write that CL is ‘as old as humankind.’ The Talmud clearly states that in order to learn one must have a learning partner. As early as the first century Quintilian argued that students could benefit from teaching one another. Johann Amos Comenius (1592-1679) believed that students benefited by both teaching and by being taught by other students. Being together undoubtedly involves interaction and, therefore, the use of language for communication and collaboration. Broadly speaking, learning involves
complex interaction with others, the natural environment, and the learner’s own prior knowledge.

As mentioned in Section 1.5, this research makes no distinction between the two terms: cooperative learning and collaborative learning; and the abbreviation CL is used throughout this work to refer to both terms. *Longman Dictionary of Language Teaching and Applied Linguistics* (1992) makes no significant distinction between the two terms. Detailed discussions of the terminology are provided by Matthews, Cooper, Davidson, & Hawkes (1995) and Lewis (2000, 2002). CL in this study also includes something commonly found in ELT literature: group work. The term group, for learning purposes, refers to a small group, usually of four or fewer, and seldom more than six students. A pair may also be considered a group (Jacobs, 2003, personal communication).

CL is a term imported into the ESL/EFL context from general education. It may be variously defined. For example, Johnson and Johnson from the Cooperative Learning Center at the University of Minnesota\(^1\) define CL as:

> A relationship in a group of students that requires positive interdependence (a sense of sink or swim together), individual accountability (each of us has to contribute and learn), interpersonal skills (communication, trust, leadership, decision making, and conflict resolution), face-to-face promotive interaction, and processing (reflecting on how well the team is functioning and how to function even better).

Slavin (1995) defines CL as “a variety of teaching methods in which students work in small groups to help one another learn academic content” (p. 2). Similarly, Tan, Gallo, Jacobs, & Kim-Eng Lee (1999) broadly define CL as “a range of concepts and techniques for enhancing the value of student-student interaction.”

Jacobs (2001) regards cooperation as a possible “theme” in education: “Teachers who use cooperative learning have learning objectives that are
academic, affective and social. Students are encouraged not to think only of their own learning but of their group members as well … Teachers cooperate with one another and let their students know about this collaboration”. A similar viewpoint is taken in this study.

3.1.2 Essential Characteristics of Collaborative Learning

Even though there are many concepts of CL, it is generally agreed that there are four essential characteristics: the teacher’s role as facilitator, student-centredness, active learning and heterogeneous grouping.

3.1.2.1 Teachers as Facilitators

The role of the teacher is crucial to the success or failure of collaborative project-based learning, although it is understood that there is less teacher control than with more traditional teaching methodology. The new role should be similar to that of a mentor who gives help and advice to the students. As Hanson-Smith (2001) puts it, “In light of the technology-driven pedagogy, the teacher’s role becomes that of guide and mentor, encouraging students to take charge of their own learning, helping them to learn at their own pace”. It is proposed that one way of helping learners to be independent is the use of the context of collaborative activities, where the responsibility is transferred from the teacher to learner (Wenden, 1997).

Cohen (1994) describes how the teacher’s role changes when students are working in groups:

> Groupwork changes a teacher's role dramatically. No longer are you a direct supervisor of students, responsible for ensuring that they do their work exactly as you direct. No longer is it your responsibility to watch for every mistake and correct it on the spot. Instead, authority is delegated to students and to groups of students. They are in charge of ensuring that the job gets done, and that classmates get the help they need. They are empowered to make mistakes, to find out what went wrong, and what might be done about it. (p. 103)

1 Source: [http://www.co-operation.org/](http://www.co-operation.org/) [December, 2002].
In this study, the researcher and his collaborators encourage the students to play a greater role in their own learning. By doing so, it is expected that they will develop an increased awareness of their learning processes.

3.1.2.2 Student-Centredness
The teacher’s role is considered vitally important in this study, but student-centredness is also a crucial aspect of CL. The emphasis is on students rather than materials, and students are expected to be active constructors of knowledge rather than empty vessels to be filled with knowledge (Brown et al., 1990). Teachers who work from a student-centred perspective attempt to facilitate their students’ learning because they know they cannot fully control it (Murphey & Jacobs, 2000).

This characteristic of CL can be explained by the fact that CL and the constructivist approach to learning are complementary. CL is student-centred in the sense that students are required to take charge of their own learning and construct their own understanding, rather than reproduce the material from textbooks or the teacher (Wooley et al., 1990). Learner-centredness is also a major characteristic of communicative language teaching (Nunan, 1988), which likewise promotes CL in the form of group work.

In this study, students not only construct their own knowledge, but they also co-construct with teachers. Such an approach allows students many opportunities to construct learning outside the classroom, either on their own initiative or with their teachers’ guidance.

3.1.2.3 Active Learning
CL actively involves students in the learning process. CL methods aim to maximize student-student interaction through their various participatory activities (Johnson et al., 1991). In most CL classrooms, students are frequently asked to socialize with others, for example, by moving around the room to interact with peers. Such activities provide opportunity for students
to learn through “active engagement, not by watching and listening” (Tannenberg, 1995).

3.1.2.4 Heterogeneous Grouping
One of the principles of CL is the idea that diversity is something to be worked with, not negotiated around. It is thought that more learning takes place when students of different backgrounds (for example, culture, gender, proficiency level) are placed together and actively participate in a small group (Sharan, 1985).

In this study, the four vital characteristics of CL, active learning, student-centredness, heterogeneous grouping, and teacher’s role as facilitator, are complementary.

3.1.3 English Language Teaching and CL

There are many arguments that support the use of CL or group work in language learning. According to Long and Porter (1985) group work increases language practice opportunities, improves the quality of student talk, helps individualize instruction, promotes a positive affective climate and motivates learners. CL creates more input and more output. It creates context variables that facilitate language acquisition. This is why, according to Kagan (1995), CL and ELT support each other. Even very early research (Long, Adams, McLean & Castaños, 1976) shows that CL can be an effective aid to communication in the classroom across a broad range of social and interpersonal functions.

3.1.4 Some Concerns about the Use of CL

CL is not free from criticism. In fact, there are some serious concerns about its application in English language learning and teaching. Two major concerns are negative learning and the students’ use of L1 when doing group work. Negative learning refers to CL reinforcing incorrect learning. Plann
(1977, cited in Ellis, 1994, p. 59) suggests that exposure to incorrect peer input may lead to the fossilization of incorrect language use. Similarly, Pica (1994) points out that group work, while it may allow learners increased opportunity to interact in the target language, may also reinforce errors.

However, such concern is only speculation. Jacobs (1989) reports a study that investigated the presence of miscorrection when students engaged in peer feedback on writing tasks. Participants were 18 third-year English majors at a university in Thailand. Peer feedback consisted of corrections and indications of uncertainty about correctness. Corrections were coded into four categories: (A1) wrong in original – correction wrong; (A2) wrong in original – correction right; (A3) correct in original – correction also right; (A4) correct in original – correction wrong. Indications of uncertainty were coded into two categories: (B1) wrong in original; (B2) correct in original. The researcher found that by far the largest category was A2, wrong in original – correction right. Categories A1 and A4 were the smallest. Furthermore, of the seven A4 miscorrections, just four were adopted when the original author wrote the final draft. All four were in the same student's draft and all concerned the identical grammar point: articles. The author notes that the findings of this study are consistent with the results of a study on spoken interaction. This latter study found only a small number of miscorrections by peers. Citing the two studies by Porter (1977; 1986), Ellis (1994) believes that peer correction seems to be fairly accurate; and it is likely to be more helpful than harmful.

The other major concern is the use of L1. Prabhu (1987) prefers not to rely on group work for his communicative activities, reasoning that, in monolingual classes, students will want to talk to each other in L1. Similarly, Porter (1977; 1986, cited in Ellis, pp. 599-560) reports evidence that group work among L1 and mono-cultural speakers might result in inappropriate
input, and therefore may not help learners develop socio-linguistic competence from their interactions.

Concerns have been raised about the size of the classroom. Problems can arise for teachers when trying to use CL in classes of 50-55, especially where the administration does not tolerate any sound other than the teacher's voice. For some participants also, group work is too noisy although noise is not necessarily a problem. As Slavin, a leader in CL implementation studies, puts it, "A cooperative learning classroom should sound like a beehive, not a sports event" (Slavin, 1995, p. 142).

Teachers have raised other concerns. Where students in a class have widely divergent proficiency levels some students may not benefit; in particular, high achievers may not benefit from interacting with low achievers. Another concern is about group conflicts. There can be many problems with student-student relations in diverse classrooms; for example, the high achievers may not want to help the low achievers. Here it is argued that teachers should aim to make the group heterogeneous. The more students of different backgrounds and language levels work together, the more they can learn from one another. If students cannot read well, teachers should not avoid group work activities that involve reading; instead, they should redouble their efforts to help the students learn to read. The belief here is that teachers actually do the high achievers a favour by giving them the opportunities to help peers.

There is one other very important concern about the use of CL. Some teachers argue that students need a certain level of proficiency before they can engage in group activities. In this study it is accepted that, with the proper amount of language support, even low proficiency students can participate in group activities. Groupmates can provide some of the required support.
3.2 Concepts Supporting the Use of Collaborative Learning to Promote Critical Thinking in Language Learning

Four concepts are used here to explain how and why CT in language learning can be promoted through CL. They are (1) Vygotsky’s zone of proximal development (ZPD), (2) Krashen’s input hypothesis, (3) observational learning, and (4) humanism in education and psychology. Each concept mentioned is believed to pervade every element of the learning environment.

3.2.1 Vygotsky’s Zone of Proximal Development (ZPD)

Vygotsky’s ZPD is probably the most popular concept in the literature when it comes to collaborative education. Vygotsky defined ZPD as “the distance between the actual development level as determined by independent problem solving and the level of potential development determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, (1935), p. 86). He conducted his research by studying the acquisition of scientific concepts and the learning of language. Basing his analysis on a socio-historical perspective, he found that learners have the potential to develop themselves. To make progress they need help from a heterogeneous group – a group that includes more equal and fewer less capable individuals. The task should be one that allows the students to do more than they could do alone in order to make it possible for them to develop further. Collaborative activities promote growth because students of similar ages are likely to be operating within one another’s zone of proximal development. Today, the term scaffolding is generally used to refer to Vygotsky’s ZPD.
According the above figure, learners A, B, and C have different levels of ability. Learner C, who has the lowest level of ability, may not be able to accomplish the task alone. When learner C works collaboratively with the more capable peers, that is, with learners A and B, the difficult task becomes possible. This construct, according to Kinginger (2002), “may assist educators in conceptualizing the meaning of ‘experience’ and of ‘social interaction’ in learning as an emergent process” (p. 242). Learning based on this construct is progressive and collaborative: learners should learn together to solve problems that do not yet exist (ibid.).

Another perspective that aims to make sense of this concept of learning by working together has been proposed by Lewis (2002). He extends Vygotsky’s ZPD by putting forward the idea that a learner has two areas of knowledge: the core and the potential. The learner can autonomously use his or her core knowledge in performing tasks. Surrounding the core knowledge...
is the development zone in which the learner ‘has some knowledge, but needs help in performing tasks which depend on that knowledge’.

The figure that Lewis uses to represent his perspective is worth reproducing.

Figure 3-2: Core Knowledge and ZPD (source: Lewis, 2002)

When learners work together, some parts of each student's core and potential knowledge overlap those of other learners. Lewis (ibid.) writes that “the collective core knowledge is, not surprisingly, greater than that of an individual but also that each person can support cognitive development in the group by providing scaffolding for others in domains where their knowledge is not yet available for autonomous use”. In short, Vygotsky’s ZPD and its derivatives support mixed group collaborative learning, and the role of scaffolding plays a part in the process.

3.2.2 Observational Learning

In 1933 the American linguist Leonard Bloomfield, strongly influenced by radical behaviourism, discussed the idea that language acquisition is the
result of a process of habit forming. In his discussion he includes what is known now as observational learning. Some decades later, social psychologist Albert Bandura proposed a broad learning theory based on a belief that mental states or thoughts regulate actions. In his view, behaviour, personal factors and environmental factors “all operate as interlocking determinants of each other” (Bandura, 1977, p.9). Humans can learn by observing the environment, and through their observations can form ideas that can later be retrieved. Bandura seems to argue against the behaviourist’s position on the matter of learning. “A theory that denies that thoughts can regulate actions … does not lend itself readily to the explanation of complex human behavior” (Bandura, 1977, p.10). Language is one such. In his view, “… behavior, cognitive and other personal factors, and environmental influences all operate interactively as determinants of each other” (Bandura, 1986, p. 23).

Learning, then, can take place indirectly, by observing phenomena, as well as through first-hand experience. Learners as observers can acquire new cognitive skills and patterns of behaviour by “observing the performance of others” (Bandura, 1986, p. 49). To assist with understanding, Bandura has coined the term ‘vicarious learning’, which means that when learners pay attention to the modelled activities or events [most of them are abstractly represented as conceptions, rules of action which specify what to do] they remember them. They then transform what they observe into their cognitive representational systems. The third component of modelling involves the transformation of what is perceived into appropriate actions. Then there is the influence of a motivational factor. Positive or negative reaction from the environment gives feedback about what to think and how to do things. Learning can take place by simply observing the outcomes of other people’s behaviour. Lastly, the pattern of modelled events is matched when the observers function well in similar situations. In short, learning can be facilitated by providing learners with access to the experience of other learners.
In the context of ELT, the Bamboo Enterprise offers learners a variety of models to observe and emulate. When learners confront the models, they first observe, by paying attention to the models; then their behaviour and perception are shaped through reinforcement. The idea of reinforcement is a matter on which Bandura agrees with Skinner. In observational learning “reinforcement is considered a facilitative rather than a necessary condition because factors other than response consequences can influence what people attend to (ibid. p. 37).” Anticipation is one such factor that acts as a stimulus. We help learners so that they can help themselves and help others.

In CMCL learning contexts the Internet, like television, is full of “symbolic models” that can play important roles in shaping our behaviour and perception. Bandura predicted that “With increasing use of symbolic modelling parents, teachers, and other traditional role models may occupy less prominent roles in social learning” (ibid., p. 39). It is worth noting here that this prediction from the 70s has been shown quite valid, especially with recent global developments in online communication.

In sum, humans learn by doing as well as observing. The following section examines the second language acquisition notions of language input and output, showing how they are supportive of the use of CL.

### 3.2.3 Input and Output Hypotheses

CL uses both productive and receptive elements in the process of language acquisition because of its reliance on intensive and meaningful interaction. Clearly, CL encourages language production but, as Krashen writes, comprehensible input is also necessary for successful acquisition of language. Krashen and Terrell (1983) explain that humans acquire a language by making an effort to understand its message even if it is a bit beyond their existing level of ability. For such understanding to be
successful, the context needs to be provided (p. 37). In short, we acquire language by understanding the input.

Krashen (1981) attempts to draw a line between ‘learning’ and ‘acquisition’. What is consciously acquired is learned, and what is learned unconsciously is acquired. As noted above, Krashen hypothesizes that, in order to acquire language, learners need to understand the input. There are two elements to input: what learners know and what they do not know (where what they do not know is ‘a little beyond’ their current competence). Learners use both linguistic and non-linguistic competencies to move forward. Krashen’s hypothesis also emphasizes meaning rather than structure. If communication, or rather comprehension, is successful, in addition to learners understanding the meaning, they will acquire the structure almost by default. A series of studies conducted under the umbrella of the Bangalore/Madras Communicational Teaching Project (Prabhu, 1987) was based on a similar understanding of language learning, namely, that forms are best learnt when students are focusing on meanings. It is a belief that is put into practice in the communicative approach to language teaching: teachers focus more on meaning making than on teaching grammar. However, there has been extensive argument and research concerning the difficulty of making the distinction between ‘acquisition’ and ‘learning’ as well as determining what i+1 means (e.g. Gregg, 1984; McLaughlin, 1987; e.g. Gass & Selinker, 1994; Dunn & Lantolf, 1998)

The input hypothesis recognizes the learners’ current ability, as does Vygotsky’s notion of ZPD. Both Vygotsky and Krashen realize that students’ current abilities are still developing – ability is dynamic. Though both concepts aim at the further development of current abilities, Vygotsky’s idea seems to offer more room for development. The zone need not be limited to ‘a little beyond’. In the context of Vygotsky’s ZPD, learners may perform tasks far beyond their current ability levels if they work with peers who have higher competency. This study acknowledges that there are some
scholars in the field (for example Dunn & Lantolf, 1998) who argue that the two concepts are incompatible. This study, nonetheless, maintains that both Vygotsky’s ZPD and Krashen’s i+1 are not incompatible, but rather complementary. They are about taking into account students’ current competence, while helping them move forward in an atmosphere that provides support and helps them succeed. This support, or scaffolding, is the main point.

Krashen and his associates (Dulay et al., 1982) recognize individual differences in language acquisition. To account for this factor, they propose another hypothesis: the ‘filter hypothesis.’ A filter lies somewhere in the processing function of the brain, and is said to be comprised of psychological or attitudinal factors such as motivation, needs or emotion. The filter operates subconsciously and may enhance or obstruct language acquisition. Krashen describes the process as follows:

> Those whose attitudes are not optimal for second language acquisition will tend not only to seek less input, but they will also have a high or strong Affective Filter – even if they understand the message, the input will not reach that part of the brain responsible for language acquisition, or the language acquisition device. (p. 31)

Krashen also realizes the significance of output: “Output aids learning because it provides a domain for error correction” (ibid., p. 61). Based on the norm of reciprocity, the input is a function of the output, and the more learners produce linguistic output the more input they will have. Output, therefore, has a high correlation with input. The situation of the deaf learning an oral language is a useful illustration. Because the deaf cannot get the same kind of feedback from their output as normal hearing persons, they have great difficulty monitoring their own speech and feedback from others. As a result, they seldom become native speakers of an oral language (Cicourel & Boese, 1972). Other evidence can be observed from the deaf learning sign language where they have feedback and can monitor their own learning. Output, from the socio-cultural perspective, as Swain (2000) points out, is important in language learning. Output may function as models or items for
reflection. It may also function as models for students to notice the language (Ellis, 1994).

In CL, obviously, there are more inputs or stimuli for learners than when learning is undertaken in traditional classrooms. The more comprehensible input is created from meaningful interaction, and the more comprehensible output, the better it is for language learning.

The following section discusses how the idea of promoting CT through CL is rooted in humanism.

3.2.4 Humanism in Education and Psychology

The humanistic movement has contributed to the development of a student-centered approach to teaching, and its influence on language teaching and learning is quite significant. As Nunan (1992b) says, “It provides a rationale for several of the more prominent teaching methods such as Community Language Learning, the Silent Way, and Suggestopedia” (p. 2). The humanistic approach to ELT places considerable emphasis on the value of individual differences, the teacher’s capacity for empathy with learners and, above all for the benefit of this research, social interaction in the form of group work.

In sum, all four concepts presented above provide theoretical underpinnings for the use of CL in general education as well as in language education. With the support of computer technologies, CL can take those concepts into a new and promising dimension, CMCL.

3.3 Research on the Relationship between Critical Thinking and Collaborative Learning

This section reports the results of research concerned with the relationship between the two main variables of this study, CT and CL, as well as other
more general, but highly relevant, research. It begins with an examination of
the nature of the relationship between CT and CL in the context of general
education, and then in the TESOL context, in both traditional face-to-face
settings and online settings.

3.3.1 General Education Context

Essentially, CL views learning and social relations as concepts within the
same domain. CL has been used to advantage in educational settings where
participants from different backgrounds learn together in groups. This is
evident from the results of research cited by Sharan (1985). He notes that
one of the fundamental, beneficial characteristics of CL is that: “People who
help each other and who join forces to achieve a common goal will generally
grow to feel more positive about each other and will be willing and able to
interact constructively when performing a collective task” (p. 255).

CL promotes interactive learning. When people from different cultures work
together to solve problems, they are more likely to come up with innovative
ways of dealing with the problems. Today, with the Internet and the
assistance this provides by means of tools, freedom (Warschauer, 2000) and
different perspectives, CL can empower learners even more than was
previously the case. CL can foster social activities that extend beyond
classroom activities. It has the potential to enhance critical and creative
thinking as well as reasoning and problem-solving skills (Davidson &
Worsham, 1992; Johnson & Johnson, 1994).

The relationship between CL and CT is strong. Johnson and Johnson (1994)
report the work by McKeachie (1988) that shows this to be the case:

…at least three elements of teaching make a difference in students’ gains in
thinking skills: students’ discussion, explicit emphasis on problem-solving
procedures and methods using varied examples, and verbalization of
methods and strategies to encourage development of meta-cognition.
(p. 57)
Johnson and Johnson (1994) also note that, compared with individualistic and competitive learning, the collaborative approach to learning appears to result in “more higher level reasoning, more frequent generation of new ideas and solutions, and a greater transfer of what is learned within one situation to another” (p. 38). They suggest that CL elements are frequently present when higher-level reasoning strategies and CT are required (ibid.). In their review Bellanca & Fogarty (1991) add some other significant research findings about CL. They report that, compared with students who do not utilize CL: (1) students who learn cooperatively perform better academically than those who learn using individualistic or competitive learning styles; (2) CL activities enhance students’ short-and long-term memory as well as their critical thinking skills; (3) cooperative experiences promote positive self-acceptance, which means students improve their learning, self-esteem, liking of school and motivation to participate; (4) CL leads to positive interaction among students, so their intrinsic learning, motivation and emotional involvement in learning are developed to a high degree; and, (5) CL develops stronger scholastic aspirations, more pro-social behaviour and more positive peer relationships in students.

In summary, it can be said that there is clear indication that CL is an effective vehicle by which learners can enhance higher order thinking. CL is an excellent means of assisting students with learning to solve problems and to integrate and apply knowledge and skills (Warschauer, 1997). In addition, according to Palloff and Pratt (2003), CL promotes students’ thinking skills, reflection and their co-creation of knowledge.

### 3.3.2 ELT Context

It is generally acknowledged that language learning is more effective when it takes place in a meaningful and supportive context (e.g. Widdowson, 1978; e.g. Nunan, 1981). Research has shown that CL offers opportunities for students to negotiate meanings and it allows them to have more access to
linguistic input and output, both conditions that promote effective language learning (see for example, Long, 1985, Jacobs and Farrell, 2003). In recognition of such thinking, CL is a major feature of communicative language teaching (Jacobs and Farrell, 2003). It is also a major characteristic of the learner-centred approach to language learning, because it offers an active learning environment through authentic interaction in meaningful contexts between learners, and between learners and teachers. Table 3-1 presents a tabulated survey of CL studies in an ESL context.

Table 3-1: Some CL Studies in L2 Contexts

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Main Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long, Adams, McLean, Castanos (1976)</td>
<td>Subjects were adult ESL students</td>
<td>Group work prompted students to adopt more roles and use a greater range of language functions than teacher-fronted activities.</td>
</tr>
<tr>
<td>Sharan et al (1984)</td>
<td>Comparing three methods of teaching: (1) Group Investigation, (2) Student Teams and Academic Divisions and (3) traditional whole-class</td>
<td>The two methods associated with CL promoted higher-level conceptual language learning in literature.</td>
</tr>
<tr>
<td>Long and Porter (1985)</td>
<td>A comprehensive review of literature related to CL and SLA.</td>
<td>Less anxiety was found to be connected with speaking in smaller groups. Working in groups also motivated learners and gave them more opportunities to use English.</td>
</tr>
<tr>
<td>Bejarano (1987)</td>
<td>The study assessed the effects of two small-group CL techniques: Discussion Group and Student Teams and Achievement Divisions, and the whole-class method on academic achievement in EFL. Subjects were 665 pupils in 33 seventh grade classes and 18 teachers.</td>
<td>Based on the total score of the tests, the students in the two small-groups using cooperative methods did better than students taught by the whole class method.</td>
</tr>
</tbody>
</table>
Almost three decades ago, Long, Adams, McLean & Castanos (1976) reported that group work prompted students to adopt more roles and use a greater range of language functions than teacher-fronted activities. Their research, which aimed to compare the benefits of lockstep teaching (a teaching situation “in which all students in a class are engaged in the same activity at the same time, all progressing through tasks at the same rate” (Richards & Schmidt, 2002, p. 315) with teaching by means of group work for intermediate level ESL students in Mexico, showed that ‘lockstep teaching’ was inadequate for language learning because it offered limited potential for communicative discourse. In contrast, group work offered numerous possibilities for exploratory talk. Compared to the speech of students undergoing lockstep instruction, there was an increased quantity and variety of student speech in the groups.
In the early 1980s, Sharan and his collaborators (Sharan et al., 1984) reported two studies conducted in Israel that were undertaken in order to assess the effects of CL methods on the academic achievement of students studying English as a foreign language and English literature. The results of this study show that CL through group investigation promotes higher-level conceptual learning in literature. Contrary to their initial expectation, the method also promotes achievement in the study of English as a foreign language.

The use of group work in classroom second language learning has long been supported by sound pedagogical arguments. However, a psycholinguistic rationale for group work has emerged from second language acquisition research concerned with conversation between non-native speakers, or interlanguage talk. Provided careful attention is paid to the structure of the tasks students work on together, the negotiation work possible in group activity makes it an attractive alternative to the teacher-led, ‘lockstep’ mode. Group conversational activity is a viable classroom substitute for individual conversations with native speakers. In their comprehensive literature review, Long and Porter (1985) conclude that CL strategies have the potential to enhance acquisition because it fosters student-student interaction.

During the late 1980s, Bejarano (1987) assessed the effects on academic achievement in EFL of two small-group cooperative techniques, namely, the Discussion Group, Student Teams and Achievement Divisions, and compared them with the achievements of students who participated in whole-class teaching. The subjects of the study were 665 pupils in 33 seventh grade classes and 18 teachers. The students were assigned at random to a class that used one of the three teaching methods. Each class was taught by a teacher who participated in training workshops prior to the study and follow-up in-class coaching. An evaluation of the pupils’ achievement levels was conducted by observation and by special achievement tests administered before and after the teaching. The findings revealed that, on the total score of
the test and on the listening comprehension scale, the students who were involved in the group teaching methods registered significantly greater levels of improvement than the students instructed by the whole-class method. These findings support the idea that there is a direct link between improvement in communicative competency and CL in small groups.

In 1990 Berger (1990), after analysing the results of a study conducted by a community college classroom teacher in San Diego, reports on the effects of peer and self-feedback. The main aim of the study was to examine the effects of peer and self-feedback on: (1) the number and types of revisions ESL students make; and (2) ESL students’ attitudes toward the feedback and revision processes. The subjects of the study were 54 multilingual ESL students. Research data were collected from drafts of two student essays, writing questionnaires, and feedback evaluation forms. The results suggest that peer feedback is more effective than self-feedback in regard to the number and types of revisions students make, and that students generally appreciate and benefit from peer feedback.

Nelson and Murphy (1993) also report on classroom research that was conducted into the benefits of writing groups. In their study, the subjects were four ESL students (from Taiwan, Columbia, Peru, and Chile) who worked as a group by responding to each other’s writing. The researchers observed that, although the students lacked the social skills necessary for collaboration, to a certain extent the activities raised awareness of their own writing problems.

Swain (2000), who analyzed five examples from three studies, reports findings that suggest that collaborative dialogue (problem solving dialogue) fosters language learning. Her work has reinforced the significance of collaboration in ELT.
Martine (2004) also, from observations of eighteen MA students in TESOL at a university in the UK who were working in small groups, found that language proficiency and culture significantly influenced the text the students produced. Martine concluded that group discussion should be promoted as a means of learning as it enables students to learn from each other.

In summary, it can be said that the studies presented above all point in a similar direction. CL is an effective learning strategy particularly because it promotes student-student interactions. Therefore, it has the potential to promote second language learning.

3.4 Computer-Mediated Collaborative Learning (CMCL)

As mentioned previously, information and communications technology (ICT) is playing an increasingly important role in people’s lives and this is certainly the case for those involved in teaching and learning languages. Writing, considered a human technology, was invented to keep record and to augment human capacity, and its development marked a turning-point in the development of civilization (Avi-Yonah 1973, p. 7). However, until the recent past only a few privileged groups had access to learning and communication. According to Niall and Thomson, authors of the Oxford Book of Australian Letters (1998), “To write and receive letters was a matter of course only for the literate and the well-to-do” (p. xx). It took the invention of printing for the earliest form of the information society to come into existence.

It was not until the late 1800s that the spoken form of language could be frozen in time for later use. However, since then, language and technology have comfortably co-existed and language teachers, as they have come to recognize and appreciate the value of using the relevant developing technologies, have explored and exploited them. As early as the 1930’s Ben R. Gibbs, in his book English for Interest, documented that gramophones
could be used to make English learning enjoyable. Now, computers are frequently the technology of choice for language teachers and one can expect that this will increasingly be the case.

Computers can be linked together for classroom language teaching purposes. There are two principal types of computer linking. Computers can be networked and share the same software so that resources can be shared; this is usually done for reasons of economy. Computers can also be linked while remaining stand-alone computers. This latter system allows students to communicate with one another but still work independently. Skehan (1985) created this scenario:

> It is also possible, with appropriate computer software, to link up with other computers. Within a university system this might be done by direct, purpose-built lines. More usually, devices such as modems or acoustic couplers are used to connect a computer to a telephone, which is then used as a data transmission device to a similarly equipped computer elsewhere. This allows programs and data to be transmitted, databases to be interrogated, and interaction between distant users to be possible. (p. 136)

Questions concerning the use of computers in language education, according to Chapelle (2001) and some of the earlier pioneers in the field such as Higgins and Johns (1984), have gradually shifted from whether or not computers should be used in language teaching, to how they can best be used in language teaching and learning. In the words of Stevens (1995), “I don’t think the question for most serious professionals is whether, but when and how to go about it” (cited in Boswood, 1997, p. viii). There are two broad approaches in evidence: to enhance individual learning using computers as personal tutors (Lepper et al., 1993; Lian, 1993); and, to enhance collaborative language learning (Klemm, 1996; Koschman, 1996; Warschauer & Kern, 2000). Although the latter approach is a more social constructivist approach (Klemm, 1996) than the former, the two approaches
have a common goal, namely, to enable learners to become independent and successful language users.

### 3.4.1 Definition of Computer-Mediated Collaborative Learning

In this study, when reference is made to computers it is assumed that the computers have Internet access.

Warschauer (1997) describes five features of computer-mediated communication (CMC) that have the potential to promote CL in the context of language learning. According to Warschauer (Ibid.), CMC: (1) is text-based; (2) enables many users to communicate with one another; (3) is time and place independent; (4) enables long distance communication; and (5) can be distributed easily via hypermedia links. The five features are essential for any CMCL environment. Learning that uses CMCL increases students’ achievement levels, inter-group relations, acceptance of academically handicapped classmates and self-esteem.

How technology is used to achieve this new learning environment of CMCL can be illustrated by describing two products: WebCT and Yahoo Groups. The first, WebCT, is a collection of tools that facilitate teaching and learning on the Internet and is used as the main online learning environment at a large number of educational institutions. WebCT has the five features required for CMCL. In other words, WebCT enables students to use the computer for many learning activities, such as accessing lecture notes and subject content; communicating by email with their lecturers, tutors, and other students enrolled in a subject; conducting discussion and chat sessions; completing online quizzes and self-assessment activities; and, submitting assignments. Students can also use WebCT to prepare individual and group online activities.

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3 According to its website, in December 2003 there were thousands of institutional customers in more than 80 countries.
presentations; conduct searches and use glossaries; and, view scheduled events by means of a subject calendar.

*Yahoo Groups*, similarly, is also equipped with the five features categorized by Warschauer (1997). Although it is an advertising supported service, it can offer its users opportunities to share files and photos, plan events, and send newsletters. The users can keep in touch with other members of their groups or discuss various topics. Like *WebCT*, it was set up to enhance CL. *Yahoo Groups* also has support tools that enable a teacher to keep records of learners’ activities ([http://groups.yahoo.com/](http://groups.yahoo.com/) [11/10/2002]).

*WebCT* is a commercial product that offers a wide range of opportunities for teachers and administrators who are willing to utilize its features and functions, but it is not always feasible for smaller institutions to invest in such a product. This study chose to use the public service provided by Yahoo because it is a more economical option that equipped with all the features that are necessary for CMCL. Therefore, *Yahoo Groups* was selected for use in this research.

A Yahoo group named the *Bamboo Enterprise* was created to function as an online language-learning community. This arrangement was expected to provide desirable learning opportunities for students, particularly because it provides the opportunity for group members to be self-reflective about their own learning, and to use English effectively to communicate their ideas and attitudes to other group members. This CMCL, as mentioned in Chapter 1, was a blended or hybrid CMCL entailing both online and offline learning activities. The students, in addition to attending their normal classes (meet face-to-face with each other and their teacher), were required to complete their given tasks using the Internet to communicate with other students. The decision to follow this flexible patch was made by the researcher and his collaborators prior to the research, as it was a ‘doable’ approach. This position was similar to the work reported by (Strambi & Bouvet, 2003)
where both online and face-to-face modes were reported. In short, the Bamboo Enterprise was created to promote student participants’ critical thinking in language learning.

### 3.4.2 Research Findings on the Use of Computers in English Language Teaching

Recent research attempts to determine how to maximize the potential benefits of computers in language classrooms. The Internet has the potential to empower students when it is used appropriately, guided by appropriate pedagogies (Warschauer et al., 1996). However, it is apparent that, in order to get full benefit from using the computer in the classroom, there is a need to move away from the conventional classroom and an instructional approach that has the teacher doing most of the talking while students listen passively and following instructions. Instead, a learning environment that provides complex challenges through the integration of authentic learning tasks and CL is necessary (Warschauer, 1997). Research on the effects of CMCL on language learning has shown encouraging results when employing this latter approach. Table 3-2 presents some CMCL studies within L2 learning contexts.

Table 3-2: Some CMCL Studies in L2 Contexts

<table>
<thead>
<tr>
<th>Study</th>
<th>Method</th>
<th>Main Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bee-Lay and Yee-Ping (1991)</td>
<td>Two groups of teenage students: Singapore and Quebec, exchanged ideas and opinions on bulletin boards.</td>
<td>The project developed the students’ grasp of technology, improved their commands of English, gave them a sense of pride in their own work, and enlarged their awareness of themselves as members of an international, global community.</td>
</tr>
<tr>
<td>Warschauer (1996b)</td>
<td>Comparing face-to-face and electronic discussion in the second language classroom</td>
<td>Computer-mediated conversation was syntactically more complex and lexically more dense than face-to-face conversation</td>
</tr>
<tr>
<td>Study</td>
<td>Method</td>
<td>Main Results</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Chapman (1997b)</td>
<td>Six students in Australia corresponded with six students at Nanzan University, Japan, for about 6 months</td>
<td>CMC has the potential to foster sociolinguistic competence of the students</td>
</tr>
<tr>
<td>Gray &amp; Stockwell (1998)</td>
<td>Eighteen Australian undergraduate students at Griffith University communicated with nineteen Japanese undergraduate students at Waseda University, Japan</td>
<td>CMC had the potential to enhance target language acquisition and intercultural awareness</td>
</tr>
<tr>
<td>Kramsch, A’Ness, and Lam (2000)</td>
<td>Two cases of CMC learning contexts: (1) the construction of a CD-ROM and (2) the use of Internet relay chat by an ESL learner were analyzed.</td>
<td>A communicative approach based on the use of authentic texts and on the desire to make the learners author their own words was altered by the physical properties of the electronic medium and the students' engagement with it changed.</td>
</tr>
<tr>
<td>Li (2000)</td>
<td>22 ESL students’ email writing (132 pieces) was analyzed.</td>
<td>Students tended to produce complex sentences and use a variety of words.</td>
</tr>
<tr>
<td>Smith (2004)</td>
<td>24 intermediate-level non-native speakers of English communicated with each other synchronously</td>
<td>Negotiated interaction offers by CMC enhanced lexical acquisition.</td>
</tr>
<tr>
<td>Al-Jarf (2004)</td>
<td>113 Saudi female freshmen were divided into two groups: one underwent normal writing course (the control group); another underwent web-based writing course.</td>
<td>The experimental group scored better in the post-test. They also improved their attitudes towards writing.</td>
</tr>
</tbody>
</table>
Study Method Main Results
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Kosaki (2004) Real-time and delayed chats between Australian and Japanese students Both the Australian and the Japanese students raised their awareness of their own language as well as their target language through their online exchanges.

Lee (2004) A network-based collaborative project, conducted in the US, between native speakers of Spanish and non-native speakers The non-native speakers believed that the online interaction helped them to improve their writing skills. They were also scaffolded by the native speakers through online discussion.

The above studies were chosen for this review because they represent a broad range of contexts where computers have been used in language learning and teaching. Based on the above table, it is evident that CMCL has the potential to raise students’ cultural awareness, promote learner autonomy, promote equal participation, encourage the use of complex linguistic conventions, facilitate a problem-solving approach to learning, and promote teacher-teacher collaboration. Following is the review of each aspect.

Raising Intercultural Awareness. E-mail communication has been used to raise intercultural awareness. Jacobs (2001) reviews a study conducted by Liaw and Johnson which found that learners’ awareness of cultural differences was raised through email exchanges between learners who had different cultural backgrounds. Vilm (2003) reports similar outcomes from several online collaborative writing projects that were begun in 1993. She found that both students and teachers involved in such exchanges gain from the collaboration and concluded that the projects enhance the student’s cultural awareness as well as their proficiency.

Fedderholdt (2001) reports on an email exchange project between a group of Japanese university students, and a group of Danish students preparing for
university entrance examinations. He notes that some students find email rewarding because it helps them discover aspects of culture unfamiliar to them. In a similar vein, an email-exchange project between US teacher candidates and Israeli EFL students conducted by Nutta and Spector-Cohen (2002) revealed that online exchanges enhanced students’ cultural awareness.

From her study of asynchronous communication between Australian and Japanese students, Kosaki (2004) reports that this form of communication enhances cultural awareness of the two cultures. She concludes that the type of computer mediated communication she researched can be helpful in increasing authentic communication and enhancing students’ language learning.

Promoting Learner Autonomy. Research has found that CMC promotes learner autonomy. As mentioned earlier, the dominant paradigm in second language education has shifted towards learner-centredness and the promotion of learner autonomy. Learner autonomy can be promoted by integrating the use of computers with Internet access into existing classroom activities, particularly in terms of students’ perceived locus of control. Sakar (2001), for example, reports that email exchanges can increase students’ perception of control. Kramsch, A’Ness, and Lam (2000) also reported that the Internet helped the students to develop their voices and took greater control of their own learning. It enhanced their autonomy by giving them opportunities to present their ideas and feelings to the world audiences. Kayser (2002) has reported that her project-based course where students were required to work together to create websites was motivating for her students. It encouraged the students to be creative and to take charge of their own learning.

Promoting Equal Participation. In addition, CMC has been found to be a means of promoting equal participation. Warschauer (1996a) compares two
modes of communication in the second language classroom: face-to-face and electronic. His findings show that there is a tendency toward more equal participation when the class is in computer mode. This finding is consistent with some earlier studies (Kelm, 1992; Kern, 1995, cited in Warschauer & Kern, 2000). The study also reveals that students generally use language that is lexically and syntactically more formal and complex in electronic discussions than that used in face-to-face discussions.

Encouraging the Use of Complex Linguistic Conventions. Two studies report that CMC seems to help students produce more complex vocabulary and grammar (Warschauer, 1996a; Li, 2000). A study has also found that online exchanges with native speakers have encouraged non-native speakers to use vocabulary and structures beyond their abilities (Lee, 2004).

CMC has been found to be a viable means in raising the students’ writing awareness. The results of a study into ‘network talk-writing’, a written form of online communication, led DiMatteo (1991) to the conclusion that such writing, albeit turbulent, helps raise students’ awareness about writing. Synchronous network writing helps students understand their ideas when they speak in writing. Boyle (2003) reports an online collaborative writing project that was undertaken in 1996 between Wake Forest University and Acadia University. Five groups from each university were asked to work collaboratively, and reflect on a philosophical statement of Henry Newman relating to liberal arts education in the age of technology. Students’ essays reflected their CT. Moreover, the students were proud of having accomplished a difficult multidimensional task with minimal help from the teachers. The students succeeded in concrete ways, because they “… thought together, wrote together, and published their ideas – in their own struggling voices – on the web” (ibid.). In addition to raising writing awareness, research has also reported that CMC improves students’ attitudes towards writing (Egbert et al., 1991).
Facilitating a Problem-Solving Approach to Learning. In addition to the above-mentioned benefits, studies have also reported that having students collaborate with other students around the world, particularly when the students also have autonomous access to information, facilitates a problem-solving approach to learning (Barson et al., 1993; Barson & Debski, 1996; Debski, 1999; Debski, 2000b).

Promoting Teacher-Teacher Collaboration. CMC has also been reported as a means that promotes teacher-teacher professional collaboration. As already stated, online collaboration benefits both students and teachers. Some writers even go so far as to believe that CL implies teacher-teacher cooperation (Sapon-Shevin et al., 1994) and therefore, collaborative learning for them. As Vilm (2003), Boyle and Rigg (1998) have found that the teachers learned a great deal from the project they were involved in, especially in terms of experience gained from working with technology and assessment issues.

Quite evidently, support for the use of CL in ELT comes from a number of research areas. In second language acquisition and the ELT context, CL has been widely implemented. However, it is worth noting that, in the EFL context, to date there have been only a few studies investigating students’ critical thinking in the CL process. Most of these have determined the existence of CT through an analysis of students’ answers to pre-determined questions (Ho, 2000; Sakar, 2001). Research into critical thinking, especially critical thinking that incorporates use of the Internet, is still very young.
3.5 Project-Based Language Learning

I hear … and I forget
I see … and I remember
I do … and I understand
Learn as though you would never be able to master it;
hold it as though you would be in fear of losing it.

A Chinese Saying

It is commonly believed that language learning is more effective when it involves meaningful communicative acts, when sentences are put in context and have communicative value (Widdowson, 1978; Nunan, 1981; Spolsky, 1989). Richards (1978), a pioneer in the field of TESOL, points out that: “The acquisition of communicative competence in a second or foreign language involves learning how the target language reflects the influence of functional setting, topic, participant, medium, or other sociolinguistic factors in speech events” (p. 13). Therefore, in classroom practice teachers make an effort to enable their students to perform meaningful communicative acts; for example, they frequently have students perform tasks that involve both productive and receptive skills in an appropriate context.

3.5.1 Group Projects as Macro Tasks

Group projects can be considered macro tasks. The term ‘task’, as Ellis (1994) points out, is very broad. Citing Crookes (1986), Ellis (1994) writes that a task is “a piece of work or an activity, usually with a specified objective, undertaken as a part of an educational course, or at work” (p. 595). Tasks vary in type; some are small and simple, some are more complex. Nunan (2002) offers a few examples of simple tasks that frequently must be carried out in the in the real world: “Call the airline and reconfirm a reservation you have. Check other details, such as time of departure, and time you have to be at the airport”. Examples of complex tasks include producing TV shows, publishing magazines, and performing dramas.
Breen (1987) writes that a language task is a structured language endeavour which has a specific objective, appropriate content, a particular working procedure, and a range of possible outcomes for those who undertake it. Breen views tasks as a range of work plans, from simple to complex, with the overall purpose of facilitating language learning. “All materials for language teaching can be seen as compendia of tasks” (p. 26).

Nunan (2002) highlights seven principles of task-based language teaching:

- Students need to be adequately supported. Scaffolding is the first key to success;
- Each task should depend on another;
- Language items should be recycled;
- Students should be made aware of language forms and their relationships with meanings;
- Steps should be in order: from language reproduction to creation;
- Learning should be active;
- Students should be given time to reflect on what they have learned and how well they are doing.

In this study, a project is considered a form of task. It is a task with (1) broad scope or size and, (2) complexity. A project is a piece of work to be done, and, because of its size and complexity, it usually requires careful planning and collaboration. From this stance, it can be argued that project-based learning is simply a form of task-based language learning. The principles of learning are the same. Both task and project learning share the same requirement for communicative language learning and teaching. They need:

- Activities that involve real communication for language learning;
- Activities that use language to carrying out meaningful tasks and so promote learning;
- Language that is meaningful in order to the learner to support the learning process.

(Richards & Rogers, 2001, p. 223)
Project work is becoming increasingly popular in education generally, and in language education in particular. Projects provide sufficient scope for students to pursue their individual interests and opportunities for students to work together on extended tasks. ELT teachers can use group activities within the framework of projects as vehicles for applying the three principles of communicative language teaching stated above.

According to Henry (1992), there is no universal definition of the term project. In the context of the classroom, usually the student selects the topic. The teacher takes the role of advisor. The task itself often lasts over an extended period. The student is often required to present an end product. As early as 1975, Adderly et al. (cited in Henry, 1992, p. 13) pointed out that projects also “involve a variety of educational activities, generally involve the solution of a problem and often offer the chance of tackling interdisciplinary areas”.

Project work usually offers students some measure of freedom in deciding on the topic. It asks the students to use an enquiry process, to collect some material and then organize and present the data. Such an approach allows the student to act with considerable freedom. Proponents of the project-based approach to learning see several benefits. Henry, in *Teaching Through Projects* (1992), suggests the following characteristics that are potentially beneficial:

- Self-direction – the capacity to carry out a competent piece of work independently; a skill that takes initiative;
- Inventiveness – the creative use of resources, alternative methods and explanations;
- Problem-solving abilities – a diagnostic ability, problem formulation, problem solving, analytical and evaluative skills;
- Integrative skills – the synthesis of ideas, experience and information from different sources and disciplines;
- Decision-making skills – deciding what is relevant and what is not, what to include and what to leave out;
- Interpersonal communication skills – communicating with individuals and elucidating ideas through the written word.

(p. 49)
Because of its potential benefits, project work has been used widely in all fields of education. In the context of ELT, Legutke and Thomas (1991) have proposed that task-based learning projects be introduced into the curriculum for EFL/ESL courses, reasoning that learners should best learn English by doing things using English. Sheppard and Stoller (1995) have found that project-based language teaching was a challenging pursuit, but a motivating one for both teachers and learners. Debski (1999) has argued that project-based learning and technology are allies. He suggests that the teachers should create learning environments in ways that are learner-centred, task-based, and motivating for learners to exercise their creativity.

3.5.2 Research on Project-Based Language Learning in L2 contexts

Project work to foster language learning has been used in a variety of forms and settings. Anderson (1989), for example, discusses the use of drama activities as a project for second language learning. Armstrong and Yetter-Vassot (1995) believe that collaborative project work is a means of increasing learner autonomy and communication in the L2 classroom. They suggest that students work in groups to design and produce their own videos. Chin and Blumenthal (1989) report using a small-group project in a high intermediate/low advanced level reading class and describe how students profited from bibliographic instruction by participating in a guided research assignment. The project demonstrated that students benefit by acquiring new skills, developing a broader perspective on contemporary issues, experiencing group dynamics, and absorbing the second language through actively using it in a variety of non-classroom contexts.

Tomei, Glick and Holst (1999) report on project work undertaken in a Japanese university classroom. They studied the projects done in a freshman English class. Advantages claimed for these projects include encouraging the recycling of skills, enhancing motivation as students choose their own project topics, sparking creativity, helping teachers act as facilitators rather
than lecturers, and simplifying lesson planning as students play a role in generating materials. Over a 15-week term in which the class met once a week, the first five sessions were spent helping students to develop presentation skills. Then, students did two projects of five weeks duration each. The projects were built around surveys in which project teams interviewed classmates and developed 7-10 minute presentations based on their findings. The article provides details of a 5-class schedule for each project. Students evaluated other groups' presentations, and these evaluations became the course grades.

3.6 Collaboration as a Possible Theme in Language Education

In addition to being a teaching method, in this study, collaboration is conceptualized as a possible theme in education (Jacobs, 2002, personal communication). A learning program viewing collaboration as a possible theme needs to be organic and flexible. In an attempt to improve language education, van Lier (2002) has proposed “an ecological perspective on language” (p. 140) and argued for a language curriculum that is organic and flexible, which should be “contextualized, activity-based, experiential, and developmental” (p. 157). Similarly, Murray (2001, 2005) has used the metaphor ‘ecology’ to describe the practice of English language teaching, including the roles and responsibilities of TESOL leaders. This study, however, takes a step further, arguing that an important key underpinning the metaphor ‘ecology’ is the concept of collaboration. In the context of ELT, this position means that, in addition to student-student collaboration, teachers work together and keep students informed about their own collaborative activities (Sapon-Shevin et al., 1994).

3.6.1 Teacher-Teacher Collaboration

In this study the view is taken that computer-mediated communication or CMC requires a new paradigm of learning, namely, computer-supported collaborative learning (Koschman, 1996). Network technology provides a
means by which research can be undertaken collaboratively, benefiting all parties involved, including teachers. Collaboration extends to all fields of study. Teachers from different fields, such as science and English for example, can work alongside one another on an equal footing. According to Sagor (1992), collaborative action research can help create "an active community of professionals" (p. 10). It is also worth noting that, when teachers work together, they are generally more satisfied with their jobs. Sagor summarized the benefits: “We all gain more, learn more, and are more professionally satisfied when we work with others” (p. 26).

Nunan (2002) provides a good reason for doing classroom research while engaged in ESL learning. “Priorities for research often reflect the interests of academic researchers or central office administrators, not school people. Teachers and students in the classroom are rarely actively engaged in the research”. Online collaboration, according to Schulz-Zander et al. (2002), benefits both teachers and students: teachers develop their competencies in educational methods and students increase their effort and motivation to achieve.

Burns (1999) discusses the major benefits for teachers that come from collaborative action research. She concludes from comments of teachers and discussions in the literature, that teachers should engage in collaborative action research for their professional development. In this context CL can also bring about reflective practice. And, according to Richards (1990), reflection can "help teachers move from a level where they may be guided largely by impulse, intuition, or routine, to a level where their actions are guided by reflection and critical thinking" (p. 5). Debski (2000a) has reported a collaborative research project conducted by a team of researchers in Melbourne, Australia. The project regarded collaboration as a concept,
including teacher collaboration. He has claimed that, despite some problems, the project-based approach to language learning was motivating for both teachers and learners and that the teacher participants benefited from their collaboration.

Working with other teachers is beneficial to the teachers. It is also beneficial to their students. CL can lighten teachers’ preparation hours and enlighten their practice. At the same time, the teachers are models for their students as they actively display the benefits of collaboration. The following paragraphs explore the reasons why collaboration should be considered a possible theme in language education.

### 3.6.2 Global Topics as Content

At the sixth caucus of TESOL, TSR (TESOLers for Social Responsibility) Caucus, it was said that professionals in the field should take some responsibility for global problems of social concern and attempt to address them. Concern for the environment is one such issue. In this study, concern for the environment is taken seriously and addressed directly; the environment is not introduced simply as an excuse to practice language.

This study entails three related projects that can be regarded as parallel studies under the common theme: the environment. However, all participants can benefit from the collaborative research; it can help them establish reference points from which individual understanding can come, and beliefs about the global social problem that is the focus of the research. The matter is studied sensitively, with student, teacher, and institutional agreement. The study began with what the students already knew.

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4 At the same conference, Michael Long (2002) said that “Much SLA research has little or no relevance to language teaching, and is not conducted with the classroom in mind – the researchers have other fish to fly”. 
Chapter Summary
In this chapter attention was drawn to the results of relevant research and associated debates. The chapter began with a discussion on what CL is and its major characteristics. Some concepts supporting the use of CL to promote critical thinking in language learning were then identified, and the concept of CMCL was introduced. This was followed by a discussion of research already completed on the relationship between CT and CL. Then, finally, previous studies that report the effects of CMCL on several language learning outcomes were discussed. The next chapter will describe the Bamboo Enterprise, a CMCL learning environment that was specifically set up for this study, and then three case studies that use the Bamboo Enterprise as the means by which participants use and develop CT skills while learning collaboratively. The chapter will focus particularly on the Bamboo Enterprise as an online learning community and will provide an explanation of how the activities of the Bamboo Enterprise were designed to promote students’ CT in language learning.
CHAPTER FOUR

METHODS AND PROCEDURES

Introduction

In Chapter 2 critical thinking was defined, both in general and in relation to EFL/ESL contexts. There was also a model proposed for conceptualizing and evaluating critical thinking in language learning.

Chapter 3 provided a definition and discussion of collaborative learning that explained why CL matters in language learning. The chapter also described a project-based collaborative language learning environment that had computer technology as a key component. The term computer-mediated collaborative learning (CMCL) was introduced, and a model of CMCL that promoted critical thinking in language learning was proposed. Chapter 3 also provided a description of how the conceptual framework outlined in Chapter 2 was applied by setting up an online learning community called the Bamboo Enterprise. Its potential as a learning environment for promoting CT in language learning was discussed.

This chapter first describes the case study methodology; then, how the Bamboo Enterprise was implemented as a learning community and why Yahoo Groups was put to good use for this purpose. There is then a discussion on why group activities within the Bamboo Enterprise were able to promote critical thinking in language learning. The components of the learning community set up for this research are described, particularly the research participants and the procedures that were followed in the study. Two self-evaluation questionnaires formed part of the mechanism to encourage the students to be self-reflective in their language learning and an explanation of these is given. Then, a support community that was used is described. The three case studies that were central to the project are explained in detail, along with the sources of data used. Finally, there is a discussion of how the data analysis was approached.
4.1 A Case-Study Approach

4.1.1 Case Study in Research in Language Learning

The Case study is a widely used research method. According to Brown and Rogers (2002), a case study “comprises an intensive study of the background, current status, and environmental interactions of a given social unit: an individual, a group, an institution, or a community ...” (p. 20). Yin (1984) perceives the case study to be, among other things, “an empirical inquiry that investigates a contemporary phenomenon within its real-life context ... and in which multiple sources of evidence are used” (p. 23). There are two key phrases: real-life context and multiple sources of data. It is common practice in research that uses the case study method to focus on an actual environment, and the triangulation of data in order to gain insight into an observed phenomenon or multiple phenomena. In the field of second language acquisition (SLA), this approach is almost synonymous with the longitudinal approach, where a subject or a small group of subjects are observed over an extended period of time (Larsen-Freeman & Long, 1991). Research on how a child acquires a second language, for example, may take several years. Recently, however, the case study approach has been adopted to evaluate a new program or a classroom change, usually over a semester or two. Stenhouse (cited in Nunan, 1992, p. 78) refers to such studies as evaluative and action case studies.

SLA research has an agenda that, one might think, should contribute to formal classroom practice. Yet there is still a gap between theory and classroom practice (Nunan, 1992). One way to narrow that gap is through classroom research. Every classroom, with its unique characteristics, may be considered a community or a case. A growing number of studies in ELT have begun to investigate classroom phenomena, especially the interplay between students, teachers, their classrooms and the general educational setting. Freeman (1998), for example, has encouraged language teachers to do their research, reasoning that such teacher-research has the potential to be
a useful means for teachers to better understand themselves and their work so that they can develop themselves professionally. In ELT, many researchers are using the case-study approach to conduct their research because it has the potential to take into account the complexity of classroom practice, and provide data that reveal rich insights (Nunan, 1992b; Miller, 1997).

Within the case study approach, ethnographic research may play an important role. Commonly used in anthropological and sociological studies (Wilson, 1982), ethnography is a method suitable for an enquiry in which the researcher, in order to probe complex issues and questions, becomes a participant in the environment under study. Such ethnography is often referred to as participant ethnography or “neo-ethnographic case study” (Stenhouse, 1983, cited in Nunan, 1992, p. 78). According to Woods (1986), ethnographic study “... seeks to describe and understand the behavior of a particular social or cultural group. In order to do this, researchers try to see things from the perspective of members of the group and this requires extended exposure to the field” (p 15). In many respects, case study and ethnography are two related concepts. In ethnographic studies, as with most case studies, multiple sources of data are used as evidence. Also, both address the ‘phenomena in context’ (Nunan, 1992b, p. 75).

There are well known weaknesses with ethnography and case studies. With ethnography, since the researcher is also a participant, the research is arguably less objective than controlled experiments. In both case study and ethnography it is often thought there is less rigour than studies based in the psychometric tradition. Further, because both approaches generally focus on a single environment, it is not possible to generalize findings to other similar contexts. Despite such disadvantages, ethnography and case studies have been widely used in social science and humanities research. Nunan (1992b) argues that ethnography lends itself to investigation of “the natural contexts in which [behaviour] occurs” (p.52) and one significant natural context is the
classroom. The researcher enters into the field and gains a richness of data that another type of researcher could not hope for. The case study is defensible because, while it may not allow generalizability, it offers illuminating insights into behaviour that others may relate to their own situations. Furthermore, the case study is particularly useful “for studying educational innovations, for evaluating programs, and for informing policy” (Merriam, 1988, cited in Miller, 1997, p. 33-53).

4.1.2 An Ethnographic Case-Study Approach

In the light of the above mentioned merits of the case study and ethnography in research into language education, the present study has taken an ethnographic case-study approach to the analysis of the proposed model of critical thinking in language learning. In order to investigate the efficacy of the model, three case studies were set up using the same online learning environment, each one a separate class or group and assumed to be representative of the larger population of English language learners at their level of proficiency. The findings, drawn from a cross-case analysis, can be expected to give the reader a broad perspective on the phenomenon of critical thinking in CMCL. The researcher intended to be a participant observer in each case in order to obtain data on a wide spectrum of behaviour from inside each small community, as the ethnographer does. The research work was done not only in standard classrooms; rather, information was sought on the subjects in whatever space they were learning.

It must be admitted that this study has one significant non-ethnographic dimension: the researcher deliberately set up a learning process in order to put the proposed framework into practice, and he occasionally intervened in it. In this sense, the research could be viewed as a sort of ‘pre-experiment’, distinct from a ‘true experiment’ (Nunan, 1992, p.27), which would require a control group and pre- and post-tests. Once the learning situation was set up
for the research, ethnographic methods could be implemented, including observation, field notes and interviews.

### 4.2 The Bamboo Enterprise as a Learning Community

The Bamboo Enterprise was set up as a learning community that would enable its members to develop projects centring around a common theme, the environment. The learning community used *Yahoo Groups* as an open forum where members of the community could have their say about issues relating to their projects, language learning and the collaborative process in which they were engaged. To form the online network, all of the research participants needed individual Yahoo email accounts.

**Figure 4-1: Bamboo Enterprise Website**

![Bamboo Enterprise Website](image)

Figure 4-1 shows the front page of the Bamboo Enterprise, the meeting place. It is evident from Figure 4-1 that the Bamboo Enterprise site was equipped with functions and features that can handle asynchronous
communication in a typical bulletin-board fashion. This was essential because it allowed members to post questions and responses to questions. It also provided important collaborative functions such as database access, links, chat rooms and email.

The Internet empowers its users to organize themselves across local, national and international boundaries, and this potential was utilized by setting up the Bamboo Enterprise in such a way as to enable the research participants to communicate with each other while undertaking their group projects. The aim was to provide a context of learning that is supportive and challenging. The Internet also provided a means by which global issues could be incorporated into ELT, both by making cross-cultural communication easy and cheap, and by providing a superb reference resource (Etchells, 1998).

In recognition of the practical concerns raised by some researchers (e.g. Warschauer & Whitaker, 2002), this study did not rely on sophisticated software. Rather, free software that was already available on the Internet for public use was employed. As many have already successfully used Yahoo Groups as a means of communication among themselves, it seemed appropriate for use with the Bamboo Enterprise. The online community created by Yahoo Groups was relatively easy to access, user-friendly and simple to navigate. It had many useful features: databases, bookmarks, management tools and web page capacity; and, it could be accessed from all over the world. It has all the five necessary features of CMC pointed out by Warschauer (1997). The system was text-based, allowed many-to-many communication, time and place independent; enabled long distance communication, and equipped with hypermedia links. However, it needs to be noted here that technology, in order to be useful to learners, has to be appropriately applied to specific situations. According to Hoven (1999, quoted in McPherson & Murray, 2003, p. v), “it is not so much the computer but the kinds of tasks and activities that learners do on the
computer that can make the difference”. The Bamboo Enterprise was such a specific situation, one that facilitated language learning tasks and activities.

4.2.1 Yahoo Groups

The *Yahoo Groups* service was advertiser-supported and advertisements were inserted into the email messages received by users. However, this feature was not overly intrusive. *Yahoo Groups* allowed ‘moderators’ – in the case of the Bamboo Enterprise the moderator was the researcher – to bring members together through websites and email. It was convenient and easy to use for both members and moderators. People could join in and interact with one another across the globe. The service was privacy-and-spam-protected, and users worked in a secure environment. Users could use the service at [www.yahoo.com](http://www.yahoo.com) or through any email program.

In general, *Yahoo Groups* offered tools that could be used to support CL. Its major features and functions were:

- **Messages**: Users could send and receive *Yahoo Groups*’ messages.
- **Files**: Users could upload and download files, organize files and folders, and set up auto-deliver files.
- **Photos**: Users could add, edit and remove photos. They could also work with albums.
- **Bookmarks**: Users could control access to and sharing of bookmarks.
- **Links**: Users could make links to other web pages using bookmarks.
- **Polls**: Users could create polls, vote and change their votes. They could also modify and conclude the polls.
- **Calendar**: Users could schedule events, view a shared calendar and set up reminders.
- **Database**: Users could create custom tables and organize information.
- **Members**: Users could view a list of current group members and their profiles.
- Theme Colours: Owners or users could customize the colour (theme) of their work-group portal to reflect the objective of the portal; for example, orange stands for non-discrimination, etc.

The moderator of a group was able to manage the group through the management area. This area was exclusive to the moderator who had special privileges.

1. The Group Activity area allowed the moderator to keep track of group activity, such as email messages, membership changes, web feature usage and changes to the group's settings.

<table>
<thead>
<tr>
<th>Group Activity</th>
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<tbody>
<tr>
<td>Memberships</td>
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<tr>
<td>Message Posts</td>
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<tr>
<td>Web Features</td>
</tr>
<tr>
<td>Email Commands</td>
</tr>
<tr>
<td>Moderator Activity</td>
</tr>
</tbody>
</table>

   The Activity area allows you to keep track of group activity, including email messages, membership changes, web feature usage and changes to the group's settings.

2. The Group Settings area enabled the moderator to edit the group description, posting options, features access, and other such functions.

<table>
<thead>
<tr>
<th>Group Settings</th>
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</thead>
<tbody>
<tr>
<td>Description and Appearance</td>
</tr>
<tr>
<td>Membership</td>
</tr>
<tr>
<td>Web Tools</td>
</tr>
<tr>
<td>Messages</td>
</tr>
</tbody>
</table>

   The Settings area enables you to edit your group description, posting options, feature access, and other important settings.

3. The Delete Group area allowed the moderator to delete the group.
The Pending Tasks area allowed every in-coming message and member to be approved, and this information to be displayed to the group members.

<table>
<thead>
<tr>
<th>Pending Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members</td>
</tr>
<tr>
<td>Messages</td>
</tr>
</tbody>
</table>

Pending messages and members require your approval before they can be displayed to your group members.

Yahoo Groups seemed to be a viable platform for this research because it had:

- Interactive features (message boards, chat, email groups);
- Resource creation facilities (a way of posting links or creating one's own directory of important resources);
- Content collaboration facilities (the ability to run a project or publish a website using a content management system that enables different levels of access for a geographically dispersed team of employees or enthusiasts).

Based on the above-mentioned characteristics, Yahoo Groups has the features that are necessary for CMCL. It was also useful for this project because it supported appropriate human-human and human-computer interaction (Preece, 2000).

**4.2.2 Description of the Bamboo Enterprise**

The name Bamboo Enterprise has a number of relevant philosophical underpinnings:
• The greatest strength of bamboo is its interconnectedness. Bamboo always grow together in a tightly knit cluster.

• Bamboo is a very useful plant that has many and various beneficial qualities. Its shoots and branches are versatile food sources and, in days gone by, the poor used its stems in all aspects of house building, both on land and on the river. Nowadays, it serves as scaffolding for construction workers in southeast Asia, material for furniture making, and for household utensils such as brooms and other gadgets.

• Bamboo is a durable plant that regenerates itself indefinitely by way of an ever-widening network of shoots.

• In earlier times Chinese scholars and other concerned individuals all over Asia gathered in and around bamboo groves to drink tea, philosophize and talk of sundry matters ranging from politics and ethics to family and wine.

The Bamboo Enterprise had the above-mentioned characteristics of continual thriving growth, flexibility, usefulness, and the spirit of comradeship. It was a community comprised of members who could exchange views and do interesting things together for mutual benefit. The word ‘enterprise’ reflected its innovative and exploratory spirit.

The Bamboo Enterprise functioned as an online community. It consisted of individuals and groups who participated in the community. Each group was comprised of two or more participants responsible for creating projects, whose published results were available to the public. The researcher performed the following roles:

• Coordinating with his collaborators;

• Giving advice to individual learners when they had problems concerning their projects; including giving them instructions on how to use the Internet;

• Providing technical support for the community as a whole;

• Managing the day-to-day operations of the groups.
Each project had at least one helper as a member. The helper may have been an English teacher or a volunteer who was deemed appropriate. The helper assisted his or her group either through the Internet, face-to-face contact or a mixture of modes. Volunteers who lent support could help in a variety of projects that learners initiated and carried out in an autonomous manner. The scaffolding or support was a wide range of means and resources that learners could access in order to solve problems that could be expected to arise when they engaged in the collaborative activities of the projects. The students undertook collaborative work on an equal footing. They could seek help from many sources such as fellow group members, the researcher, their own teachers, and volunteers as well as online databases and other websites.

4.2.3 Using Group Activities Within the Bamboo Enterprise to Promote Critical Thinking in Language Learning

Pedagogically, CMCL is an approach to language learning based partly on a constructivist learning theory (Vygotsky, 1935; Luria, 1971; Luria & Yudovich, 1971; Luria, 1982) that assumes that language learners can undertake learning tasks that are greater than their actual unassisted competency levels, provided they have the assistance of the appropriate scaffolding. In other words, it is posited that effective learning will occur when the learners are able to perform tasks that are ahead of their existing abilities with the support from the teacher or more capable peers (Bruner, 1986; Gray & Cowey, 2000; Hammond, 2001). In this study, the group activities within the Bamboo Enterprise were created to support the learners to carry out the challenging task ahead of their abilities.

On the understanding that critical thinking in language learning is enhanced through participation or collaboration, the Bamboo Enterprise was designed so that more scaffolding could be accessed as necessary and was, therefore, a learning environment in which everyone could participate. There were three planes of support for its members that could contribute to collaborative
learning. The notion of three planes was suggested by Jordan (2004) in the context of primary education. The three planes were:

1. The Community Plane
This plane refers to scaffolding from the community. It included the philosophy and policies of the community that supported authentic activities. It also referred to communication with other groups or communities.

2. Interpersonal Plane
This plane refers to the relationships among members of the community, including the relationship between teachers and students, teachers and the researcher, volunteers and other members.

3. Personal Plane
This plane refers to members’ empowerment and task scaffolding.

The Bamboo Enterprise was able to provide all three planes of community support, its support consisting of the teachers, the researcher, the volunteers, resources on the Internet and additional materials.

Students learning English as a foreign language outside English-speaking environments generally have few opportunities for socialization. Now, however, the Internet allows people to interact in a virtual world, so that learners can participate in a true English-speaking environment and be empowered by this during the language learning process.

Using the Internet, learners can read in English and can talk to English speakers, both native and non-native, through online communities or chat rooms. Such a virtual world is not perfect. It can be viewed as an indirect way of learning, or a type of observational learning (Bandura, 1977). Nevertheless, the type of online collaboration undertaken here was carried out in a context where learners experienced real opportunities to
communicate. The learning environment was such that the students could also develop their critical awareness as they attempted to cope with various unpredictable situations. In undertaking online projects participants needed to deal with other people who were from different cultural or social backgrounds and who had different opinions. Because written language is still the main medium of the Internet, as Warschauer (1997) has pointed out, learners used writing as a tool for communication.

To sum up, the activities of the Bamboo Enterprise had the ingredients necessary for effective language learning. They were input-rich, interactive, and designed so that participating students needed to negotiate meanings.

4.3 Research Participants

As mentioned already, the members of the Bamboo Enterprise were people from different nationalities. After the permissions from the two institutions (School of Languages and International Education, University of Canberra and the Language Institute, Dhurakij Pundit University) were granted, the researcher began recruiting for the research participants, on a voluntary basis. Participants included the researcher as well as teachers, students and volunteers. The students were two groups of intensive English students at the University of Canberra (UC) and one group of English students at the Language Institute of Dhurakijpundit University, Bangkok, Thailand (DPU). The learning activities of the Bamboo Enterprise involved three case studies.

Table 4-1: Research Participants

<table>
<thead>
<tr>
<th></th>
<th>Case Study 1</th>
<th>Case Study 2</th>
<th>Case Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>16</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>Teachers</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Volunteers</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Researcher</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>32</td>
<td>38</td>
</tr>
</tbody>
</table>
4.3.1 Students
The student participants were recruited by their teachers. They worked in groups, investigating environmental problems and creating online work. Some posted their work on the Internet and used the discussion boards.

The teachers encouraged the students to assess their own performance so that they could become more independent. According to Underhill (1987), self-assessment is a means of helping students become aware of their own learning experience, an important element in acquisition. In this study, students were asked to answer self-evaluation questionnaires, and at every stage students could have their say about their learning process and the learning environment either through the Internet or in person. This was important because it has been found that students’ perceptions of their own English ability is, some indication of their actual ability level (Thadphoomthon, 2000). In other words, there is generally a positive correlation between students’ perceived ability and their actual performance.

4.3.2 Teachers
They recruitment process was facilitated by the institutions. The prospective research collaborators were recommended by the program head of each institution. There were several informal meetings between the researcher and the research collaborators prior to the start of the research. Teachers were both native and non-native speakers of English and were actively involved in the inquiry. They worked alongside one another for mutual benefit, and they shared their experiences so became both facilitators and ‘co-learners’.

4.3.3 Volunteers
Several volunteers, recruited by the researcher and the teachers, played a significant role as part of the support system. They helped the students and teachers solve technical problems. They also shared their opinions on the Internet. Before completion of the project, some of the volunteers were
asked to describe their learning experience and comment on their experiences with the learning environment.

**4.3.4 The Researcher**

The researcher was also a participant or co-learner. As a member of the Bamboo Enterprise, in online discussion he also shared his views on the learning experience.

**4.4 Procedures**

This research is guided by a set of sequential activities: (1) briefing of the research participants, (2) engaging in the research projects within the Bamboo Enterprise, (3) completing of the projects, (4) sharing of experiences, and (5) debriefing. The following are descriptions of such sequences.

At the start, every research participant was invited to join the community using his or her Yahoo email account. Upon joining, each was asked to read the information about the research project and then sign a consent form.

The teachers informed the students that the Bamboo Enterprise was an online learning community. These students would receive some guidance and support from the researcher, their teachers and other helpers but they were invited to use their own initiative as well. They were expected to work collaboratively with other students, and there would be other participants joining their projects. The students from Canberra were told that other participants, for example the volunteers or their own teachers, might ask questions or offer some help by giving suggestions. While on the Internet, students were free to express their concerns and personal points of view.

In addition, student participants were informed that they could ask for advice or seek help from the community while undertaking their investigation. They
were advised that they might have to deal with unexpected technical problems in the process of doing their work, for example problems relating to the website. Also, they were told that they may need some help with their English and where such information could be obtained. It must be noted here that the research participants were not asked to provide their age or gender; nor were they asked to identify their religious or educational background, or their nationalities. All student participants were over 18 years old, so it was not necessary to get approval from their parents or guardians. The names of all student participants in this study have been changed in the report that follows in order to preserve anonymity.

At the start, all research participants were included in a research briefing session which was conducted in both countries: Thailand and Australia. During this time the teachers, volunteers and students heard from the researcher about the research aims and objectives, the terms and conditions of the study, including joining and leaving requirements, issues of privacy and trust, and issues related to plagiarism and copyright. At this stage practical questions were addressed, such as those relating to what the Bamboo Enterprise was, how to collaborate in their group and with the Bamboo Enterprise, where and how support was available, and what the learning benefits for participants were.

The research project started when the first participants became members of the Bamboo Enterprise in July 2003. Becoming members of the community meant that participants had already signed consent forms (see Appendix D). At the first stage, the student participants were asked to provide three types of basic demographic data (name, age, contact details). They then engaged in the projects which were conducted between July 2003 and October 2004.

During the first week, those who were present in class were asked to answer two self-administered questionnaires: Perceived English Ability and Attitudes Towards Studying English. Before answering they were informed
that these questionnaires were for their self-reflection as well as for the researcher’s information. It was anticipated that many would choose to keep the results to themselves. They were also told that they would be asked to answer the same questionnaires again at the end of the research.

Around late November and early December, most student projects within the Bamboo Enterprise were completed. The student participants were asked to answer the same questionnaires again. At this stage, participants were able to share their experiences with other members of the Bamboo Enterprise. The researcher interviewed the student participants, teachers, and the volunteers. The student interviews were conducted on an individual as well as group basis.

4.5 Self-evaluation Questionnaires and Interviews

4.5.1 Self-evaluation Questionnaires

The study used two questionnaires: (1) Perceived English Ability and (2) Attitudes Towards Studying English. The students used the questionnaires to reflect on the quality of their learning. The questionnaires were administered at the beginning and end of the students’ participation. Details of the questionnaires are as follows:

1. **Perceived English Ability.** This was a 27-item questionnaire developed by Thadphoothon (2000) that had items requiring responses ranging from 1, “Very Unlike Me”, to 3, “Like Me”. It had a previously reported internal consistency reliability of 0.88.

Examples of the items are:

- I feel that I am not suited to learning English.
- I cannot do English homework by myself.
- I have always successful in studying English.
- I am confident when I study English.
- I have been successful in my learning of English.

The full version of the questionnaire is provided in Appendix A.
2. *Attitudes Towards Studying English* This was a questionnaire that included a 5-point Likert-type scale, ranging from 5, “Strongly Agree”, to 1, “Strongly Disagree”, where a higher average score reflected higher positive attitudes towards studying English. It had an internal consistency reliability (Cronbach’s $\alpha$) of 0.78 reported in Thadphoothon (2000).

Examples of the items are:

I feel happy when I study English.
English is boring.

Regarding demographic data, the study asked at the beginning that all participants provide two pieces of information: their ages and contact addresses.

4.5.2 Interviews

Interviews with students were conducted informally at the end of the project by both the researcher and the teachers. Below are the questions the students were asked.

How did you form your group?
How were decisions made? Who decided what?
How did you spend your time?
What did you do when you did not understand something?
What were some of the characteristics of the support provided?
Was the support adequate?

In addition to student interviews, the researcher conducted interviews with the teachers. The teachers were asked:

How did the students form their groups?
How did they make decisions?
How did the students spend their time?
What happened when they did not understand something?
Was the support adequate?
4.6 Support within the Bamboo Enterprise

The students were supported in various ways. This qualitative study reflected a social-constructivist perspective of language learning, where support for the learners is vital.

This perspective, as suggested in the previous chapter, is an ‘ecological approach to language learning’ in which other community members would support the students. This approach, according to van Lier (2002), embraces a broader perspective of learning and is organic. Support, therefore, is crucial. Scaffolding, the term coined by Bruner (1980) according to Gray and Cowey (2000) and founders of Scaffolding Literacy, is “a process through which more knowledgeable participants support the performance of the less competent participants in a learning situation” (p. 4). It is based on Vygotsky’s notion of ZPD that was discussed in the previous chapter. The students were asked to undertake complex, challenging tasks, so support or scaffolding was crucial for them. As Figure 4-2 shows, this study provided multiple sources of support.

Figure 4-2: Support Structure of the Bamboo Enterprise
Apart from their peers, the teachers were the main source of support. The teacher, according to Jacobs and Farrell (2003), should be regarded as a co-learner, not a leader. As students worked in small groups, another source of support was their peers. In this project the groups were long-term, heterogeneous CL groups with stable memberships (Johnson et al., 1992). The purposes of the group were to give the support, help, and encouragement each member needs to make academic progress (attend class, complete all assignments, learn) and develop cognitively and socially in healthy ways. Support was also available from the researcher, the volunteers, and online resources and classroom materials.

4.7 Three Case Studies

In this research three cases studies were used to investigate the potential of the Bamboo Enterprise as a learning environment. As this was an exploratory study it was thought that an examination of multiple cases would provide a truer and more complete picture of what occurred in the learning environment than would examination of a single case. The participants undertaking projects through the Bamboo Enterprise were placed in one of three groups: two groups were at the University of Canberra and one at Dhurakijpundit University.

4.7.1 Case Study 1

This case study, located at the UC was a collaborative activity between the researcher and an intensive English class, with some help from an MA student in TESOL and a few volunteers.

The researcher and the teacher met several times prior to implementation of the learning activity. At this time it was agreed that participants would develop projects that would serve a number of purposes. They would be a means of (1) enabling students to use English in the real world, (2) assisting students with development of their social skills, (3) encouraging students to be reflective about their learning and the pressing global issues that were the
focus of the enquiries, (4) developing students’ computer skills. The environment was selected as a desirable general theme, and the title of the collaboration would be *Using Collaborative Environmental Projects to Promote Communicative Language Learning and Computer Skills*.

Sixteen students in the English language class (ELICOS Module 2) that was in session during October and November 2003 participated as students in this investigation, which was integrated into their existing syllabus. The students were from different countries: Bangladesh, China, Japan, the Czech Republic, Hong Kong, and Thailand. Students were assigned to groups of four or five people to research an environmental problem. The assignment entailed two items: a written report of about 250 words, and a spoken PowerPoint presentation about the problem. The whole assignment took nine weeks.

In Week 7, the collaboration underwent some unexpected changes. The original teacher was assigned to a new responsibility. As a result, another teacher took her place. Despite the change, the collaboration went ahead.

Topics agreed upon for the collaborative project were Air Pollution, Water Pollution in Rivers or Lakes, Ocean Pollution, Plastic Garbage, Overpopulation, Drought, Desertification, Bushfires/Forest Fires, Ozone Layer Depletion, Global Warming, Introduced Toxic Pests, and Endangered Animals. Students were told that the report needed to include: (1) definitions of the chosen environmental problem, (2) the current situation worldwide, (3) the current situation in Australia, and (4) solutions and ideas to solve the problem (this could include actions already taken by governments or by other interested groups). The students were advised that the report should include a reference list and bibliography, and that it would be posted onto the Bamboo Enterprise website. All group members should contribute to writing the report.
Each group was also required to give an oral presentation to the whole class. All group members had to speak and use PowerPoint. The students were asked to hand in their information sources after the presentation. Repeatedly, the students were encouraged to use their own words and acknowledge their sources of information.

The work of this assignment was ultimately a combination of tasks: (1) online research using the Bamboo Enterprise, (2) Drafting, (3) Writing, (4) Teacher consultation, (5) Group discussion, (6) Preparing PowerPoint presentations, and (6) Practising speaking.

In the first week, the teacher gave each student the two questionnaires to answer in class. The questionnaires were self-administered and were aimed primarily at enabling students to reflect on their own ability and attitudes. Few students returned these questionnaires, so only a few questionnaires were eventually available for analysis.

Each group was given resources from the Academic Skills Program of the University of Canberra: These were handouts on: (1) How to work in groups to do assignments, and (2) How to acknowledge sources in academic writing. The students were also given practice on how to prepare summaries, and provided with vocabulary relating to the environment and conservation.

4.7.2 Case Study 2

As with Case Study 1, this case was a collaboration between the researcher and an ELICOS class at the University of Canberra. The researcher and the class teacher, an experienced English teacher, worked alongside each other as equals. After a number of informal meetings in which ideas and information on teaching approaches were exchanged, it was decided that the
The title of this collaboration should be: Using Environmental Themes in Computer-Supported Cooperative Learning to Prepare ESL Students for Academic Study in an Australian University Environment.

The collaboration produced fifteen projects and involved more than twenty student participants. This case study was divided into two parts: following the teaching modules. The aim was to create a learning environment that offered the students opportunities to develop themselves in all the macro-skills (reading, writing, listening, and speaking). Also, it was recognized that students needed to familiarize themselves with the academic atmosphere of Australian tertiary institutions. In common with Chin and Blumenthal (1989) the researcher and teacher felt that ESL teachers were not preparing students appropriately for mainstream studies in Australian colleges and universities if the students were limited to textbook learning.

The collaboration exercise spanned two 9-week modules of English classes. Module 1 focused on global environmental topics; Module 2 focused on local environmental topics associated with the University.

The students were instructed to work in groups of three or four. The groups were to undertake research into the assigned topic and prepare a written report and an oral PowerPoint presentation. The report needed to be about 250 words in length, and include: (1) a description of the problem (definition, causes and effects) and a research question; (2) a description of the research method used (for example, quantitative survey, observation), (3) the research findings and an analysis of the data, and (4) solutions and suggestions. Eight weeks were allowed for this phase of the project.

The students were informed that the report was to be posted on the Bamboo Enterprise website in Week 8. All group members were required to

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5 Mikulecky, B S and Jeffries, L More Reading Power Addison-Wesley Publishing Company, Unit 10, pp. 167-177
6 English Vocabulary in Use (Advanced) pp. 94-95.
contribute to writing the report, which needed to include a reference list and bibliography.

The second requirement for each group was an oral presentation about their research to the entire class. All group members were required to speak, and use an accompanying PowerPoint presentation. The length of each person’s presentation had to be about 5 minutes and the presentations were to be done during the last week of the module.

The suggested topics were as follows:

- Littering
- Swooping magpies
- Disposal of non-biodegradable products by food vendors
- Smoking on campus
- Alcohol on campus
- Unsafe air conditioning
- Uncomfortable classrooms
- Advertising on campus
- Crime (theft, vandalism, assault)
- Personal safety
- Disabled access
- Traffic problems (cars, trucks, buses, motorbikes, bicycles/skateboards)
- Weather protection

The students were told that the research should be done outside school hours and that each student should count the research time spent in a weekly 5-hour log. The students were reminded that this project entailed a variety of activities: online research using the Bamboo Enterprise website, writing, drafting, teacher consultation, online discussion, off-line group discussion, off-line research, PowerPoint presentation preparation and speaking practice.

The collaborator used a website assessment form to evaluate the students’ online projects. Criteria for evaluation were as follows:

- The language of the report: appropriate tense choice, sentence structure, grammar, and vocabulary
- Structure of report: use of topic sentence, use of supporting sentences, appropriate length
Other web features: pictures, links, look and layout, and audio files

4.7.3 Case Study 3

This case was a collaboration between the researcher and an English teacher at Dhurakijpundit University, a private university located on the outskirts of Bangkok. Students were 34 first year university students who took a foundation English course (compulsory). Students were all Thai and non-native speakers of English.

The collaborator agreed to carry out her own classroom research in collaboration with the researcher. Every student in the class was requested to join the project. The students themselves were those who were involved in a pilot study being conducted by the Language Institute of the University. The pilot study aimed to enhance students’ language proficiency through a new online instructional program, in addition to the normal face-to-face interaction. After being introduced to the new program the teacher participant felt that the Institute’s additional online instruction was still limited because it simply required the students to complete certain lessons and exercises: “It is just like putting the textbook in the computer”, she said. Language learning under the new program, therefore, was still limited to the classroom context. However, the Bamboo Enterprise did appear to be a useful and creative extension of that program.

The students were asked to work in groups. Each group was assigned a project, which required that they investigate a global environmental problem such as air or water pollution in Bangkok. The student participants were English-major students, mostly female and in their early twenties. The proficiency level of the class was at the lower-intermediate level, according to their placement test results.

At the beginning of the semester the researcher spent two sessions introducing the research project at DPU. During the first session the aims,
procedure and nature of participation for students and teacher were explained. The researcher, teacher and students also discussed the content expectations and potential problems that might arise, especially technical difficulties, access to the Internet and language barriers. The students were asked to spend some time reading and gathering information from various sources, for example, newspapers, books, and the Internet. The teacher told the researcher at the second session that the required tasks were too advanced for most students; and, it was true, many students did find the material they had gathered difficult to understand. However, the decision was made to go ahead with the project. After two sessions of orientation the teacher worked with the students helping them to understand the material and the scope of each project was refined and narrowed. A volunteer, a technician at the university’s self-study centre came alongside and provided additional support, then another teacher agreed to assist also. The researcher also gave assurance that he would provide additional support to the Bamboo Enterprise should there be need of further help.

According to the teacher, conducting her own classroom research in close collaboration with this research project would benefit not only herself and her students, but also the Language Institute as its findings could provide additional useful information regarding the effectiveness of the newly implemented program. Thus, the collaboration started and it was titled Promoting Communicative Language Learning through Computer-Supported Cooperative Learning. As the title suggests the main aim was to find ways in which the Internet and group activities could be used to promote communicative language learning and so enrich the students’ language learning experience.
4.8 Sources of Data

Multiple sources of information are essential in good qualitative research so that the evidence is rich and this crucial point was taken into account in this research. Figure 4-3 summarizes the data sources. Five were used: (1) interviews and written reflections, (2) teachers’ comments and opinions, (3) questionnaires, (4) online presentations, and (5) online interactions. The following section will discuss the approach to data analysis employed for this study.

The Bamboo Enterprise commenced operations in July 2003 and was closed in February 2004. During this time members of the community undertook 20 student projects.
4.9 Data Analysis

The aim of this study was to examine the potential of the CMCL environment to promote critical thinking in language learning. As discussed in Chapter 2, five parameters of critical thinking in language learning were derived from the model: (1) Linguistic Conventions, (2) Audience, (3) Communication Aims, (4) Reasoning, and (5) Self-reflection in Language Learning. The five elements served as the qualitative analysis guidelines of the study.

Below is a description of the approach used showing how the five aspects of the model were addressed in the analysis.

4.9.1 Linguistic Conventions

In this study, as discussed in Chapter 2, linguistic conventions refer to vocabulary and grammar or lexicogrammar (Butt et al., 2000). In order to deal with this phase of the analysis, the students’ overall work as well as their interactions as seen on the Internet, were analyzed using text analysis software available at www.UsingEnglish.com. The software is an online tool that helps analyze the quality of English usage using calculations based on the number of words, number of unique words, number of sentences, average words per sentence, and lexical density. Also, for each of the three case studies three indexes were calculated: Type-Token Ratio (TTR), Gunning Fog Index (GFI), and Coordination Index (CI). The following are the formulas for the calculation of these indexes.

Type-Token Ratio (TTR):

\[
TTR = \frac{\text{Number of different words}}{\text{Total number of words}}.
\]

TTR is calculated by dividing the number of different words by the total number of words. For example, the sentence, “The man loves the woman”
would have a TTR of 0.8, because there are four different words divided by a total of five words. According to Warschauer (1996), a higher TTR would indicate the greater complexity of a given text.

Gunning Fog Index (GFI):
The GFI provides an indication of the richness of the vocabulary used. The formula for calculating this index is: 

\[ \text{GFI} = \left( \frac{\text{The average number of words in sentences} + \text{the percentage of words with three or more syllables}}{100} \right) \times 0.4 \]

Coordination Index (CI)
The Coordination Index helps assess the grammatical sophistication of a text. The CI is defined by Warschauer (1996) as “the number of independent clause coordinations divided by the total number of clauses combined – that is, independent coordination plus dependent subordination”. This index is “inversely proportional to complexity, since more advanced writers or speakers of a language generally use proportionally more subordination than do beginners”. The formula is:

\[ \text{CI} = \frac{\text{the number of main clauses}}{\text{by the total number of clauses (main plus subordinate)}} \]

For example, the passage “Mary has a boyfriend who is poor. She loves him. However, her parents do not” would yield a CI = 3/4 = 0.75.

A benchmark was created for each index, based on an analysis of random excerpts from four academic textbooks:

The students’ grammatical accuracy as well as text complexity was considered. To do this, samples of the students’ writing were analyzed and the ratio of grammatical errors per sentence to text was calculated. In addition, the teachers’ opinions and comments regarding grammar accuracy were also considered.

4.9.2 Audience

The activities of the Bamboo Enterprise allowed the students to address a wide audience. In fact, the audience consisted of three groups: (1) fellow students, (2) the teacher and the researcher, and (3) the online audience, which included other members of the Bamboo Enterprise. Each group had both fellow group members and academic audiences. In answering this question, this study relied on comments from the research participants as well as the students’ overall work, including their online discussions.

4.9.3 Communication Aims

What did the students want to accomplish? Did they achieve their aims?

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7 Source: http://www.usingenglish.com/glossary/fog-index.html [last accessed 5 April 2005]
Broadly speaking, the students had two sets of goals: short-term and long-term. To achieve the former, students needed to complete the assignment in a way that was satisfactory to the teacher, and create an information website to communicate information to their audience. To achieve the latter, it was necessary for there to be noticeable improvement in their academic English. These two aspects of students’ communications were investigated by analyzing the comments from the research participants and also the students’ overall work, which included their online discussions.

4.9.4 Reasoning

As discussed in Chapter 2, the proposed model consisted of three areas, one of which was reasoning. In this study, it is thought that reasoning or arguing is appropriate if it is logical, and in a sense ethical. To be logical, information must be organized in ways that serve the communicators’ communicative purposes (Hoey, 1983; Lee, 2002) and reasoning must be coherent. Therefore, students’ output was examined to determine the level of information organization, taking particular note of the use of cohesive devices. Cohesive devices refer to language that is used to join sentences together (Harmer, 1991, p. 114) and in this way they help make texts coherent. Halliday and Hasan ((1976) recognize five ways of binding text together. First, pronouns can be used to refer to nouns. Secondly, one word can be substituted for another. Thirdly, words or phrases that have already been mentioned and are unnecessary can be left out. Fourthly, use can be made of conjunctions, for example and, but or so, and also transition words or phrases, for example, firstly, secondly, or finally (Oshiman & Hogue, 1991). Lastly, different words, phrases or expressions that make the text more interesting can be used. The students’ explicit use of cohesive devices was investigated; specifically the presence of conjunctions, pronouns, use of different words, substitution and ellipsis (Halliday and Hasan, 1976) was noted. As the proposed model requires that reasoning must be ethical, that is not harmful to others, objective and open-minded, and
should also take into consideration others’ points of view. These factors were also considered under this factor.

4.9.5 Self-reflection in Language Learning

Four elements of this CMCL were designed especially to foster the students’ self-reflection, namely, (1) self-evaluation questionnaires, (2) peer collaboration, (3) task and content, and (4) feedback from the teacher. To address the presence of students’ self-reflection, the researcher used information from the interviews with the students plus some comments and opinions expressed by their teachers. In addition, the written self-reflections from the student participants were included in the analysis.

Chapter Summary

This chapter described the case study method that was used in this investigation and the three case studies that formed the focus of the analysis. It identified the research participants. Then there was a description of the online learning community that was set up as a CMCL learning environment, namely, the Bamboo Enterprise. Next, the procedures of the research were outlined, which were followed by descriptions of the questionnaires and the questions of the semi-structured interviews. There is a brief discussion about the support for the community. The three case studies were then described in some detail. Finally, the data sources used to determine the learners’ critical thinking in language learning and the method of data analysis were described.

The next chapter will discuss the outcomes of the three case studies.
CHAPTER FIVE

RESULTS

Introduction
In this chapter the results of an investigation undertaken to determine whether the Bamboo Enterprise had the potential to promote CT in language learning are presented. The Bamboo Enterprise was a learning environment that was developed using the principles of the CMCL learning framework proposed earlier. Results are presented for each of three case studies that were undertaken. These results will be analyzed and the analysis will help determine whether this type of CMCL learning environment may promote CT in language learning.

The study has three parts. First, a framework for critical thinking in language learning was developed, and in Chapter 2 a model of critical thinking in language learning was proposed. Secondly, a collaborative learning environment, the Bamboo Enterprise, was created using the proposed model. The aim of the Bamboo Enterprise was the promotion of learners’ CT in language learning. Chapter 3 described how this model was set up for online learning and how students worked in groups in this learning environment, to investigate environmental problems. Thirdly, the potential of this type of learning environment with its focus on critical thinking in language learning was explored. Chapter 4 describes the methods and procedures that were employed to test the learning environment using case studies. Various sources of data, ranging from interviews with student participants, the teachers’ comments and opinions, the questionnaires, the overall work, and online interactions provided data for the analysis.

In this chapter, for each case study, the five aspects of critical thinking in language learning discussed earlier are analyzed, responding to these questions:
1. Did the students use linguistic conventions appropriately?
2. Did the students communicate their ideas and feelings with their audience appropriately?
3. Did the students attain their communicative objectives?
4. Was the students’ reasoning appropriate?
5. Did the environment encourage the students to be self-reflective in their learning?

These five questions were derived from the three aspects of the intellectual framework that was proposed earlier, namely, communication, reasoning and self-reflection. The first three questions deal with communication. The fourth question addresses the issue of reasoning, and the last concerns self-reflection. The questions are addressed systematically. Broadly speaking, two main types of data are combined as evidence. Product evidence was collected from the students’ work that was presented on the Internet and subjective evidence was collected through interviews with teachers and students, students’ responses to the self-evaluation questionnaires and written reflections of the students. However, as mentioned earlier, only some students gave their self-evaluation questionnaires and their written self-reflection reports to the teacher. The questionnaires and reflections functioned as a means to help them become more reflective in their language learning.

5.1 Overview of the Results
In this chapter the results of the three case studies are presented and discussed, case by case. Each case has its own title as follows:

1. Using Collaborative Environmental Projects to Promote Communicative Language Learning and Computer Skills
2. Using Environmental Themes in Computer-Supported Cooperative Learning to Prepare ESL Students for Academic Study in an Australian University Environment
3. *Promoting Communicative Language Learning through Computer-Supported Cooperative Learning*

**5.2 Case Study 1**

This collaborative learning exercise took place in an intensive English course at the University of Canberra and produced five student projects. Table 5-4 shows range of student projects.

<table>
<thead>
<tr>
<th>Student Project</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC-6: Endangered Animals</td>
<td>To study endangered animals</td>
</tr>
<tr>
<td>UC-7: Ozone Layer Depletion</td>
<td>To let you know about ozone layer depletion</td>
</tr>
<tr>
<td>UC-8: Acid Rain</td>
<td>To investigate acid rain</td>
</tr>
<tr>
<td>UC-9: Overpopulation</td>
<td>To suggest some solutions to the problems of overpopulation</td>
</tr>
<tr>
<td>UC-10: Water Pollution</td>
<td>To research about water pollution in lakes and rivers</td>
</tr>
</tbody>
</table>

Presented below is the first page of each project. UC-6’s first page was unavailable.
Figure 5-1: First Pages of UC-7, UC-8, UC-9 and UC-10

UC-7

UC-8

UC-9
Each group used Yahoo Groups to present their work. They followed common basic patterns, mainly because of the features and functions provided by the technology. They stated their mission and objectives and provided links to more information. They also uploaded photos (mainly JPG files) to help communicate their ideas and feelings and to help make the web page more attractive to their audiences. In order to address the research questions, two sources of data were analyzed from participants’ online work, namely, their writing and the available associated discussion.

The following sections present the results of Case Study 1 in terms of the participants’ use of linguistic conventions, understanding of the audience, communicative objectives, reasoning, and their self-reflection in language learning.
5.2.1 Use of Linguistic Conventions

Three excerpts of texts produced by the students, and taken from the online presentations and discussions, were analyzed using, in part, the text analysing software described in section 4.9.1. In this case, there were only three online writing examples, as the other students did not complete this part of the project. Text 1 was from the group UC-6. It was a written response to a question asked on the Internet. Text 2 was part of an online discussion on the subject of overpopulation. Text 3 was from a student’s online presentation. Figure 5-2 presents excerpts from the three texts.

Figure 5-2: Excerpts from the Three Texts

<table>
<thead>
<tr>
<th>TEXT 1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think for as, humans, are very important to protect all kinds of animals not just endengered animals. We have to keep our enviroment healthy withought demages.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEXT 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To solve the over population problem by to implement one family one child, I think it's not a good idea. The good way to solve this problem could be to give a good educational for adult who are maried that they should plan before having a child.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEXT 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is Acid Rain? Acid Rain commonly means the deposition of acidic components in rain, snow, fog, dew, or dry particles. &quot;Clean&quot; or unpolluted rain has a slightly acidic pH of 5.6. And more acidity in rain can make pH drop below 5, and then it is referred to as Acid Rain.</td>
</tr>
</tbody>
</table>

It is evident that while the students’ were attempting to use academic vocabulary and complex in sentence structures students’ grammatical accuracy was low.
Table 5-2: Type-Token Ratio, Gunning Fog Index, and Coordination Index for Case Study 1

<table>
<thead>
<tr>
<th>Text</th>
<th>Type-Token Ratio (TTR)</th>
<th>Gunning Fog Index (GFI)</th>
<th>Coordination Index (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.61</td>
<td>9.09</td>
<td>0.61</td>
</tr>
<tr>
<td>2</td>
<td>0.60</td>
<td>13.39</td>
<td>0.57</td>
</tr>
<tr>
<td>3</td>
<td>0.52</td>
<td>10.23</td>
<td>0.94</td>
</tr>
<tr>
<td>Average</td>
<td>0.57</td>
<td>10.90</td>
<td>0.70</td>
</tr>
<tr>
<td>Benchmark</td>
<td>0.57</td>
<td>15.20</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Table 5-3: Grammatical Accuracy in Case Study 1

<table>
<thead>
<tr>
<th>Texts</th>
<th>Average words per sentence</th>
<th>Average errors per sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14.04</td>
<td>2.55</td>
</tr>
<tr>
<td>2</td>
<td>27.34</td>
<td>2.50</td>
</tr>
<tr>
<td>3</td>
<td>16.14</td>
<td>1.47</td>
</tr>
<tr>
<td>Average</td>
<td>19.17</td>
<td>2.17</td>
</tr>
<tr>
<td>Benchmark</td>
<td>21.74</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 5-2 presents the analysis of three texts using TTR, GFI, and CI. Table 5-3 presents the grammatical accuracy of these three texts.

An analysis of Text 1 shows that the total number of words used was 126, of which up to 77 were unique or unRepeated words. There were nine sentences, and the average number of words per sentence was 14.04. The TTR was high at 0.61. However, the GFI was low at 9.09. The CI was 0.61. It can be

inferred from the average number of words per sentence (14.04) that the sentence structures were complex, even if the average number of errors per sentence was high.

For Text 2, the total word count was 109 and 65 were unique words. The TTR was 0.60. There were four sentences, and the average number of words per sentence was high at 27.34. The GFI was also high at 13.39 when compared with the benchmark of 13.97. As with Text 1, the vocabulary used was rich and the sentence structures were complex. However, once again there were some typographical and grammatical errors.

Text 3 consisted of 17 sentences. The total number of words was 273, of which 143 were unrepeated words. The average number of words per sentence was 16.14. The GFI was 10.23 and the TTR was 0.52. Compared to Text 1, this text, which was probably edited beforehand, contained relatively few spelling errors. As with Text 2, they used complex sentence structure.

The TTR was 0.57, which was as high as the benchmark. The average GFI was 10.90, which was lower than the benchmark 15.20. On average, the CI was 0.70. On average, the students produced 19.17 words per single sentence, which was quite high compared to 21.74, which was the average benchmark. The average number of grammatical errors per sentence was 2.17, which was higher than the errors founding Case Study 2.

The rhetorical tradition of the academic genre involves the acknowledgement of sources of information. Such acknowledgement was generally lacking in both the essays and presentations. Of the four front pages shown earlier, only UC 8 acknowledged the source of their photographs or images, an indication of their higher level of awareness of this convention. With further experience and scaffolding, the students may

Queensland Press. The benchmark for every index is the average number of the four sources mentioned above.
have acquired the necessary skills to cite sources appropriately in their presentations.

5.2.2 Communication with the Audience

In answering the second question – Did the students communicate with their audience appropriately? – comments from the research participants and an examination of the students’ overall work, including their online discussions, were relied on as data for the analysis. The activities within the Bamboo Enterprise allowed the students to address a broad audience consisting of three groups: (1) their fellow students, (2) the teachers and the researcher, and (3) the online audience, including other members of the Bamboo Enterprise. They communicated informally by speaking in collaborative groups and online.

Communication with Peers and Teachers

The assignment required that participants work in groups and collaborate with other group members. The teachers believed the students were successful in their communication with their peers. The second teacher said:

One aim was to use English for communication within their groups. In this respect, most groups did this quite well.

Figure 5-3 shows two PowerPoint slides from UC-7. It is evident that scientific formulas and technical knowledge were used in the communication. The slides also reveal that the students attempted appropriate language for their academic audience.
II. About the ozone

Where is ozone come from?

- Ozone ($O_3$: 3 oxygen atoms) occurs naturally in the atmosphere.
- It is created when ultraviolet radiation (sunlight) strikes the stratosphere, dissociating (or "splitting") oxygen molecules ($O_2$) to atomic oxygen ($O$). The atomic oxygen quickly combines with further oxygen molecules to form ozone

$$O_2 + UV \rightarrow O + O \quad (1)$$

$$O + O \rightarrow O_3 \quad (2)$$

About the ozone hole

- The ozone hole not mean there is a hole in the ozone.
- Actually it’s mean in that place the ozone layer is very thin.
Figure 5-3 shows that the students tried to give a broad definition of ozone layer depletion. Despite their imperfect grammar, they managed to get their message across. They used pictures to help make their presentation more interesting. It can be seen from the two slides above that the students tried to adapt information from other sources. They did not, however, acknowledge these sources.

The presentation was intended for their teacher as well as the researcher but the technology they used enabled them to reach a much wider audience. For example, their work was viewed and appreciated by other members of the Bamboo Enterprise. The interviews from Case Study 3 reveal that many Thai students benefited from the UC students’ online presentations. This is evidence of another merit of Internet use. The information presented online served as examples or models for other students to observe and learn from.

Communication with the Online Audience

The online audience consisted of students’ peers, the researcher, the teachers and unknown persons. In addition to online presentations and classroom discussions, the researcher asked a question to stimulate the online discussion. Figure 5-4 is the discussion thread on the subject of overpopulation.

Figure 5-4: Online Discussion in Case Study 1

<table>
<thead>
<tr>
<th>[A] Researcher:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have two questions for you to think about. `What effects does overpopulation have on natural resources or the environment? Please also suggest some good ways to control the growth in world population.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[B] Student 1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What effects does overpopulation have on natural resources or the environment?</td>
</tr>
</tbody>
</table>
Based on finite resources, overpopulation results in poverty, lack of necessary education, and health degeneration etc, these problems happen in developing countries quite often.

Even for developed countries, overpopulation may cause more competitive environment, reduce citizen's living standards from every aspect.

Please also suggest some good ways to control the growth in world population. For this question, china provides a good example, for example, family plan, most Chinese families are allowed to have merely one child, and Chinese population is under well-controlled.

[C] Student 2:
Do you think, to solve the problems related to over population, it is a good idea to implement one family one-child policy in the world?

[D] Student 3:
To solve the over population problem by to implement one family one child, I think it's not a good idea. The good way to solve this problem could be to give a good educational for adult who are married that they should plan before having a child. If they have enough power such as money to make sure that their children can have a good quality of life in the future how can we stop them to have children who are going to be good citizens in the near future. I think over population is not a problem, but a big problem is a large number of unemployment.

[E] Student 1:
Hello Everybody,

Even it's a controversial argument, I still believe it is still a good way to control the population in the world. Because China has adopted this policy, so the overpopulation issue in China is not as big as before. In addition, we can find other methods to resolve this problem. For example, the government can do some legislation to encourage people to have only one child. For instance, the can give the family tax concession if they have only one child.
[F] Student 4: I think too.

[G] Student 5:  
hi.. I disagree with this policy (one family one child)  
If your family has a baby girl who will continue using your family's name?

[H] Volunteer:  
Why would u disagree that we should have only one child. According to your argument, we should have more than one child, so what is your upper bound?  
The number of children we should have is i think depends on the family economic status as well, but 2 children in my point of view is good number.

[I] Student 6:  
i disagree about this topic, i think that if we should have more than one child

From the above figure, it is apparent that the first response [B] was an intelligent attempt to answer the question that was posted by the researcher. The response was from a Chinese student in UC-9, the group that was investigating the problem of overpopulation. The student repeated the question; then attempted to explain the cause of the problem. His language was formal but with some grammatical errors. There followed an online discussion on the Bamboo Enterprise. The next response was from a Thai student doing the same project [C]. On the subject of the one-family-one-child policy, a Chinese student [D] replied in support of the policy. A student [E] from Thailand posted a very short message in which he showed his agreement but although there were no serious grammatical mistakes the expression is awkward. The opinion also lacks elaboration. This may be due to many factors, such as the student’s limited language proficiency and the limited experience with online discussion. A Thai student in Canberra [F] simply agreed. Student [G] from? disagreed and tried to stimulate discussion with a question.
The online discussion presented in Figure 5-4 shows that the participants were genuinely engaged in interaction with the audience. However in this context, different from the more formal register of the presentations, the students were more concerned with communicating their message than with observing linguistic conventions.

5.2.3 Communication Aims

Broadly speaking, the students had two types of goal: short-term and long-term. For the former they were to fulfil the instructions of the assignments. That is, students were to create websites to communicate information to their audience. For the latter students were to improve their academic English.

Short-Term Goal

Each group had a specific aim. The aim was stated on the front page of the case study. UC-6 for example, aimed to study endangered animals; UC-7 to tell the audience about ozone layer depletion; UC-8 to investigate acid rain; UC-9 to suggest some solutions to the problem of overpopulation; and UC-10 to research water pollution in lakes and rivers. The online presentations showed that students attempted to accomplish these aims, although the level of sophistication was usually limited. On this matter one of the research collaborators said:

One aim was to use English for communication within their groups. In this respect, most groups did this quite well. Some of the topics were difficult and very technical (for example, Acid Rain), which caused some difficulties for them in achieving their aims.

Long-Term Goal

Each participant had as their long-term goal to learn English for academic and social purposes. The CMCL environment provided a rich and highly motivating context for academic language development. The tasks students had to accomplish entailed extensive use of all the macro-skills of academic English. The activities undertaken to complete the projects were stepping-stones to students’ realization of their long term goals.
5.2.4 Reasoning

As stated in Chapter 2, appropriate reasoning is an application of logical thinking. Three aspects of appropriate reasoning are addressed in this analysis: the level of information organization and the use of cohesive devices and the degree of objectivity and open-mindedness.

**Organization of Information**

The students’ PowerPoint slides show how they organized their information in a logical manner. Three examples are shown in Figures 5-5, 5.6 and 5.7. From the three figures it is apparent that the students created simple slides using language that was suitable for the audience, and that they organized their information clearly using patterns of logical development such as problem and solution and cause and effect. Figure 5-7, for example, shows a slide in which the students stated all the topics of their presentation in a logical order. They approached the topic by considering a definition of acid rain, then the causes, special characteristics and so on.
**Figure 5-5: UC-9 Slide on the Definition of Overpopulation**

**DEFINITION : WHAT IS OVERPOPULATION ???

• TOO MANY PEOPLE !

• LIMITED RESOURCES !**

---

**Figure 5-6: UC-9 Slide Showing Suggested Solutions**

**WHAT CAN WE DO ?**

• BIRTH RATE CONTROL

• EDUCATION & ECONOMIC

• SAVE, RECYCLE AND CREATE ENERGY
Use of Cohesive Devices

As mentioned in Chapter 4, the use of cohesive devices provides a good indication of the coherence of the texts. This is particularly important because coherence is overt evidence of logical reasoning. Samples of the students’ writing were examined based on five types of cohesive devices: reference, lexical cohesion, conjunction, substitution and ellipsis (Paltrade, 2002; Butt et. al., 2000; Halliday & Hanssan, 1972).

1. Reference: In the matter of anaphoric reference, students used pronouns widely to refer back to nouns or other pronouns. Students also used the device widely to link sentences together, as in the following example:

   I think for as, humans, are very important to protect all kinds of animals not just endengered animals. We have to keep our enviroment healthy withought demages. [Text 1]

From the above text, the pronoun ‘we’ refers back to ‘humans’ in the preceding sentence, so ‘we’ links the two sentences together.
2. Lexical cohesion:

The students were also able to use lexical cohesion to demonstrate the logical flow of ideas. The example below shows how the writer used semantic chaining to link ideas into a coherent text.

To solve the over population problem by to implement one family one child, I think it's not a good idea. The good way to solve this problem could be to give a good educational for adult who are maried that they should plan before having a child. [Text 2]

The above text, an excerpt from Text 2, shows that the student used words repetitively that were semantically related to make the writing coherent.

3. Conjunctions: As far as the use of conjunction is concerned, students used items such as ‘and’, ‘but’ or ‘so’. The following are excerpts from the students’ writing.

Excerpt 1:

We do not wont to live on the Earth alone. We are on the top of the evolution leather, so we have to protect what our ancestors destroied. [Text 1]

Excerpt 2:

I think over population is not a problem, but a big problem is a large number of unemployment. Text 2]

Excerpt 3:

There are meny extincted animals just because of the irresponcibility of the Humans. [Text 1]

Excerpt 4:

Japan was surrounded by many mountain, so acid rain is liable to fall. [UC-8]

The four excerpts above show that the simplest connective markers were frequently used. The first excerpt shows that the students used the connective marker ‘so’ to establish the causal relationship between two units of thought, reasoning why humans should protect endangered animals. The second shows use of the conjunction ‘but’ to contrast the two ideas. The third shows
the use of ‘because of’ to indicate a cause–effect relationship, and the last shows that the conjunction ‘so’ was used to tie two ideas together.

4. Substitution and Ellipsis:
The students’ writings also contained examples of substitution and ellipsis which contributed to overall coherence of their texts and provided evidence that CT was being promoted with this CMCL. For example, in the following excerpt Student B attempted to use ‘too’ to refer back to the preceding argument provided by Student A.

[A] Student A:
Hello Everybody,

Even it’s a controversial argument, I still believe it is still a good way to control the population in the world. Because China has adopted this policy, so the overpopulation issue in China is not as big as before. In addition, we can find other methods to resolve this problem. For example, the government can do some legislation to encourage people to have only one child. For instance, the can give the family tax concession if they have only one child.

[B] Student B: I think too.

The students’ writing also revealed their use of the ellipsis, even with error. For example:

We are going to explain you why this endangered animals are in danger and

[We are going to explain to you] how we can help.

[Text 1]
In summary, an analysis of cohesive devices in the students’ writing provides evidence that the CMCL offered a potentially rich environment for students to practise CT, even at a somewhat rudimentary level.

Objectivity and Open-mindedness
The second aspect of appropriate reasoning is ethical reasoning as outlined in Chapter 2. This study addressed this matter by assessing the apparent objectivity and open-mindedness of students, as demonstrated in their texts. Narrow and subjective reasoning it is not considered appropriate for critical thinkers, who should be open to new ideas and willing to explore a variety of
sources before making judgments. In a moral sense, ethical reasoning entails reasoning that is not harmful. Every group created texts that satisfied this minimum requirement. For example:

I think for as, humans, are very important to protect all kinds of animals not just endengered animals.

[Text 1]

Students’ online interactions also showed their reasoning. Often the students’ cultural background was evident in what they wrote, but the environment encouraged them to listen carefully to each other. For example, the discussion noted in Figure 5-4 (p.99) reveals different ways the students used reasons to back up their argument. Some of them simply stated their opinion without giving any reasons (for example, I think too), while others tried to demonstrate their reasoning. The suggested solution by a Chinese student is logical: If each family has only one child, it will lower the number of newborn babies. Hence, there will be a lower rate of population. From an ethical perspective, however, such reasoning may be problematic. Many students disagreed. In this respect, the learning environment encouraged open-mindedness, and allowed students to exchange ideas freely in a safe and encouraging environment.

In sum, the data analysis shows that the environment enabled students to use logical reasoning, at least to a certain degree, although they were limited by their level of language proficiency.

5.2.5 Self-reflection in Language Learning

Four elements of this CMCL were designed particularly to foster the students’ self-reflection in language learning: the self-evaluation questionnaire; peer collaboration; the task and its content; and feedback from teachers.
Self-evaluation Questionnaires

In the first week the students were given self-evaluation questionnaires to answer during class. As the two self-administered questionnaires were meant to be private and a means of enabling them to reflect on their ability and attitudes, it was not compulsory for the students to return these questionnaires, and only a few were available for analysis. The students rated their attitudes and ability as follows:

- Jang had a positive attitude towards studying English and perceived himself as having a high level of English ability.

- Andrew had a moderate attitude towards studying English, and perceived himself as having an average level of English ability.

- Mami had a positive attitude towards studying English and perceived herself as having a high level of English ability.

- Terry regarded himself as having an average level of English ability.

As few students returned the questionnaires, it is difficult to ascertain the extent to which they facilitated the students’ self-reflection.

Peer Collaboration

According to the teachers’ reports, the students faced challenges positively and tried their best to complete the task demanded of them. While working on their project, the students had to deal with unforeseen problems. The complexity of the task meant that peer collaboration was essential, and students were encouraged to report and reflect on this experience. Andrew from UC-8, for example, gave a snapshot of how his group went about doing the project.

First every member in our group read lots of articles about Acid Rain. Then we talked together and make the project. Every body was in charge one part. Lastly, when we finished each party, we made all the information in a powerpoint document.
The same student also reflected on his learning experience with peers. Here is another extract from his written self-reflections.

We can get benefits for learning English by using Internet such as joining the group in Yahoo and chat with other members. When I logon Yahoo Groups, I always looking for the topics which I’m interested in, then join the group and read the messages that other members left. If I have strongly agree or disagree with them, or have other new points about that topic, I will send message to talk about it with them. During this process, I really can learn a lot in English

According to Wells (2000), collaboration enables students to reflect on their own learning. It is evident that this is what has occurred here.

Task and Content
Even though the complexity of the task was known and scaffolding was prepared with this in mind, the language demands on students and the number of hours required for the students to complete their tasks were enormous. Hammond and Gibbons (2001) found that challenging tasks generally result in greater effort, provided adequate scaffolding is available. In this project, the students clearly made strenuous efforts to meet the challenge. It can be said that task and content were mechanisms that encouraged the students to be self-reflective in their learning in the sense that the students were encouraged to develop collaborative skills because the topics were of global interest and significance. In order to work together they needed to negotiate their understanding and resolve the differences that inevitably occur when people work together.

Mai’s experience using PowerPoint slides was very significant for her for example; it was the first time she had ever done such a project. Her reflection on the task revealed a great deal:
This task was very useful was me, because I’ve never had presentation front of many people. Many people including you [the researcher] taught how to use computer especially Power Point. When we reasoned about acid rain, we saw a lot of web page. Each of web page has different of opinion and data. It was good for my English improving. Also we discussed about topic. Speaking skill also improved. I understand acid rain very much. I read a lot of web page details. In addition, most useful things is that I understood how to use Power Point. Power Point was very useful, so I will use that in the future. When I read web page site, I had to check new vocabulary and new world. I improve English very much. After we had presentation, I have more confident than before. This module also had to have presentation. I’ve already learned how to research and how to use Power Point. It was easy to have presentation. Thank you for teaching.

Acting on the Feedback from the Teacher

Teacher feedback was routinely given on the students’ use of linguistic conventions and information organization. Even though there was not a structured framework to monitor the students’ reaction to the feedback from their teachers, the fact that their final product contained fewer grammatical errors than their drafts shows that they acted on the teachers’ feedback. This feedback, however, was intended to encourage the students to solve their own emerging problems and was never in the form of a gift of ‘the right answer’.

5.2.6 Summary of Case Study 1

The above text analysis reveals that students’ use of linguistic conventions was at a reasonably high level of complexity, but the accuracy associated with their use was low. Furthermore, students had not acquired the academic convention of citing sources.

In this case study all students seemed to understand their audience. They interacted with their peers both inside and outside the classroom and online. As far as their short-term goal was concerned, the students achieved it by giving an oral presentation using PowerPoint slides and presenting their work on the Internet. A growing ability to switch between registers was evident, although the students were still limited by their lack of vocabulary
and grammar. The students’ organization of information was logical. Their use of certain cohesive devices such as conjunctions, equivalent words, and pronouns was competent but very basic, demonstrating a growing ability to use appropriate reasoning.

The learning environment involved the completion of sets of complex tasks where peer collaboration was crucial for the success or failure of projects. Out of collaboration came self-reflection, since students were invited to report on their experience of participation in the group. The content also helped raise their awareness of global issues and served as a stimulus for engaging in controversial issues that demanded discussion skills.

In sum, the data suggest that the learning environment provided an effective setting for the students to develop CT in language learning.

5.3 Case Study 2
As with Case Study 1, the second case study was conducted in Canberra, Australia. The collaboration spanned over four months, involved two classes, and ran from July to October 2003. There were more than 32 international student participants who completed 10 student projects.

There were two parts to the collaborative study: UC-Global, which was done first, and UC-Local. As in Case Study 1, the projects were carried out in an ELICOS classroom. The first class, comprised of groups UC-1 to UC-4, worked on global environmental projects. The second class, comprised of groups UC-11 to UC-16, worked on locally focused environmental projects. See Table 5-4 below.
Table 5-4: Student Projects in Case Study 2

<table>
<thead>
<tr>
<th></th>
<th>UC-1: Bushfires</th>
<th>To research bushfires in Canberra</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>UC-2: Slapp</td>
<td>To research ozone layer depletion in Australia and the world</td>
</tr>
<tr>
<td>3</td>
<td>UC-3: D W J P</td>
<td>To explore about plastic pollution all over the world and in Australia, and to discuss some solutions to this problem</td>
</tr>
<tr>
<td>4</td>
<td>UC-4: Air Pollution</td>
<td>To research air pollution in Australia and in the world</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>UC-11: Alcohol on Campus</th>
<th>To research alcohol on campus.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>UC-12: Smoking on Campus</td>
<td>To talk about people who smoke in UC</td>
</tr>
<tr>
<td>7</td>
<td>UC-13: Uncomfortable Classroom</td>
<td>To research uncomfortable classrooms at UC</td>
</tr>
<tr>
<td>8</td>
<td>UC-14: Traffic Problems</td>
<td>To research traffic problems in UC</td>
</tr>
<tr>
<td>9</td>
<td>UC-15: Alcohol on Campus</td>
<td>To research problems of alcohol on campus</td>
</tr>
<tr>
<td>10</td>
<td>UC-16: Swooping Magpies</td>
<td>To report about swooping magpies</td>
</tr>
</tbody>
</table>

As with the previous case study, the students in this case used *Yahoo Groups* to present their work. In Figure 5-8 below shows images of the first pages of the presentations.
Figure 5-8: Some First Pages of Student Projects in Case Study 2

The first pages of UC-3 and UC-4 were not available due to technical problems.
From Figure 5-8 it can be seen that each student project shared similar patterns based on the *Yahoo Groups* prototype. The mission and objective were stated. Then, links to other pages were provided so that a person interested in doing so could look for more information. The pages were decorated with photographs that students took from other sources on the Internet. The students used these to communicate their ideas and feelings.
5.3.1 Use of Linguistic Conventions

The student group projects were analyzed using the text analysis tools described in section 4.8.

Table 5-5: Type-Token Ratio, Gunning Fog Index, and Coordination Index for Case Study 2

<table>
<thead>
<tr>
<th>Groups</th>
<th>Type-Token Ratio (TTR)</th>
<th>Gunning Fog Index (GFI)</th>
<th>Coordination Index (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC-1</td>
<td>0.53</td>
<td>10.85</td>
<td>0.73</td>
</tr>
<tr>
<td>UC-4</td>
<td>0.52</td>
<td>12.11</td>
<td>0.76</td>
</tr>
<tr>
<td>UC-14</td>
<td>0.51</td>
<td>8.53</td>
<td>0.79</td>
</tr>
<tr>
<td>UC-15</td>
<td>0.44</td>
<td>8.66</td>
<td>0.63</td>
</tr>
<tr>
<td>Average</td>
<td>0.50</td>
<td>10.60</td>
<td>0.72</td>
</tr>
<tr>
<td>Benchmark</td>
<td>0.57</td>
<td>15.20</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Table 5-5 shows the results of an analysis of the students’ writing using the Type-Token Ratio, Gunning Fog Index and Coordination Index. The average TTR was 0.50, which was slightly below the benchmark of 0.57. The average CI was 0.72, which suggests that the ratio of independent clauses to main clauses was moderate. Nonetheless, the index average was still lower than the two benchmarks mentioned above, which were 14.44 and 13.51 respectively. It is evident that the students’ writing tended to be complex and the rate of spelling errors low.

Table 5-6: Grammatical Accuracy in Case Study 2

<table>
<thead>
<tr>
<th>Groups</th>
<th>Average words per sentence</th>
<th>Average errors per sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC-1</td>
<td>17.34</td>
<td>0.66</td>
</tr>
<tr>
<td>UC-4</td>
<td>19.54</td>
<td>0.68</td>
</tr>
<tr>
<td>UC-14</td>
<td>13.64</td>
<td>0.52</td>
</tr>
<tr>
<td>UC-15</td>
<td>14.74</td>
<td>0.87</td>
</tr>
<tr>
<td>Average</td>
<td>15.00</td>
<td>0.68</td>
</tr>
<tr>
<td>Benchmark</td>
<td>21.74</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 5-6 shows an analysis of the grammatical accuracy of students’ work in Case Study 2. The average number of grammatical errors per sentence was 0.68. The students produced an average of 15 words per sentence, which was high compared to the benchmarks 16.2 and 17.25 referred to in Case Study 1.

The above analysis shows that the students’ use of linguistic conventions was largely appropriate, given their proficiency level (intermediate level students). However, the teacher complained that even after two rounds of feedback, there were still errors in the final drafts.

Did the students use linguistic conventions appropriately? Mostly, but sometimes even after two edits they were still not completely accurate. Working together, they could realize their own errors and correct others within their group.

As in Case Study 1, the students made no use of academic referencing conventions. It would seem that the students were more concerned about communicating their ideas than about accuracy in following linguistic conventions.

Two additional aspects are important to consider in analyzing the texts: the audience and students’ aims. These issues are addressed in the next section.

5.3.2 Communication with the Audience

The previous section focused on the students’ use of linguistic conventions. This section focuses on how the students’ communicate their ideas to their audience. The activities within the Bamboo Enterprise allowed the students to address a broad audience consisting of three groups: (1) fellow students, (2) the teacher and the researcher, and (3) the online audience, which included other members of the Bamboo Enterprise. To assess whether the audience understood the messages, comments from the research participants, their overall work and their online discussions, were analyzed.
Communication with Peers

The teacher’s comments, students’ own reflections, students’ online discussions as well as their overall work, demonstrate that they generally understood the nature of their audience and were able to adjust their language accordingly.

The PowerPoint slides that accompanied their oral presentation show that most students showed politeness. Figure 5-9 illustrates thanking messages, a common courtesy. Simple and routine as it is, if one fails to practice such courtesy audiences may feel that an element of the presentation is missing.

Figure 5-9: Thanking as Seen from the Students’ Slides

Thank You
Communication with Teacher

The students’ communication with the teacher was extensive because they were required to report their progress on a regular basis. The support structure was flexible, so that not much was prepared for the students in advance. Rather, the students had to seek help from the teacher, the researcher, and the volunteers. This process worked very well according to the teachers.

Communication with Online Audience

In the follow-up interview, the students were asked about the extent to which other members of the Bamboo Enterprise understood their ideas. Most were confident that the audience understood what they had presented online. UC-16, for example, believed that, even though they were not one totally sure of clear communication, their presentation was reasonably good. As the sentences and words were not difficult, the students reasoned, the audience should be able to understand their work. “Although we did some mistakes on grammar, I think they can understand us”, one student said.
Figure 5-10 shows the online discussion conducted by UC-11. It is evident the students communicated with their audience appropriately. Even though their grammar was far from perfect, the language was appropriate for the audience. However, in one particular case questions could be raised about the appropriateness of a photograph. The image might be appropriate for their peers but inappropriate for a wider audience (see Figure 5-12). The line between creativity and appropriateness can be very thin.

Figure 5-10: Online Discussion from UC-11

<table>
<thead>
<tr>
<th>[A] From the researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject: Hi</td>
</tr>
<tr>
<td>Hi,</td>
</tr>
<tr>
<td>How are you? Why do you think drinking is a worry?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[B] From a member of UC-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject: Re: Hi</td>
</tr>
<tr>
<td>I don't think so because drinking is not a worry. But drinking too much is bad for you and your study.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[C] From the researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject: Why drink it?</td>
</tr>
<tr>
<td>Hi every1</td>
</tr>
<tr>
<td>Please give 5 reasons why it is not good to drink alcohol:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[D] From a student in Bangkok</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject: hi</td>
</tr>
<tr>
<td>Hi..How drinking alcohol have result to your studying?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[E] From the researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject: Alcohol &amp; Sexuality</td>
</tr>
<tr>
<td>One of your respondents says that alcohol on campus is good because it helps him to pick up girls. I think this is a worry. Research elsewhere has reported that alcohol drinking is a strong contributing factor to the high incidence of high-risk sexual behavior among many college students.</td>
</tr>
<tr>
<td>From a student in Canberra</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>Subject:</strong> Re: Alcohol &amp; Sexuality</td>
</tr>
<tr>
<td>I disagree with that thing. It is because if people get drunk, they also know what they are doing.</td>
</tr>
<tr>
<td>For example, when I drink with my friends, we always look after everyone and after we drink, we will go home together.</td>
</tr>
</tbody>
</table>
5.3.3 Communication Aims

As in the first case, the students had two principal sets of goals: short-term and long-term. To fulfill the former, they were to complete an assignment to satisfy the teacher, and create a website in order to communicate information to their audience. The students’ long-term goals were concerned with improvement of their academic English. Comments from the students, the students’ work and their online discussions were analyzed to examine their communication aims.

Short-Term Goal

The students’ short term goals were accomplished because all of the groups fulfilled their assignments. The teacher claimed to be satisfied that the basic demands of the assignment had been met. In his words:

Did they attain their objectives? Their objectives were mostly achieved in that they were exposed to relevant technology and the macro-skills were used.
Long-Term Goal

As most planned to continue their study at Australian universities, students’ long-term goals were to be competent in English, especially academic English. In general, the learning environment of the Bamboo Enterprise helped the students’ experience a complex learning environment and gave them opportunities to practise and reflect on their language abilities. This CMCL has the potential to prepare international students for academic study in an Australian University environment. It may be said that, for these students, this CMCL environment was a good stepping-stone from which to move ahead with confidence.

5.3.4 Reasoning

Organization of Information

The following figures show how the students generally developed subtopics in a logical manner. The examples of web pages in Figure 5-10 show how the online presentations were done in a logical order. The students outlined their presentations to serve their communicative purposes; they created links for users and these indicate their skills in identifying important headings on the basis of the students’ knowledge of the whole topic and sense of the audience needs. As in Case Study 1, the environment of the Bamboo Enterprise guided the students into a logical presentation of their information.
Hole in the Ozone Layer?

Our objects are to learn about ozone layer depletion:

- **Definition of ozone layer depletion.**
- **The current situation worldwide.**
- **The current situation in Australia.**
- **How to solve this problem?**

[Back]
Figure 5-13 shows the front page of UC-12. The students organized their information in a logical manner.

Figure 5-13: Front Page of UC-12

Figure 5-14, shows two slides from UC-11’s (Alcohol on Campus) Internet site. From these it is evident that the students’ very simple information was presented clearly and logically.
Australian students

- I think it is good to have alcohol on campus.
- It helps me to relax, have fun with my friends and meet new people.

International students

- A little is good but too much at that moment.
- Students and alcohol are not the best combination.
Use of Cohesive Devices

As mentioned in Chapter 4, the students’ use of cohesive devices provides an indication of the level of textual coherence in the students’ work. Coherence is a major element of logical reasoning.

1. Reference: Pronouns were extensively used in their writing. For example:

   Magpies are common birds in Australia that you can see everywhere around Australia. They have sharp beaks, talons and a loud call; Furthermore, their colours are black and white. They live in the gum trees and spend the rest of the day sitting on a branch or power pole near their nest. Magpies become dangerous in spring and summer, especially from August to December, because they often swoop people. The reason they do that is because they try to protect their babies from the threat of other birds or people. As the result of this, a lot of people get attacked.
   [UC-16]

   Pronouns refer back to nouns or other pronouns and, therefore, link sentences together. From the above excerpt the pronouns ‘they’, and ‘their’ repeated in the last four sentences, refer back to ‘magpies’. This use of the pronoun links all four sentences. Similarly, the demonstrative pronouns ‘this’ and ‘that’ refer to the birds’ behaviour described in the previous sentence.

2. Lexical cohesion: The student’s writing shows rudimentary use of lexical cohesion as a way of developing reasoning. For example, the following excerpts show one students’ use of metonyms, synonyms and repetition to maintain cohesion.

   Excerpt 1: Metonymy
   We had interviewed 10 people, four international students and six Australians. According to the research, we found out a lot of useful information about the swooping magpie.
   [UC-16]

   Excerpt 2: Synonymy
   Bushfires are also called Forest fires.[UC-1]
3. Conjunction: Conjunctions were widely used to make texts coherent. The students used both textual and interpretive markers, for example. Here are a few examples:

Excerpt 1:

Bushfires occur because of three reasons: fuel, heat, and oxygen.

[UC-1]

Excerpt 1 shows that a logical connective [because of] has been used to establish a causal relationship between bushfires and their causes.

Excerpt 2:

I don't think so because drinking is not a worry. But drinking too much is bad for you and your study.

[Online discussion]

Excerpt 2 shows that a logical connectives ‘But’ and ‘and’ were used to connect ideas. However, the students’ use of conjunctions is still developing, as can be seen from the inappropriate use of ‘furthermore’ in Excerpt 3.

Excerpt 3:

Magpies are common birds in Australia that you can see everywhere around Australia. They have sharp beaks, talons and a loud call; Furthermore, their colours are black and white.

[Online discussion]

4. Substitution: Students seldom used this type of cohesive device, as oral communication was not analyzed.
Hi,
How are you? Why do you think drinking is a worry?

I don't think so because drinking is not a worry. But drinking too much is bad for you and your study.

[Online discussion]
From the above interaction it can be seen that the word ‘so’ substitutes the preceding statement – ‘that drinking is a worry’.

5. Ellipsis: Students used this device frequently. For example:

Excerpt 1:

People agreed that the tables and chairs were too small and [tables and chairs were] broken and there were not enough [tables and chairs].

[UC-13]

In general, students used reference simple cohesive devices with reasonable competence demonstrating the potential of the CMCL to provide a platform for students’ critical thinking in language learning.

Objectivity and Open-mindedness

Students were asked to conduct a small research task for the second phase of the project. They were asked, also, to be objective in their work and their presentation of it. Below are a few examples.

Example 1

3. Research of Findings and Analysis of Data

According to our research, even though alcohol on campus seems to have serious problems, most Australian students and overseas students, including security guards think that it should not be banned, so we cannot ban alcohol on campus.

Example 1 shows that the group had attempted to draw conclusions based on researching the views of three groups of stakeholders. They interviewed representatives of the three groups of stakeholders: (1) international students, (2) Australian students, and (3) a security guard. While their conclusion is
naively expressed, it is evident that the students have been encouraged to be open-minded in their consideration of the issues.

Example 2
This example shows how a group created its own questionnaire to collect data.

Figure 5-15: Questionnaire Developed and Implemented by UC-14

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Don't know</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pick up point</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not enough car parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The car parking is too far</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The car parking isn't safe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not enough bicycle parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The security system doesn't</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cover the bicycle parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No safety area for riding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bicycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use of the questionnaire shown in Figure 5-15 indicates that the students strived to be as objective as possible. The fact that the students devised their own questionnaires and collected their data by this method can be considered an attempt to be objective.

Example 3
Another group, UC-13, described their methodology when they gave their oral presentation. Figure 5-14 shows how the UC-13 group collected its data. Here, also, there seems to be an attempt to be objective in the presentation of the argument.
All examples show that students were encouraged, through the task and scaffolding, to be objective. They actually carried out fieldwork to collect first-hand data and presented both sides of an argument. In Example 1, it is evident that the group discovered that Australian students and international students had different views on drinking alcohol on campus.

The learning environment encouraged students to be objective and open-minded. After their oral-presentations there were tough questions from the audience. On this subject, the teacher noted:

Students in groups came up with logical arguments and discussed ethical issues with each other. This was also reflected in their data analysis.

Generally, while the formal presentations demonstrated logical and ethical reasoning, the online discussion was much less thorough in this respect because, clearly, the students had much less time to prepare their language, and also because of the spontaneous and informal nature of the interchange. In this aspect of students’ work there is evidence of other weaknesses in
logical reasoning. However, the online discussion forum provided a fertile environment for students to enter into dialogue with each other using English for meaningful purposes.

5.3.5 Self-reflection in Language Learning

Four elements of this CMCL were specifically designed to foster the students’ self-reflection. They are the self-evaluation questionnaires, peer collaboration, task and content, and feedback from the teacher.

**Self-evaluation Questionnaires**

As with Case Study 1, the questionnaires were introduced primarily as a mechanism to enable students to be self-reflective in their language learning.

Most students from the second class (UC11-16), in fact 12 out of 16, answered and returned the self-evaluation questionnaires at the beginning of the intervention. It was found that most of these perceived themselves as having an average level of English ability although three students rated themselves below-average. Later, after the second intervention and all 16 of the students had returned the questionnaires, it was found that most students were generally positive about their English ability. According to the analysis, only one student at this later stage perceived herself as having a below-average level of English ability. When the two sets of data are compared, 7 out of 12 (58%) had become more positive about their English ability; five moved from having average-ability perceptions to having high-ability perceptions. Two students moved up from being below-average to average-ability perceptions. Arguably, these changes may not be solely attributable to the intervention.

The students from the second class (UC 11-16) answered their questionnaires on attitudes towards studying English during the last week of
the course. Most (13 out of 16) had a neutral attitude toward studying English, two had a positive attitude and only one had a negative attitude.

Peer Collaboration, Task and Content
The task complexity played a significant role in helping the learners to become reflective in their language learning. At the end of the research project, each group was asked about the extent to which they were satisfied with their performance, and the overall performance of other groups within the community. Most students said they were satisfied with the performance of their own group. During the interviews, however, it was found that some students, as with some students in Case Study 1, had difficulty with working in groups. Many said they learned how to use technology. A few said it was the first time they had PowerPoint. Overall, the complex learning environment appeared to encourage the students to be self-reflective in their learning.

Acting on the feedback from the teacher
In this case study, feedback from the teacher was regular and the teacher explicitly required students to follow-up on his feedback. There was feedback in the classroom context but also students sent their drafts to the teacher for comments and correction. Feedback from the teacher was given to students about both their oral presentations and their websites. Feedback on oral presentations was given individually.

Overall, their teacher was positive about the learning environment that had been created. He said:

Did the learning environment encourage them to be reflective in their learning? Yes, especially when they could view their work and others on the website. Speaking presentations showed clearly that they were reflective in their learning.
5.3.6 Summary of Case Study 2

The students’ use of linguistic conventions revealed both weaknesses and strengths. While the use of complex language was evident their language use lacked accuracy. However, the students made a genuine and worthwhile attempt to communicate complex ideas and to present an argument in their own words. Technically, however, their work was far from perfect. In addition, the students’ lack of command of linguistic conventions in the online discussion limited their ability to express their ideas effectively. Clearly, this learning environment was challenging students to work beyond their linguistic comfort zone.

In terms of their communication with the audience, most students were successful. They attained their short-term goals through task completion and the building of information websites. According to the teacher, their learning objectives also were largely achieved, in that they were exposed to relevant technology and all the macro-skills of language were used. However, the widespread lack of acknowledgement of sources was a significant failure in working towards control of English for academic purposes.

In terms of reasoning, the texts showed that students generally organized their information in a logical manner and that cohesive devices were used to make texts coherent. The task given in the second phase helped them to be objective and open. However, it was apparent that further scaffolding was required, especially at the task level. One way to improve their reasoning, for instance, is to provide them with examples of texts with appropriate reasoning. Explicit instruction on intellectual standards, as suggested by Paul and Elder (2002), is one possible alternative.

The learning environment clearly challenged students to use linguistic conventions beyond their comfort zone, and their communications with the audience both online and off-line were generally appropriate. Also, it
appears that the students reasoned independently and effectively. Therefore, overall, it appears that this CMCL environment had the potential to promote the students’ critical thinking in language learning.

5.4 Case Study 3
Unlike Case Studies 1 and 2 done in Canberra, Australia, Case Study 3 was conducted in Bangkok, Thailand. The student participants were 34 first year university students attending a private university in Bangkok and learning English as part of their program. The teacher was Thai and a non-native speaker of English. The two volunteers were Thai, one male and one female. The collaboration was conducted over a semester, starting June 2003 and finishing in September 2003. The students’ participation in the Bamboo Enterprise learning environment resulted in five completed projects. Table 5-7 shows the five student projects that were a part of Case Study 3.

Table 5-7: Student Projects in Case Study 3

<table>
<thead>
<tr>
<th>Name</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPU-1</td>
<td>To research air pollution</td>
</tr>
<tr>
<td>DPU-2</td>
<td>To explore the garbage pollution problem in the Bangkok area, and discuss some solutions to the problem</td>
</tr>
<tr>
<td>DPU-3</td>
<td>To study what water pollution from households is doing to plants and animals, and to find out how water pollution affects humans</td>
</tr>
</tbody>
</table>
| DPU-4 | To study indoor air pollution [unexpected problem]  
2. To study the effects of indoor air pollution  
3. To suggest solutions to the main problems of indoor air pollution |
| DPU-5 | To research the problem of mangroves in Thailand, and to talk about solutions to this problem |

The table above shows the students’ projects and their tasks. The topics were: Air Pollution in Bangkok (DPU-1), Garbage Problems in Bangkok
(DPU-2), Water Pollution in Bangkok (DPU-3), Indoor Air Pollution (DPU-4), and Mangroves in Thailand (DPU-5).

Figure 5-17 is a display of the first pages of each project.

Figure 5-17: First Pages of DPU-1 to DPU-5
1. Investigate the problem
2. Suggest ways to solve the problem
3. Report it on the Internet

Our objectives are:
From Figure 5-17 it is evident that the students used the front pages of their Internet sites to inform the audience about the objectives of their projects. As in the previous cases, the students here used a photograph to attract the visual interest of the audience, and links were provided so that the audience could access more information. DPU-1, for instance, provided a colourful
image, a title, and a description of the project. There was also a description of the project objectives. DPU-4 was unique, in that the group used cartoon characters to make their presentation interesting; they also provided descriptions of objectives and links to further information. DPU-5, in the same way as the four other groups, on the first page used uploaded photographs, stated their mission and provided links to further information.

5.4.1 Use of Linguistic Conventions

Texts in Case Study 3 were analyzed in a similar manner to the analyses of Case Studies 1 and 2. The analysis included calculations of the Type-Token Ratio, Gunning Fog Index and Coordination Index. The detailed results are shown in Table 5-8.

Table 5-8: Type-Token Ratio, Gunning Fog Index, and Coordination Index for Case Study 3

<table>
<thead>
<tr>
<th>Groups</th>
<th>Type-Token Ratio (TTR)</th>
<th>Gunning Fog Index (GFI)</th>
<th>Coordination Index (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPU1</td>
<td>0.50</td>
<td>8.14</td>
<td>0.78</td>
</tr>
<tr>
<td>DPU2</td>
<td>0.50</td>
<td>11.00</td>
<td>0.54</td>
</tr>
<tr>
<td>DPU3</td>
<td>0.53</td>
<td>8.90</td>
<td>0.76</td>
</tr>
<tr>
<td>DPU5</td>
<td>0.53</td>
<td>6.46</td>
<td>0.81</td>
</tr>
<tr>
<td>Average</td>
<td>0.51</td>
<td>8.6</td>
<td>0.72</td>
</tr>
<tr>
<td>Benchmark</td>
<td>0.57</td>
<td>15.20</td>
<td>0.58</td>
</tr>
</tbody>
</table>

From Table 5-8 it is evident that the average TTR was 0.51, which was below the benchmark 0.57 and also below the average TTR reported for Case Study 1. The average Gunning Fog Index was 8.6, which was much lower than the benchmark of 15.20. DPU-2 students produced complex sentences (CI = 0.54) whereas DPU-5 produced relatively simple sentences (CI = 0.81). The average Coordination Index was 0.72, and high compared with the benchmark of 0.58.
As with the two previous cases, it is evident students’ grammatical errors included errors resulting from the misuse of articles, the misuse of punctuation, subject-verb agreements, tenses, misuses of cohesive devices, the passive form, and the misuse of prepositions. Table 5-9 shows the grammatical accuracy of students’ work in Case Study 3.

Table 5-9: Grammatical Accuracy in Case Study 3

<table>
<thead>
<tr>
<th>Groups</th>
<th>Average words per sentence</th>
<th>Average errors per sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPU-1</td>
<td>12.94</td>
<td>0.28</td>
</tr>
<tr>
<td>DPU-2</td>
<td>19.54</td>
<td>0.12</td>
</tr>
<tr>
<td>DPU-3</td>
<td>13.24</td>
<td>0.61</td>
</tr>
<tr>
<td>DPU-5</td>
<td>9.03</td>
<td>0.74</td>
</tr>
<tr>
<td>Average</td>
<td>13.25</td>
<td>0.43</td>
</tr>
<tr>
<td>Benchmark</td>
<td>21.74</td>
<td>-</td>
</tr>
</tbody>
</table>

For the four groups the average ratio of grammatical errors per sentence was 0.43. The students of the four groups produced an average of 13.25 words per sentence, a figure well below the 21.74 words per sentence that was calculated for a random sample of sentences taken from passages in two standard textbooks on environmental studies.

Table 5-9 shows that the students’ spelling and grammar were well under control. This was not unexpected as the students had some editing assistance from their teacher. Of the five online presentations, 10 four pieces of students’ online writing were chosen for analysis. On the students’ use of linguistic conventions, the teacher commented:

The students could only use simple grammatical structures and short sentences. However, I had to help them in organizing ideas as well as the language. They made many errors in their spellings and grammar when they sent emails to the researcher.
In sum, as far as linguistic conventions are concerned, this case produced fewer grammatical errors. However, the length of the sentences was generally short compared to sentences in standard textbooks and the level of complexity was far lower. This was not a surprise as students were still at the lower intermediate level of English. With editorial assistance, the accuracy of student writing was high.

5.4.2 Communication with the Audience

The activities within the Bamboo Enterprise allowed the students to address a broad audience. Their audience consisted of three groups: (1) their fellow students, (2) the teacher and the researcher, and (3) the online audience, including other members of the Bamboo Enterprise. All three groups were both intimate and academic audiences. In answering the second question this study relied on comments from the research participants as well as the students’ overall work, including their online discussions.

Communication with Peers

Group work was used in order to increase student-student interaction. For these students, the learning environment outside the classroom was different from the Canberra-based cases. Outside the class, students used their L1 for communication. On this subject, the teacher said:

> In classroom, the students worked quite well in groups. But they were less confident to talk with online friends. They needed to read more or gain more information to discuss on the Internet.

Although the Bamboo Enterprise offered opportunity for online communication it appears that students in this case study did not take advantage of this feature.

Communication with Teacher

As did the students working in the other cases, the students in Case Study 3 had to communicate with their own teacher. The students also communicated

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10 DPU-4’s text was not available because they created PowerPoint slides to present their work on the Internet.
with the researcher using email. According to the interviews with the students, most students faced an immense technical challenge even though technical explanations were provided in L1; for example, they did not know how to change the colour of the font or upload the photographs. They asked the teacher, the researcher (via email), and the technician, for such information. They thought the online audience understood their messages because their work was checked by their teacher. The emails below show how two students, representatives of their groups, emailed the researcher to seek help.

To dpu_acl_one@yahoogroups.com
Subject [dpu_acl_one] Owner of dpu-ac11

Hello,

May I have to introduce myself. My name is P. I want to be a leader of group1 dpu project. I have to do my project about "Air Pollution". Now I have some problem with the picture that I prepare to show on my web but It same picture of Canberra University. How can I do? Please give me an advice!

Thank you.

Subject: About project
To: janphauc@yahoo.com

I'm Ann who is a member of acl-group2. I have problem about doing our webpage. I can't change picture to show in our project. Can you help, please? I want to know about the method that change our picture instead of your picture that show on webpage.

The two email messages above show that the students’ writing contained many spelling and syntax errors. However, the requests of the messages could be easily understood. It seems that the students were successful in their informal communication with the teacher and the researcher.

Communication with Online Audience

Unlike Case Studies 1 and 2, the students in this case used Thai, their L1, to communicate with each other. Their motivation was probably different from that of most students in Canberra. As with Case Studies 1 and 2, during the
course of interviews all students said they thought the audience could understand their ideas and feelings as they were presented on the Internet because they had used easy words and simple structures. An online discussion available on DPU-2’s website has been selected as an example of how appropriately the students communicated with their audience. Figure 5-18 shows the discussion.

Figure 5-18: Online Discussion in DPU-2

[A] Subject: hi
I'm Pang. I'm in Canberra. I read your project. Can I join you grop.

[B] Subject: Re: hi
Hi.. I'm May. I'm a member of dpu_acl_two. Yes, if you join my group. I'm want your suggestion.

[C] Subject: One way to solve this problem
I would like to suggest the 2 ways to solve this problem. The first one is that we should recycle household wastes as much as you can. Another way is our government should provide the cooperative recycle plant for people to reuse and recycle some garbage that can be reused.

[D] Subject: Re: One way to solve this problem
Thank you for your suggestion. Now we are develop this homepage.

[E] Subject: hi
hi! if you see someone dump their rubbish by the road, what do you do?

[F] Subject: Re: hi
if I see someone do this. I will tell him about the negative conseque and tell him to leave dump in a bin.

[G] Subject: What do we do with the old computer!
As technology is advancing, all the old computer are being thrown away. So where do we do with this?

[H] Subject: Re: What do we do with the old computer!
All old computer that we don't use beacuse it's old or modern but many program on computer can use. You should donate to a lack of a chance children.
It appears from Figure 5-18 that the language used to communicate with the online audience was successful even though it had many grammatical errors. A student from Canberra [A] asked to join DPU-2, a group in Thailand. She first introduced herself and she stated her purpose. Her grammar and spelling were far from perfect and she obviously violated some linguistic conventions, but the intended message was successful. Then a member of DPU-2, as a host, accepted the request to join the group [B]. She introduced herself and made a grammatically incorrect statement, asking her guest to give the group some advice. Both communicators made spelling and grammatical mistakes, which should have been avoided because she had access to her teacher for correction.

A volunteer [C] shared her opinion on waste pollution. She did not tell her audience who she was. Despite her experience in the TESOL field, she also made some errors. A member of DPU-2 thanked the volunteer. He told the audience that they were developing their webpage. Next, a student participant [E] from Canberra asked a question. The reply came from a member of the group. Their violation of spelling and syntax conventions was obvious. Then, volunteer [G] who was a Vietnamese student in Canberra,
asked a question on the subject of old computers. The two Thai students [H and I] from Bangkok answered the question based on their context. Then, another member of the group asked if it was possible for every house in Thailand to separate different types of waste. A student in Canberra gave his opinion.

All students made spelling and grammatical mistakes. Yet, they understood each other. The researcher voiced his opinion. A member of the group asked a question. The interactions showed that the rich and complex learning environment encouraged the participants, including the volunteers and the researcher, to use English in context to communicate ideas and feelings to different people. The above interactions demonstrate that most Thai students used an honorific form when they addressed the researcher or their teacher. In Thai society, it is the norm to address those with a higher status, such as teachers, with honorific titles. Aj is a short form for the word ‘Ajarn’ (Master). This shows that the student was aware of who the audience was and adjusted her address accordingly. This finding is similar to Chapman (1997a) and Chun (1994) who found similar language structures in oral and electronic discourse.

In summary it can be said that, most students generally communicated with their audience appropriately.

5.4.3 Communication Aims

Short-Term Goal
The teacher thought that most students achieved their course objectives. The students worked in groups, researched environmental topics and used computer technology to complete the assignment by publishing their work online to communicate information to their audience. Their performance, according to the teacher, was ‘satisfactory.’ On this subject, the teacher said:
They learned what they did even though their grammar was not perfect. They could communicate through their topics among themselves in class. I did not want to expose themselves to online communication. They understood what they messages [posted on the Internet] were about. This might have resulted from their lower proficiency of English.

**Long-Term Goal**

DPU students probably did not have the goal of achieving a high level of competence in academic English language or a desire to pass a standardized test (such as the IELTS) for acceptance into a university in an English speaking country, as did the students in Canberra. The students were first-year English and Hotel and Tourism majors so the learning activities would help prepare them for their long-term aims in two aspects: their study and future careers. In other words, the learning activities helped them develop language skills that they could use in other English subjects and probably, also, in their jobs when they graduate. In addition, they could possibly apply their web skills, language skills and/or study skills to promote life-long learning.

Overall, it can be concluded that the students attained their communicative aims, at least to some extent.

**5.4.4 Reasoning**

As with the previous cases, three questions relating to the students’ organization of information, use of cohesive devices and objectivity were addressed.

**Organization of Information**

Each group organized its work in a logical manner. DPU-1 (see Appendix D), for example, started their presentation with the topic Air Pollution. The source of the photograph was acknowledged: “This photo was taken from…”. After the introduction the students gave a definition of air pollution and then they looked at the causes of the problem and its negative effects. Their presentation ended with suggestion for solutions to the problem.
DPU-2 similarly organized their online presentation in a logical manner. The students started by stating the problem (The Problem with Garbage), and then gave background details. They suggested solutions to the problem which were classified using sub-headings. The presentation ended with the question, What do you think?

The first page of each group showed how the information was logically organized. Figure 5-20 shows one example. DPU-4 first gave a definition of the term ‘indoor air pollution’, then stated their objectives and provided a link to their work.

Figure 5-19: First Page of DPU-4

The way the groups referred to topics and subtopics also helped the audience to follow their logic. This is evident from the following examples.

Example 1:
Effects of air pollution are obvious in many areas:

1. Health

Dirty air is harmful for the health of people. If we breathe in a lot of dirty air, we will get sick. Everybody wants to have good health

2. Economy

Tourism will be in trouble if the air in big cities is contaminated. Tourism is important because it brings a lot of money to the country. Foreign tourists may not want to stay in big cities full of air pollution. They may want to go to visit other places where the air is fresh, clean, and clear. In addition, unhealthy people cannot work well and the government has to spend a lot of money on healthcare. So air pollution is bad for economy.

Example 2:

Introduction
- Effects of water pollution
  - The causes of dirty water
  - The ways to reduce the dirty water

Example 1 shows how DPU-1 organized its information. Example 2 shows the outline provided by DPU-3. Both examples show that the groups organized their information in a logical manner.

Use of Cohesive Devices

As mentioned in Chapter 4, the students’ use of cohesive devices reveals, at least partly, the coherence of their texts, a major element of logical reasoning.

1. Reference: Students’ use of anaphora was largely appropriate. For example:

Excerpt 1:

Tourism is important because it brings a lot of money to the country.

[DPU-1]
Excerpt 2:

Save our **mangroves**... they are in crisis
[DPU-5]

2. Lexical cohesion: Students used a variety of ways to tie their words together. For example:

Excerpt 1:

They are forests along coastal areas. *In many countries*, the mangroves are sources of firewood, housing materials. But now they are being destroyed. *In Thailand* there are fewer mangroves than the past. The problem is very serious.
[DPU-15]

Excerpt 2:

*Tourism* will be in trouble if the air in big cities is contaminated, Tourism is important because it brings a lot of money to the country. *Foreign tourists* may not want to stay in big cities full of air pollution. They may want to go to visit other places where the air is fresh, clean, and clear.
[DPU-1]

Excerpt 3:

We can do many things to help make **mangroves** green and beautiful. We can replant a **mangrove** forest. We can help by not dumping rubbish into the water.
[DPU-5]

In Excerpts 1 and 2 students used meronymy (Paltridge, 2000), that is, words that are in a whole–part relation, to tie their sentences. In the third excerpt, they used repetition to make their sentences coherent.

3. Conjunction: Students used conjunctions extensively to tie their texts together. Two excerpts from this case study illustrate how students used conjunctions to show the causal and adversative relationships between sentences.
Excerpt 1:

The age-old practice of burying garbage is generally the preferred option of disposal because it is the cheapest.
[DPU-2]

Excerpt 2:

Rivers are very important in supporting many types of life. Rivers provide us drinking water. However many household practices are polluting the rivers.
[DPU-3]

Excerpt 3:

In addition, unhealthy people cannot work well and the government has to spend a lot of money on healthcare. So air pollution is bad for economy.
[DPU-1]

In Excerpt 1, the conjunction ‘because’ was used to signal the causal relationship between the two ideas. In Excerpt 2, the adversative conjunction ‘however’ was used to contrast the idea with the preceding sentences, shifting the audience’s attention to the main point. In Excerpt 3, the additive conjunction ‘in addition’ and the causal conjunction ‘so’ were used to make the text coherent.

4. Substitution

Excerpt 1:

Subject: Re: question

hello,

I am the one of group three. Your question is very interesting. I think, everyone know what they should do with this problem. The best way to solve water pollution for me is “Do not throw the garbage into the river” I think it is very easy to do that. Do you any idea?
[Online Discussion]

Excerpt 2:

They are two basic ways of looking at waste minimisation. One way is to look at the personal responsibility of creating less waste. The other is to look at schemes to divert waste from landfill.
[DPU-2]
In Excerpt 1 the words ‘do that’ substitute the statement that was quoted: "Do not throw the garbage into the river". In Excerpt 2 ‘the other’ is used to substitute the clause ‘way of looking at waste minimization.’

5. Ellipsis

Excerpt 1:

What is air pollution? We have searched [the meaning of air pollution] from the net. And this is the result [of our search].

[DPU-1]

Excerpt 2:

In Thailand there are fewer mangroves than [there were in] the past.

[DPU-5]

Excerpt 3:

[A] Subject: hi

hi! if you see someone dump their rubbish by the road, what do you do?

[B] Subject: Re: hi

if I see someone do this. I will tell him about the negative consequences and [I will] tell him to leave dump in a bin.

[Online Discussion]

Excerpt 1 shows that two expressions have been left out: (1) “the meaning of air pollution” and (2) “of our research”. In Excerpt 2 the clause “they were in” was left out. In Except 3 the clause “I will” was omitted.

From the above analysis it can be seen that the students used cohesive devices to aid their communication and develop a logical flow of ideas. Most used the devices appropriately. Substitution was used rarely.

Objectivity and Open-mindedness

The students gave examples to support their points, especially students in Group 3. They used pictures and examples that were very specific and relevant to the topics. It would have been more interesting if they had done
more research or made an effort to respond to the statements that were presented online. The levels of objectivity and openness were limited. Unlike students in Case Studies 1 and 2, students in Case Study 3 did not adequately elaborate their propositions. From online discussions it is apparent that the opinions they gave were only from their points of view; opinions reflected students’ everyday lives in Thailand. On this subject the teacher said:

From their presentation, it could probably be said that the students reflected their ideas on the topics they were working on. They tried to find evidence to support their research and belief.

According to the teacher, it is possible that the students’ arguments were very limited because of their relative lack of maturity in comparison to the students in Case Studies 1 and 2. It may also have been, and the two are not exclusive, the students’ low level of language competence.

5.4.5 Self-reflection in Learning

Self-evaluation Questionnaires
As noted earlier, the self-evaluation questionnaires were intended to encourage the students to be self-reflective in their learning. At the end of the project only 15 students answered the questionnaires on perceived English ability. An analysis of the returned questionnaires shows that, of the 15 students, only one perceived himself as having below-average language ability. Most were very positive about their abilities. In terms of their answers to the questions on attitudes towards studying English, 11 students answered the questionnaires and most (9) had a neutral attitude towards studying English. Of the remaining two, one had a positive attitude and one a negative attitude towards studying English.

Peer Collaboration
CL was an essential element in the success or failure of the intervention. The selected written reports presented below demonstrate that the learning environment encouraged the students to become reflective in their language
Learning. Somsri, a member of DPU-2, reflected on her experience as follows:

Last semester, I did one project about garbage pollution. First, I didn’t know how to do about project. In my group have 5 members but have someone didn’t do it. I have many problems in my work. But I was given advising from Mrs Jittaya who is my teacher. She introduced our that we should do. After I have the title about the project, I and my friend; Athitaya searched the information from the Internet. Then I took it to my teacher for check. Then we took it on page of website but I can’t do it. So I had to ask officer for did it which it was very good. I pleased that I do it because I did work with many people and I learnt with internet. Most important I got many knowledge from project.

Her written reflection was not edited. Somsri reflected that she and her classmates faced many challenges. The effective working of the group was one of such.

Similarly, Parichard, a member of DPU-3, reflected on her experience:

This activity is fun and I can to join it with my friends, so my group search about the water of pollution, we make a good webpage about this title together. Although, we have a problem, but we enjoy it and we try to continue this activity. Finally we get successful in our good activity. However, we get a good suggestion together.

The above reflection shows that the student had problems working in a group. However, she dealt with it positively: “Although, we have a problem, but we enjoy it and we try to continue this activity.”

Task and Content

One thing the students agreed upon was the complexity of the task. Nam reflected on her experience as follows:

Well, I think I know many things from the internet. The first time I knew few words in English and do not know how to use the internet. So I think I can not do the project. But My Janpha told us that it is not difficult to do. So he taught us to do the page on the website. Then we had to find the information of water pollution. I tried to read it. But I could not read it. So I tried to open the dictionary. I knew many words from my work. I can say this project can make me know many things about the internet, know how to use it and learn English naturally. I think it is not necessary to learn teachers. You can learn from the internet and many things on the internet that you have never knowed before.
However, even though, the task was difficult, students said they felt satisfied when they had completed it. For example:

…sometimes I feel boring because the project is too hard. The project finish I feel happy…

**Acting on the Feedback from the Teacher**

Students consulted with their teacher, the volunteers, and the researcher (online) from time to time. Their teacher gave them feedback on grammatical errors as well as on contents.

**5.4.6 Summary of Case Study 3**

The final work presented on the Internet revealed that the students appropriately used linguistic conventions after feedback from their teacher, but their online discussions showed a low level of accuracy with their poor grammar. In terms of communication with their audience, although the students used L1 with their peers, they accomplished their short-term goal in the sense that their final work was uploaded onto the Internet. Their reasoning was largely appropriate; none suggested violent means of problem solving. The information organization was logical, but the students did not adequately exemplify or elaborate their arguments. There was evidence of students making a good effort to use cohesive devices, given their level of proficiency. There was, however, room for improvement in the students’ objectivity and open-mindedness. This CMCL helped the students to use the language in a meaningful context. The learning context helped them to become self-reflective in their language learning.

According to their teacher’s accounts, the students worked in groups. However, it was apparent that not every student was an active group participant. Only some students, usually group leaders, answered questions or made comments on the web-board. This was the main reason the same email names regularly appeared on the discussion boards.
The students, in the course of the interviews, argued that they had assigned their representatives to ask and answer the questions on the Internet. According to the teacher, the topics were clearly presented and the students’ information well organized. The language they used was quite understandable and easy to read.

Completing online-projects was a challenging exercise for the students. All five groups seemed to start their projects with the students having some element of doubt in their minds. The students had to learn to operate the computer system, having never done this before. They tried to get help from staff in the Self-Access Language Learning Center (SALLC), their own teacher, and sometimes the researcher via email. The email requests for assistance were in English. However, even with such obstacles the groups managed to complete their projects successfully.

5.5 Summary of Major Findings

This section summarizes the major results of the study, using information from the three case studies. The summary addresses the three areas of the proposed conceptual model of CT in language learning: (1) communication (linguistic conventions, audiences, aims), (2) reasoning (appropriate reasoning: logical and ethical considerations), and (3) self-reflection.

5.5.1 Linguistic Conventions

Linguistic competence and communicative competence complement each other. The former skill is an enabling factor, a pre-requisite for successful communication. This study analyzed the students’ texts that were made available on the Internet as a part of the project. In terms of linguistic conventions, three indices were used to examine the complexity of the students’ writing: TTR, GFI, and CI. In addition, the accuracy of students’ writing, grammatical errors, spelling errors, and the length of their sentences
was also assessed. Table 5-10 presents the Type-Token Ratio, Gunning Fog Index and Coordination Index calculations for the three cases.

Table 5-10: Type-Token Ratio, Gunning Fog Index, and Coordination Index for the Three Case Studies

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Average Type-Token Ratio (TTR)</th>
<th>Average Gunning Fog Index (GFI)</th>
<th>Average Coordination Index (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.57</td>
<td>10.90</td>
<td>0.70</td>
</tr>
<tr>
<td>2</td>
<td>0.50</td>
<td>10.60</td>
<td>0.72</td>
</tr>
<tr>
<td>3</td>
<td>0.51</td>
<td>8.60</td>
<td>0.72</td>
</tr>
<tr>
<td>Average</td>
<td>0.52</td>
<td>10.03</td>
<td>0.71</td>
</tr>
<tr>
<td>Benchmark</td>
<td>0.57</td>
<td>15.20</td>
<td>0.58</td>
</tr>
</tbody>
</table>

In Case Study 1, the average TTR was 0.57, which is as high as the benchmark (0.57). However, in Case Study 2, the average TTR was 0.50 and in Case Study 3 it was 0.51. The average TTR over all Case Studies was 0.52, which is slightly lower than the benchmark. The average GFI was 10.03, which was lower than the benchmark of 15.20. On the average, the students’ sentence structures were simpler than the benchmark 0.71. The average GFI of Case Study 3 was slightly lower than the averages of Case Studies 1 and 2. This indicates that the students in Case Study 3 used simpler vocabulary or words with fewer syllables. On the average, the CI of the three cases was similar.

Table 5-11: Grammatical Accuracy in Three Case Studies

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Average words per sentence</th>
<th>Average errors per Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19.17</td>
<td>2.17</td>
</tr>
<tr>
<td>2</td>
<td>15.00</td>
<td>0.68</td>
</tr>
<tr>
<td>3</td>
<td>13.25</td>
<td>0.43</td>
</tr>
<tr>
<td>Average</td>
<td>15.80</td>
<td>1.09</td>
</tr>
<tr>
<td>Benchmark</td>
<td>21.74</td>
<td>-</td>
</tr>
</tbody>
</table>
In terms of grammatical accuracy, Table 5-11 shows that the students used an average of 15.80 words per one sentence compared with the benchmark of 21.74, and made 1.09 points of error per sentence. Students in Case Study 1 produced texts with the most grammatical errors (and average of 2.17), which was not a surprise as two of the texts analyzed were created spontaneously.

The following list shows the types of grammatical errors found:

- Wrong lexical choice (including words that should not be there)
- Particles of phrasal verbs
- Articles
- Major punctuation errors
- Linkers
- Use of capital letters
- Sentence structures
- Tenses
- Anaphora (incorrect use of pronouns)
- Singular/Plural concord (including Plurality)
- Use of prepositions (missing prepositions/incorrect use of prepositions)
- Use of Modal verbs

Considerations relating to lexis were more positive. The TTR was found to be quite high, especially in the final drafts or online presentations. It is evident that, when compared with their impromptu writing, the students use of English grammar in their discussions was less accurate (Case Study 1). Perhaps, with online presentations, the students had time to pay attention to spelling and grammar. This evidence partially demonstrates that the students in general were aware of both their audience and their communication aims. The notions of aims and audience determined the complexity and accuracy of their writing, which is in tune with the major finding of Li (2000) who conducted a study on the linguistic characteristics of ESL writing in task-based email activities.

Students were often aware that conforming to standard spelling (spelling that obeys the rule of English orthography) is necessary, especially in academic
contexts. Being able to spell correctly involves various aspects of language knowledge, such as phonetic and morphemic knowledge, syllabification, and semantic and syntactic knowledge. A simple process to reduce such errors, for example using Microsoft Office’s Proofing Tools which were not available in the Yahoo Groups environment, may have helped reduce such errors. However, technology is not a long-term solution to spelling problems. Students need time to realize the significance of drafting and proofreading in the academic context and they need many opportunities to engage in appropriate language practice. In fact, most postgraduate students learn these crafts ‘on the job’.

This study also confirmed the findings of Warschauer (1996a) who found that CMC produced language that was syntactically and lexically complex. Certainly, when they used English on the Internet, the students took risks in producing texts. There was a tension between accuracy and complexity. Across the three case studies, as one might expect, it was found that the students violated linguistic conventions, especially spelling. Most spelling mistakes could have been significantly reduced or avoided had the students proofread their work adequately.

5.5.2 Communication with the Audience

In all three cases there were three types of audience: (1) fellow students; (2) the teacher, researcher and volunteers; and (3) the online audience, including other members of the Bamboo Enterprise such as the students and teacher in Thailand. Appropriateness in this study entailed comprehension despite errors in grammar and wording. It also included whether the content (including visual text) was appropriate.

It was found that students’ online texts generally communicated successfully, despite the high number of linguistic errors. Moreover, in all cases, the textual evidence suggested that the students adjusted their style to suit their audiences. This aspect is similar to the main finding reported by
Davis and Thiede (2000) who demonstrated that L2 students tend to shift their writing style to match new situations. Such shifting of style may indicate that the students “have become aware of a range of discourse conventions in L1 and are beginning to imitate or accommodate to these conventions” (p. 87). Actually, there were more spelling errors on the discussion boards than with the online presentations which may imply that the students, at least to a certain extent, were beginning to become aware of the communication context, that is, who their audiences were.

The results show that the students tended to write with the audience in mind, which is a similar picture to that presented by the discussion in Warschauer (1999). When the students published their work on the Internet, an act of public display, they were encouraged to make their writing more accurate and formal.

From the interviews, the students were confident that their audiences understood their messages, reasoning that they had used simple words and grammatical structures. The online discussions (text-based) seemed to suggest that, despite errors, the intended messages were largely successful.

5.5.3 Communication Aims

Every group had its specific aim and this was stated on the front page. UC-6 (Case Study 1), for example, aimed to study endangered animals. UC-7 (Case Study 1), aimed to tell the audience about ozone layer depletion. Across all three case studies, the students created websites to present their work and to communicate their information with the audience. They fulfilled the assignments. Their teachers commented that most students performed much better than was initially expected. In this sense, the students accomplished the short-term goal.

The long-term goal was to improve students’ language proficiency for other purposes, as most, but especially those in Case Studies 1 and 2, wished to
continue their study in an Australian higher institution. Even though this study could not demonstrate the extent to which the students actually achieved their long term goals, the complex learning environment did give them opportunities to practice and familiarize themselves with academic discourse.

5.5.4 Reasoning

The assumption of this study, is that a critical thinker also reasons appropriately, that is, reasons in a logically and ethically appropriate manner (described in Chapter 2). As discussed in Chapter 4, logical reasoning was in evidence in the way students organized their information and their textual coherence, as well as in their use of cohesive devices. Appropriate reasoning also means that such reasoning is ethical, and in this sense, the content of the students’ work (writing) revealed some objectivity and open-mindedness.

In Case Study 1, based on the data available, the students’ presentations, showed that they organized their information in a coherent manner. The texts that were produced, despite errors, showed the use of a variety of cohesive devices. The PowerPoint slides also showed that the outlines of their presentations were logical. Some students even showed creativity and a certain unexpected level of sophistication. In terms of objectivity and open-mindedness, the students researched their topics and presented their work in some depth. However, most did not cite the sources of their information in their presentations. Heterogeneous grouping and technology helped the students open up to new ideas. The features and functions of the online environment widened their perspectives.

In Case Study 2, the students were given tasks with explicit instruction to be as objective as possible. This inquiry-based approach helped the students to be objective and open. A variety of ways were used to make their writing coherent, that is, logical. Unlike students in Case Studies 1 and 2, the students in Case Study 3 did not elaborate their propositions extensively.
Their use of such devices was largely appropriate. However, their organization of ideas was appropriate, which was in evidence in their methods of data collection among students in the second class. The learning environment helped the students test their perceptions with other members of the Bamboo Enterprise.

According to the teacher, in Case Study 3 many students attempted to communicate their ideas and feelings. The language they used had many grammatical errors, but their ideas were communicated. In terms of content, when compared with the students’ writing in Case Studies 1 and 2, the writing of students in Case Study 3 was simpler. Moreover, their online presentations contained less elaboration to support their arguments. However, the students did use English for real communication. The task requirements were authentic and challenging. Peer collaboration was largely in their L1. Because the student projects were content-focused and inquiry-based, the students were stimulated to be objective. Also, the online environment exposed them to different perspectives, an important condition to develop critical thinking.

The online discussion on the subject of overpopulation in Case Study 2 illustrates the learning environment that promoted critical thinking in action. The Chinese students suggested that the Chinese way of solving the problem was to implement the One-Family-One-Child policy. They said that this policy worked very well in reducing the population of China. However, the Indonesian and Thai students disagreed with the proposed policy. However, controversy can be considered a healthy sign for students. As Johnson and Johnson (1995) noted, academic controversy, properly structured, can result in higher quality reasoning, problem solving and decision making.

In sum, this study has shown that this CMCL environment helped people from different cultural backgrounds to interact constructively with each other. There were many examples across the three cases, of group activities
and technology enabling students to learn from one another. Thus, it can be claimed that this complex learning environment has the potential to expand students’ learning capacity. As being open-minded is a characteristic of a critical thinker, any approach to ELT that promotes communication in an open and supportive environment is likely to have this potential, however, this study cannot claim that CMCL is more effective in this regard than other learning environments.

5.5.5 Self-reflection in Language Learning

In all cases, the students were given self-evaluation questionnaires to answer. The main aim of the questionnaire was to help them become self-reflective in their language ability and in their attitudes towards studying English. The researcher and the collaborators could only collect a limited number of questionnaires for the analysis, however, the second phase of Case Study 2 gave the picture that the students were reflective in their attitudes and ability, and that the exercise of filling in the questionnaires did in fact afford an opportunity for students to self-reflect on their language learning.

Peer collaboration gave the participants another opportunity for self-reflection, especially when it came to the writing of articles. Working in groups was challenging for many students in all three cases. In Case Study 3, for example, many of the students reflected through their writing that they felt discouraged as they encountered difficult language and technical problems. One student confessed, “In fact we had abandoned it. I give up”. What brought him back from the brink was the help and support of the teacher and the researcher. The teacher gave this comment on the demands of the task:

The Bamboo Project was quite challenging for my student. It was the first experience for most of them to learn English through computer. They learned how to search, select the information they needed. However, most of them found that it was difficult to understand messages/data which was full of complicated grammatical structures and more advanced vocabulary.
Because of the challenging nature of the task, scaffolding at the task level was a key factor to successful task accomplishment. All student participants had to learn web skills. Also, they had to make decisions about topics, about working in groups and about searching for the information on the Internet. They had to use English, especially written English, which was not at all easy for them. Moreover, they had to meet the challenge of presenting their work on the Internet. In a similar vein to the information from the semi-structured interview, the students reported that they had learnt a lot from the research project.

In all three case studies, this CMCL environment encouraged the students to be self-reflective in their language learning. The complex situations, with the use of scaffolding, encouraged the students to step out of their comfort zones, and this gave them a chance to grow beyond their existing ability. It might well be said that the students also were encouraged to be self-reflective in their language learning. The learning environment offered many learning opportunities that enabled the students to learn and be reflective in three major areas: their performance, their learning strategies, and the intervention.

The appropriate use of computer technology played a significant role in enabling the students to be reflective in their learning. Students were able to view their own work as well as that of others on the website. The online presentations could be seen at all times, by everyone. The very nature of this asynchronous communication meant that the students had more time to reflect than they would have had in a more traditional learning environment. There were cultural and educational differences between the settings, and this factor seems to have had an effect on learning. There were similarities between Case Studies 1 and 2 because the educational setting in which they took place was the same; English was used inside and outside the class. In Case Study 3, English was used only part of the time, during the project. Outside the classroom, L1 was used. Another cultural difference was evident
in the teacher’s view on CL, and her expectations on the students’ performance. In Case Study 3 the teacher’s perspective on plagiarism, for example, was that texts with plagiaristic characteristics were acceptable as long as they were relevant. In addition, because of the class size and the tight learning schedule, the students in Case Study 3 did not have enough time to work well in groups. Research has shown that the amount of time given for task completion could be a significant factor (Honeyfield, 1993) in fulfilling the task requirements and clearly, this was the case here.

Probably most students in Case Study 3, due to their cultural background, would have preferred the teacher-fronted approach to language learning, compared to the communicative and autonomous learning environment of the Bamboo Enterprise. Tan and Williams (2000), for example, argue that most Asian students are introvert rather than extrovert, and therefore generally do not feel safe enough to challenge the teacher’s authority. This may account for a teaching approach that is product-focused rather than process-focused.

5.5.6 Conclusion

The implementation of the proposed learning environment with its model of CT in language learning has both strengths and weaknesses. This study was not intended to demonstrate whether this CMCL was more effective than any other environment. Neither was it an attempt to prove that the proposed model of CT in language learning was better than other models. It was simply exploratory research endeavouring to address one set of phenomena: what happens (what do the students do?) when they are placed in this complex learning environment. The main aim was to study the potential of a particular learning approach an accompanying model of critical thinking in language learning. The data that was analyzed to answer the question was drawn from the students’ overall work, their self-reflections, the completed questionnaires, the teachers’ comments and the data from the interview.
The results show that the learning environment provided the opportunity and motivation for students to practise English in ways that encouraged them to be critical thinkers in language learning in all three key areas of the model: communication, reasoning, and self-reflection.

**Chapter Summary**

This chapter began with a brief description of the investigative activities that were undertaken, and then discussed the results of the study systematically, case by case, considering five aspects: linguistic convention, audience, aims, reasoning and self-reflection.

In summary, it can be said that the learning environment based on the constructivist approach to language learning, was found to offer the students complex situations in they could use English for communicative purposes. The students’ use of vocabulary and grammar was generally complex, but their accuracy was at a low level. The students found groupwork challenging. This preliminary investigation has found that this approach, and the proposed model of CT in language learning, have the potential to promote communicative use of English, reflective language learning, and critical thinking in language learning.

In Chapter 6 the potential of this CMCL will be discussed, and its strengths and avenues for improvement will be identified. Chapter 7 will address the research aims and summarize the study by combining the results of each case. The broader implications of the results of the study and suggestions for further study will also be discussed.
CHAPTER SIX

EVALUATING THE POTENTIAL OF THE LEARNING ENVIRONMENT

Introduction

A conceptual framework to promote CT in language learning was proposed and then investigated. In an attempt to put the framework into practice, the researcher created an online language-learning environment called the Bamboo Enterprise, where students undertook group projects and used computers to support the collaborative activities that were required for completion of the projects. The main aim of the investigation was to confirm that the learning environment that was established (the Bamboo Enterprise) has the potential to promote CT while students are learning a language.

What emerged as a clear result of the investigation was that the teaching approach adopted for this research did in fact provide an environment in which CT in language learning could flourish. There seems little doubt that the proposed model has the potential to promote CT. Therefore, one of the aims of the study has been realized. However, the results presented in Chapter 5 reveal that there are not only strengths but also weaknesses associated with the framework. This chapter will offer a discussion of both the strengths and weaknesses that became evident as a result of the investigation.

6.1 Strengths

Findings from each of the three case studies reveal that many students, through the demands of their tasks or projects, were encouraged to take greater risks when they collaborated with one another. The group activities in this study promoted students’ communicative use of the language they
were learning, promoted CT in action, extended students’ learning potential, and encouraged appropriate use of the Internet.

6.1.1 Communicative Use of English

It was apparent that the language-learning environment of the Bamboo Enterprise promoted the learners’ communicative use of English. It encouraged the students to engage in purposeful communication in the target language through the collaborative activities that were required for completion of group projects. It also gave the students many opportunities to use English with a high degree of autonomy in their communications. There was no attempt by teachers to have students participate in drills or rote memorization. In Case Study 2, for example, the students practised English through all four macro-skills. In addition to writing and reading tasks, students had to talk to each other, and give presentations orally and in writing that were followed by discussions. The use of technology also played a significant part in promoting purposeful communication.

The online discussions and interactions, presented in Chapter 5, reveal that English was being used for meaningful purposes while students engaged in their learning activities. Students were also being encouraged to take risks in their language learning. Some students voiced their ideas and feelings quite freely. This risk-taking behaviour, a typical characteristic of communicative language learning, has been identified as a good indicator of a successful learner of another language (for example, Ely 1986a, cited in Ellis, 1994, p. 518). Although taking risks often results in making errors, it also has the overall effect of enhancing learning. The view taken here on errors is similar to that of Corder (1978), who believes that teachers should willingly encourage students to take risks even at the expense of committing errors. English teachers should, according to Corder, “accept errors as a sign of motivation for learning, or indeed a strategy of learning, and not something to be deprecated, let alone penalized” (p. 84).
The completed work and online discourses, as well as the comments and reflections from both students and teachers who participated in the three cases studies, provide clear indication that this CMCL learning environment has the potential to promote students’ communicative use of English. It also shows that CMCL has the potential to promote CT in language learning in an active way.

6.1.2 Critical Thinking in Action

The proposed framework has the learner undertaking critical thinking as a participant, not as a spectator. Learning is an active rather than passive activity. The CMCL environment of the Bamboo Enterprise provides the complex conditions that enable the students to demonstrate their CT.

In Case Study 1, the online discussion on the subject of one-family-one-child, while controversial, was broad enough to allow the students to take different perspectives. There was additional merit to this type of CMCL. It allowed students from different places and backgrounds to share their ideas and feelings. In Case Study 2, the students carried out their own studies. They planned, formulated research questions, built research instruments, collected data, completed the analysis and offered solutions to the questions they set. In addition, they gave oral presentations accompanied by PowerPoint slides. These activities engaged all the students in the experience. In Case Study 3 the students chose their own topics, albeit to a lesser degree, formulated their own questions, planned and searched for information, and presented their work on the Internet. One of the attractions of this learning environment, as is evident from the three cases, is that it promotes CT by providing students with hands-on learning experiences. Collaborative activities, as noted earlier, help increase student interactions in meaningful ways.
The CMCL proposed and investigated here promoted active learning. It was asserted initially that approaching CT in language learning from a spectator’s perspective is not enough to change learners’ attitudes towards critical thinking. Education has to take place in an environment where CT is promoted in a meaningful and active way. The CMCL approach used here clearly created an environment of learning that is active and exploratory.

One of the research collaborators from Case Study 1 gave the following account of the active learning that took place:

What have the students learned from the bamboo project? They have learned how to organise and present their ideas by using PowerPoint and through their group presentations. They had to search and read a lot of information on the Internet for their group project at first, and then they had to summarise the articles they got. They also learned to discuss certain environmental issues from different perspectives by sharing ideas with other group members. Overall, all the four macro skills were integrated into this project in a well balanced way. In addition, they were able to develop skills of analysing certain social issues critically while they were doing groupwork. While they were organising their presentations, they learned computer skills such as using PowerPoint, and joining the Yahoo group for the project. They also developed their oral presentation skills in their final group presentations.

In common with other scholars in the field (Chamot, 1995; Chamot & O’Malley, 1996; Atkinson, 1997; Davidson, 1998; Wilson, 1998a; Briggs, 1999; Day, 2003), the researcher and his collaborators realize that CT generally should be given more emphasis in English classes but especially in classes that prepare students of non-English speaking background for tertiary level education. The type of CMCL proposed and investigated here, where group project research is a central feature, has the potential to orient students to a new academic community. Most student participants in Case Studies 1 and 2 planned to enter Australian universities, and most have subsequently done so. Universities in Australia generally have expectations or rhetorical conventions that are beyond the experience and understanding of many international students. This is especially so for matters such as how to study, how to discuss and how to present argument. The project-based approach to language learning that was used here has the
potential to offer students numerous opportunities to familiarize themselves with many aspects of higher education’s academic requirements.

6.1.3 Zone of Proximal Development

As reported in Chapter 5, the tasks assigned to students were above their levels of ability. Many students found the task, the topics, and the needs of the audience challenging. Many sought help and support from both the local education environment and from other people and places. There was, however, a common thread. Students all learned from one another. When interviewed, students from every group said they paid attention to the performance of other groups. Many said they used the online presentations of other cases as their models. With the teachers as co-learners, the students were empowered to initiate their own ideas. But the researcher and his collaborators agreed that scaffolding, as provided by the teachers and researcher, was a key to success; that is, the students who performed well were people who were adequately scaffolded at all three levels: personal, inter-personal, and community (Jordan, 2004).

The input of this learning environment was purposely set to be above the students’ current ability in order to enable the students to extend their learning potential. The more proficient helped the less proficient students so that the proficient were also extended. This CMCL learning environment, particularly through group dynamics, challenged the students to adjust their perceptions, and to interact and perform at their best. Many students said they completed tasks that they would not have been able to complete without support. Activities undertaken with support were found to extend the students’ zone of proximal development. On this point, a teacher from Case Study 1 offered the following comments:
Most students shared similar experiences when dealing with challenging tasks. Below are some of the students’ voices.

- Although, we have a problem, but we enjoy it and we try to continue this activity. [Case 3]
- What I did was really hard for me. [Case 1]
- It was good experience. [Case 2]

### 6.1.4 Support for the Students

Scaffolding helped develop the students’ potential to learn. In fact, it is evident that scaffolding is crucial to this type of learning. The students might have given up their efforts without adequate support. “In fact we had abandoned it. I give up,” was one desperate call for help because of the degree of challenge associated with a particular task. Many students said that support from their teachers and peers was crucial to their completion of project-related tasks, although the teachers realized that they were not the only influence in the learning process. There was also genuine and continuous support and cooperation from partner institutions. This was essential to the success of the research project. Many group members said they had looked at other groups’ work as examples or models. In fact, a common factor that appeared in the interviews and the self-reports was the significance of the support role. All projects created within the University of Canberra showed many concrete examples of the value of support.

Volunteer members of the community provided help by using conversation partners. This type of support was found to be quite effective. The example
below is from an online volunteer from Chile. He posted a message to share his experience on the topic of water pollution.

Subject: water pollution

Hi everybody, I’m very interested in the topic. I come from South America, Chile. There were many problems with water pollution in my country years ago. However, the government have implemented some solutions. I think the most important issue is that people is the responsible of the problems. In the future I am going to post same specific information about this topic in Chile.
Regards,

Another example is a message posted by a volunteer from Thailand. She suggested a source of information as follows:

Subject: Water Pollution
You can see how thai government solving this problem from website http://www.dwr.go.th/Information/riverday.html

The above postings represent a form of support offered by group members and others in the world community. Support from the community was very important. There was little direct instruction regarding the group projects, so students had to take responsibility themselves for outside activities. Therefore, in addition to language support, the students needed the cooperation of their peers and the support of outsiders for ideas. Even though it is not possible to know whether a genuine ‘sense of being in a community’ was developing, it appears that participants benefited from and appreciated what the online community had to offer.

There was no ‘pre-teaching’ of language for any of the projects, but students managed to solve emerging problems along the way from their own resources and assistance from the researcher, teachers and volunteers. Students were generally at the intermediate level so limited language proficiency was a problem for most. With such a proficiency level, they did not find it easy to summarize the collected reading materials, most of which came from the Internet. Moreover, most students found it challenging to deliver their texts, both orally and in writing, at an appropriate academic level. Being able to engage in academic discourse in English involves
complex tasks and students generally lacked experience of an academic discourse environment. Nevertheless, it appeared that learning about academic discourse was taking place.

### 6.1.4 Use of Technology for Developing Language Skills

Another area of strength of CMCL is its effectiveness in encouraging appropriate use of computer technology for the enhancement of language learning. Technical problems, such as those with Internet access and web skills, while reported as problems (Case Study 3), were generally perceived as an opportunity for both teachers and students to engage in language learning. For example, one student participant wrote:

> I can say this project can make me know many things about the Internet, know how to use it and learn English naturally. I think it is not necessary to learn teachers. You can learn from the internet and many things on the internet that you have never knowed before.

With the Internet, teachers and students had many more such opportunities that they could use to expand their perceptions and vision.

Students were able to learn technical skills and practise English at the same time. Two examples below are from the teacher and the volunteer attached to Case Study 3:

#### Example 1:

Date: Tue, 26 Aug 2003 22:23:32 -0700 (PDT)
Subject: Thanks for your help
To: janphauc@yahoo.com

Dear Aj. Janpha
My students and I are doing the project in the computer room right now. You are just right here in time because we are confused and don't know how to do with the pictures and information that we can't download in the project. Then Chitra, one of my students, send e-mail to you. Fortunately you are right there. Thanks. They keep trying on their projects.
Regards

#### Example 2:
Example 1 shows how emails were used for collaboration between the teacher and students doing Case Study 1 in Thailand, and the researcher in Canberra. Example 2 shows that technical advice could be obtained using email in the target language. Many participants in Case Study 3 had problems with Internet access on campus. However, they were able to overcome the problem by using computers outside the university. Linder (2004), who supports the use of computers for collaborative learning, suggests that outside computer use is a viable resolution to the access problem. This study has certainly involved such an approach.

Besides help from the researcher, volunteers and their teachers, students had help from each other. Some students had used computer technology for a number of years and many were very capable users. Some of the students participating in this study had already been using the Internet to enhance their language learning. A reflection from a student in Case Study 2 shows this was the case.

I have learnt English for 7 years. I started learning English on the Internet 2 months ago because internet contains huge of information and upgraded very quickly. There are heaps of websites which are teach you how to learn English are available for English learner. There are also some websites such as news, article, being widely explored because of their quick update. On the other hand, how many times that people usually learning English on the Internet? I usually do it everyday, just one or half an hour. After you read an article or new, you could add your opinions to the article. This is also improving your writing. Chatting with people is another way for learning English. You could have met meeting with people who are from different countries.
The CMCL learning environment created for this study encouraged the students to extend their skill levels. Most students recognized that there was a lot of information and good learning opportunities available from Internet sources. Kelvin, a student from UC-13 doing the research on the Uncomfortable Classrooms (Case Study 2) talked about his experience in this way.

Learning English on the Internet is a big challenge. Firstly, searching the information in English was difficult but I got a good experience to know how to do it again. Secondly, keeping up the important information was the other thing that I have learned. Thirdly, translating the information from the internet to your own writing that was the first time I learned. However, on the internet has huge information which you can use or can not and that was what I learned from this class.

Similarly, a Chinese student in the Canberra (Case Study 1) wrote:

The Internet has greatly interested our group to information. I have several ways to learn English through internet. Firstly, I submitted to media (newspaper), everyday I can receive headlines from New York Times. By reading these headlines I have mastered a variety of words and updated expressions. They are quite useful for improving my English. Secondly, both reading and searching materials by internet are parts of our assignments., the way we’re studying is also a excellent way to enhance English. Internet can provide us as much information as possible.

On a general level, many students said that participating in this CMCL learning experience was helpful; it helped them learn how to use technology and they could use this knowledge to enrich their learning in the future. Some students reported that this was the first time they had used PowerPoint slides for a formal presentation.

*Yahoo Groups* was used in this study as a means of helping students from different countries and cultures communicate with each other. On reflection, *Yahoo Groups* was an appropriate platform for this study as it was easy to use and could be accessed anywhere in the world.
6.1.5 Student and Teacher Empowerment

Lastly, this learning environment, by employing CL, technology and complex tasks, allowed students to have greater control over their own learning than they would have had in a traditional classroom environment. Computer technology empowered the students. For example, in Case Study 3, many students’ written reflections show that their perspective on language learning expanded. One student said: “I think it is not necessary to learn from teachers. You can learn from the internet.” The same student wrote that that there were many ways to learn a foreign language. One way is to learn by using the Internet or, in her words, “learn English naturally”.

Student autonomy does not mean that teachers do not play a significant role in language learning. This study demonstrated that both students and teachers were encouraged to take more control of their own development. Teachers positioned themselves as facilitators and co-learners. In this study, teachers were empowered through collaborative active research and reflective teaching, which are a means to develop teachers professionalism (Edge & Richards, 1993).

It is evident from the investigation that teachers play an important role in determining the success or failure of CMCL. This result is in keeping with the results of other research such as those of Akcan (1997) and Messier (2005). When undertaking project-based language learning, both teachers and students need to be active and reflective. According to Jones (2001), the successful use of computers in language education largely depends on both the type of activities and role of the teachers. In addition to being facilitators, teachers need to position themselves as co-learners (Jacobs & Farrell, 2003) and recognize how much time the students need to practise the language they are learning and to organize their understanding. This study has demonstrated how teachers can indeed take the role of co-learners. For example, the teacher in Case Study 3 said:
This is the first time for me to teach English online and use a project-based learning approach in my English class. I considered myself a co-learner with my students, the volunteers, and the researcher. I also learned how to collaborate and realized a new role of teacher as a facilitator rather than an instructor.

It is clear that the student-centred approach should be the basic pedagogy of collaborative classroom learning. This study shows that students learned when teachers acted as facilitators and co-learners instead of just feeding the students what they (the teachers) knew. This feature of the Bamboo Enterprise empowered the students. In this study, the teachers became learners as well as sources of information (Jacobs and Farrell, 2003). Thus, sometimes teachers have to expect that students would come to know more than they did on certain topics. This happened in UC-7 in Case Study 1 for example, when teachers encouraged their students to nominate and research environmental topics, and then they learned from the students’ findings.

To sum up, this learning environment promoted the communicative use of English. It also promoted CT in action, challenged students to express their potential, encouraged appropriate use of computer technology for language learning and empowered both students and teachers. However, there were aspects of the learning environment that clearly need modification if students are to gain the full benefit of this type of language learning environment, especially with regard to CT. The next section will discuss areas in which improvement is needed.

6.2 Avenues for Improvement

Despite the favourable conditions of the CMCL learning environment that was set up and the benefits students received by being part of it, the students faced a number of difficulties while doing their projects.
6.2.1 Accuracy

In Chapter 5 it was reported that, despite their use of complex language, students made many grammatical mistakes. While on the Internet the students had freedom of expression and this allowed them to relax their concern for accurate use of grammatical and spelling conventions. Such risk-taking behaviour might be interpreted as a healthy sign (Corder, 1978; Faerch and Kasper, 1980, cited in Ellis, 1994, p. 403). However, accuracy was the weakest aspect of the students’ writing in this project, a significant concern given that the relationship between linguistic conventions and discourse is reciprocal. Students needed to know the lexical units and associated structures to make meaning in order to enable their audience to follow the development of the text.

Across the three cases it was found that, in general, students frequently violated linguistic conventions. According to Wong Hoi Yee (2002), in L2 contexts pragmatic competence and grammatical competence are closely correlated. However, it should be said that here, even with the violations, comprehension was still possible. An example from the text of the discussion board of DPU-4 (Case Study 3) shows how students still managed to get their audience to understand intended meanings even when linguistic conventions failed them.
Despite their attempts to use complex vocabulary and grammar (see Chapter 5), the students made many typographical, lexical and syntactical errors. The researcher and the teachers tried to help the students reduce these errors, but many persisted. The teacher in Case Study 2 said: “I’ve tried my best to help the students correct their errors. When they presented their work on the Internet, there were still errors.” This comment recalls the thoughts of Richards (1992), who says: “We live in an imperfect world and consequently errors will always occur in spite of our best efforts” (p. 20). It is universally acknowledged that students make mistakes and in the field of second language learning it is known that making mistakes and taking risks in voicing their ideas and feelings are positively correlated.

6.2.2 Web Skills and Internet Access

It was clear from the investigation that students relied heavily on the Internet to complete the group case studies. Therefore, the students’ web skills and their access to the Internet were crucial factors in their language learning. Despite the fact that Yahoo Groups is a simple online platform, many participants found it hard to take full advantage of it. The researcher told the participants not to worry too much about technology because it would be
simple to master the necessary skills to use it appropriately. The participants were told that if they knew how to use email they would have few problems. However, evidence from the interviews shows that many students found it difficult to use the required technology, and most needed some time to make themselves familiar with its use.

The students needed additional training in web skills, especially those in Case Study 3. During the research briefing the researcher demonstrated how the students would be using the system and how the system worked. Some students learned quickly, stating that it was not too difficult to use. However, the researcher spent many hours helping others log on and then use the system in ways that would enhance collaboration. Because the researcher placed great stress on the concept of CL, participants were encouraged to ask their friends or their teachers for help if they had problems using the Internet.

The efficiency of the connection was found to be another obstacle. Student participants in Case Study 3 in particular complained about this when the researcher asked them about their access to the Internet. Many did not have computers at home, so the option to use a home computer could not be considered a reliable one. In addition, at the university or school the network speed was unreliable. Often it was too slow. Sometimes there was no connection at all.

When it comes to technology students and teachers were alike. There were some of each participating in this project who were quite familiar with the Internet and its use, but there were many others not at all keen to use it. One teacher participant at DPU dealt with this problem by asking the technical staff of the learning centre to help students who needed advice and assistance. For Case Studies 1 and 2 the researcher provided the technical support that was necessary.
The CMCL environment proposed here required that the participants have at least minimal knowledge and skills with the computer and website use. It was found that unless the teachers were power-users of technology, technical support was needed. There are two issues here. One is access, the other is the ability and creativity to make use of what is available.

6.2.3 Plagiarism

It was evident from the investigation that project-based CMCL, without sufficient and appropriate scaffolding for the students, was conducive to students resorting to plagiarism for the production of their texts. The Internet, with advanced searching capacity and cut-and-paste functions, made it easy for students to plagiarize their text if they wished. Students needed a great deal of support from the teachers to produce texts that were not, intentionally or unintentionally, plagiarized.

Below is a plagiarized text from one student who was writing in Case Study 3, clearly well above his normal level:

Today our garbage problem has been magnified many times over because of the high concentration of population in urban cities, an increasingly affluent society with more money to spend and the excessive consumption of materials, especially products made with disposal in mind-planned obsolescence.

Many groups did not cite the sources of the photographs they posted on the project website, despite the fact that they were asked to do so, and were shown how to do it. The teachers admitted that greater emphasis should have been placed on making sure that the students properly acknowledged their sources of information.

The pressure students face to produce a good product makes it very tempting to search, cut and paste the texts they find on the Internet. This shortcoming is probably another down side of using the Internet. The pressure may be
particularly strong because of students’ beliefs about learning, and this was apparent in Case Study 3, set in Thailand. In many cultures in Asia memorizing the texts is encouraged (Marton et al., 1996).

On the other hand, a good number of the groups prepared appropriate and well written text to suit their needs. They practised ‘plagiphrasing’ --- taking chunks of text from the original sources and piecing them together. (Wilson, 1998b). Wilson (1998b) argues that this is a natural process of learning the discourse of a new language, and therefore a phenomenon to be encouraged. However, where there is inadequate support plagiarized text may be expected. Healthy and adequate support (scaffolding) will move students towards mature writing. Below is an excerpt from UC-16’s online presentation that shows a relatively skilful paraphrase of sources, without obvious evidence of plagiarism.

Magpies are common birds in Australia that you can see everywhere around Australia. They have sharp beaks, talons and a loud call; Furthermore, their colours are black and white. They live in the gum trees and spend the rest of the day a sitting on a branch or power pole near their nest. Magpies become dangerous in spring and summer, especially from August to December, because they often swoop people. The reason they do that is because they try to protect their babies from the threat of other birds or people. As the result of this, a lot of people get attacked.

6.2.4 Scaffolding

Despite the high level of support that was offered the students, it became apparent as they were engaging in their tasks that often more support was needed than the researcher had anticipated, especially in the form of language assistance.

The support had to be more structured than it was (Hammond & Macken-Horark, 1999; Hammond, 2001), and different levels of support were required. There was clearly a need for institutional support for this type of CMCL to be successful as a learning environment. It was found that unless there was adequate support from institutions, it was almost impossible to conduct the research required for completion of the case studies. Institutional
support included, for example, technical support to ensure that the technology worked well, and curriculum support to allow students flexibility in their timetable so they could work on collaborative projects over a long period. The next level of support was at the teacher level; and then at a third level, support from the students themselves. During the research briefing stage, many teachers showed a keen interest, but their students did not show the same level of interest. It was not easy to have all three levels of support at the appropriate time.

The students generally needed more support in accessing and processing information. Many student participants in Case Study 3 told the researcher that comprehending the text drawn from the Internet was more challenging than presenting the finished product on the Internet. In support of this response, the students showed the researcher excessive amounts of material they had printed out. This behaviour suggested that task scaffolding is crucial but, for many participants in this study, what was provided was inadequate. Explicit scaffolding instruction on how to critically read and comprehend online texts, as recommended by Murray and McPherson (2004) is a highly desirable option. In monolingual classrooms in particular, where there are fewer opportunities for students to use the language, support is essential for the success of a research project such as this. Engaging the assistance of volunteers and posting information online are two types of support that might be useful, and they are both easily provided. Also, if students had been given more prior instruction on how to identify suitable sources and how to read challenging material effectively, they would possibly have performed better.

Providing adequate scaffolding is probably the best way to prevent the students from committing unintentional plagiarism, but scaffolding is needed for more than evaluating and organizing information from the Internet. It was observed that students needed to be made aware that proper citation of
sources is essential in academic writing, and they required assistance in actually doing it.

It was also found that the nature of the research task influenced students’ work. In the second module of Case Study 2, the students were asked to choose problems specific to their location. Searching the Internet for information on local topics was not particularly helpful. This was very apparent from the researcher’s interviews with students. “We couldn’t find the information we needed on the Internet. So we had to work it out ourselves,” one student said.

6.2.5 Groupwork Reluctance

Another avenue through which the learning environment could be improved concerns the students’ groupwork. Some students said in their written reflections that they found it difficult to work in groups. For example, one student in Case Study 2:

I could not do assignment on Internet by myself even if the teacher taught me in class. So, I had to always ask someone. Especially, it was difficult to do assignments in group, because if one of my group does not do own tasks, we can not move to next step. So we sometimes could not do not our tasks for deadline.

Similarly, another student from the same case reflected that:

I couldn’t contribute much to the project because everyone disagreed with my opinions.

Working as a group involves CL skills and cooperative attitudes. Many students in Case Study 3 said it was challenging to work in, and as, a group. Their teacher reasoned that it was their lack of CL experience: “They used to follow what’s in the textbook”. The teachers in Canberra also expressed a similar opinion. According to the teacher in Case Study 2, “Students found it difficult to express their opinion in a group situation”. Overall, there was a general reluctance on the part of students to participate in groupwork. However, from our experiences, we (the researcher and his collaborators)
have noted that groups that worked well together were those that produced better projects.

This is a phenomenon that is reflected in Jacobs’ comment on the low-level of CL practice in Southeast Asia (Jacobs, 2004, personal communication) and Cooper’s (1995) opinion that, at a global level, CL is not generally practised. In this study, every teacher reported that many students found it difficult to work well in their groups; that is, the students could not work well where social and negotiating skills are required.

It was obvious that some students lacked collaborative skills. In addressing this issue, CL experts tend to recommend that language teachers spend some time helping students develop such skills. Explicit instruction on effective groupwork is required (Kagan, 1990; Johnson & Johnson, 1994). It is thought that this is worth doing because collaborative skills are also important life skills that all learners should attempt to improve. Learning these skills fits with learning target language functions. Knowing how to help others, learning how to wait patiently, and using waiting time constructively, are all useful skills to learn.

While some students did not find it easy to work with peers, group projects did give them opportunities to become more autonomous learners. Learner autonomy, according to van Lier (1996), involves learners taking some responsibility for and having some understanding of their own learning as well as the learning of their classmates. CL and autonomous learning are complementary, and it could be postulated that CL is a means towards autonomous learning. In this study, students chose their own topics, organized their own group structure, and created a text on their own. Students needed to help each other develop a joint reconstruction of the text, rather than depending on the teacher for all the information. This particular CMCL environment provided the students with opportunities to see where they had done well and where they needed to improve. As Swain (1999)
suggests, "Students gain insights into their own linguistic shortcomings and develop strategies for solving them by working through them with a partner" (p. 145). This, then, is another way in which working in groups can assist the development of both language skills and learner autonomy.

It can be concluded from this study that one of the major strengths of the CMCL learning environment that was investigated is that it promoted the communicative use of the target language by the students. Moreover, CT was encouraged, particularly by means of scaffolding and challenging tasks. It also encouraged the appropriate use of technology. However, for the CMCL environment to operate at its full potential there needs to be a way to improve students’ accuracy in language use, web skills and Internet access. It is also important for there to be a reduction in the incidence of plagiarism, better scaffolding at the task level (Hammond and Gibbons, 2005), and less student reluctance to work in groups.

**Chapter Summary**

This chapter began with a brief introduction, followed by an evaluation of the CMCL learning environment of the Bamboo Enterprise. Five areas of strength were discussed, then suggestions were made regarding avenues for improvement. It was evident from the investigation that the strengths of CMCL were related mostly to the learner-centredness and experiential aspects of the learning environment.

In the following chapter the results of the study will be analyzed and evaluated in order to obtain an overall picture of what occurred during the project. The principal aim of the research and the five research questions will then be addressed. Finally, the major implications of the results of the study will be discussed, and suggestions made regarding further research.
CHAPTER SEVEN

CONCLUSION

7.1 Overview
The title of this study is Promoting Critical Thinking in Language Learning Through Computer-Mediated Collaborative Learning: A Preliminary Investigation. An intellectual framework for analyzing CT language learning was developed and a model proposed that had three key aspects, namely, (1) communication, (2) reason, and (3) self-reflection. In order to put the conceptual framework into practice the researcher created a learning environment called the Bamboo Enterprise. The participants in the Bamboo Enterprise engaged in group projects under the common theme of the environment. The main aim of the investigation into the operation of the Bamboo Enterprise was to study the potential of this created learning environment to encourage CT in language learning.

In Chapter 5, five aspects of CT in language learning were examined in detail for each of three case studies. These aspects were linguistic conventions, audience, aims, reasoning and self-reflection in language learning. Results of the investigation showed that the participants in this language learning environment used complex language but the accuracy of their language use was low. In Chapter 6, both the perceived strengths and weaknesses of this learning environment were discussed.

This investigation was a preliminary study that asked one principal question: What is the potential of this CMCL environment in promoting CT in language learning? In this chapter therefore, first, the potential of the environment in promoting CT in language learning will be discussed, then there will be a discussion on the viability of the model that was described in Chapter 2. Finally, the researcher’s reflections on the impact of the collaboration on himself and on the research collaborators will be discussed.
7.2 Potential of the Learning Environment in Promoting Critical Thinking in Language Learning

This investigation has found that CMCL has the potential to promote CT in language learning in the three key areas of communication, reason and self-reflection.

7.2.1 In Promoting the Students’ Communicative Use of English

The learning environment, as was discussed in Chapter 6, had the potential to promote students’ communicative use of English through complex meaningful tasks. The results of the investigation showed that the students were confident in expressing themselves in English and were not afraid to make spelling and grammatical mistakes. This CMCL offered students many opportunities to practise in class through groupwork activities (Long & Porter, 1985), and opportunities to practise language are an essential element of communicative language teaching and learning. This CMCL also supported the belief that CL enhances communicative language learning (Jacobs & Farrell, 2003). The features and functions of the Internet aided communicative learning, particularly because the Internet offered students many opportunities to interact with others in meaningful and authentic ways.

In all three case studies the students, learning English in the context of online group activities, were actively engaged in three worlds: the world inside the classroom, the world outside the classroom, and the world online. This feature of the learning environment seemed to make a significant contribution to the participants’ language learning. It was particularly valuable in providing authentic communication. The students in each case used the language to interact vigorously and, importantly, they used the target language to achieve their goals. The students had to expand their language repertoire in both vocabulary and grammar in order to express complex meanings, and both receptive and productive language was involved.
By using the support that was available from online resources, their peers, the teacher, the researcher and the volunteers, the students were able to benefit from many opportunities to use English in a meaningful context. It is commonly acknowledged that language learning is more effective when it involves meaningful communicative acts (Widdowson, 1978; Spolsky, 1989). In the design of the learning environment a major effort was made to provide students with opportunities to perform meaningful communicative tasks, tasks that involved both productive and receptive skills. And then, in practice, as reported in Chapter 5 and discussed in Chapter 6, this CMCL environment was found to have the potential to promote the students’ communicative language learning evidently because there were so many opportunities to perform meaningful communicative tasks.

Across all three cases there was evidence that the CL activities stimulated the use of English in authentic situations, especially because there were multiple sources of support in place and challenging tasks involved. In terms of their vocabulary learning, the students were required to learn language receptively and productively. This is a highly desirable way to acquire new words. A recent study revealed that this type of global learning enhanced L2 vocabulary acquisition (Mondria & Wiersma, 2005). The CMCL used here encouraged the students to develop and practise global communication skills. The Bamboo Enterprise gave the students opportunities to practise using the language in a holistic fashion and it also encouraged complex use of the language covering a wide range of communicative functions. This is a similar result to that obtained by (Kern, 1995) in his research.

In this input-rich environment the students showed evidence of sophisticated language use that is not characteristic of learners at their language level. The students’ language output was rich, diverse and complex, a finding in line with previous studies that have analyzed online texts (Warschauer, 1996a; Li, 2000). It can be concluded that the nature of the online learning context may well have played a crucial role in promoting such textual characteristics.
However, accuracy was far from perfect, and this is a shortcoming that has been reported in other studies emphasized in the two previous chapters.

It was found that the students took risks and voiced their ideas and feelings despite spelling and grammatical errors. In this study such risk-taking behaviour was encouraged, employing a similar perspective to that of Nattinger, (1988) who says:

> It is more important for students to use the newly stored language as effortlessly and quickly as possible than it is for them to wait for control of precise vocabulary (or perfect grammar), even though what they produce may stray from the standard.
> (p. 70).

However, it is recognized in this study that linguistic accuracy matters. Although the focus was on communication and getting the intended message across, students were required to be aware that the medium was not an oral one. Failing to conform to linguistic conventions such as spelling, could well have resulted in text or discourse that was difficult to understand; that is, text that was inappropriate. The nature of written language prevented the students from using other means, for example, intonation, stress, or gestures, to help convey the intended messages. In this connection, Harmer (1991) notes that, “… the reader has to understand what has been written without asking for clarification or relying on the writer’s tone of voice or expression” (p. 53).

In the three case studies there was evidence of common features:
- An emphasis on the content of the activity, rather than overt language learning;
- A reduction or complete suspension of the teacher’s judgmental role;
- A tolerance, even an encouragement, of language variation;
- More tolerance of error, with grammatical errors viewed as a natural part of the process of language learning;
- The environment was supportive and guilt-free participation was encouraged;
- Language items were presented in contexts of typical use rather than in isolation;
- An absence of predictions by the teacher of exactly what language was to be used by students;
- A focus on language in use, the functional and notional aspects of language learning;
- The groupwork approach that encouraged greater participation.

The above aspects are similar to the eleven characteristics that Brumfit (1993) identifies as being necessary to communicative language teaching. In this study group activities helped the students learn language but also helped them to be more effective language learners. Part of the explanation for this lies in the overlapping of CL and CLT (Bejarano, 1987). CLT values active use of the target language, instead of simply focusing on language usage, while CL seeks to maximize the purposeful use of language. In the Bamboo Enterprise students were in small groups so they were talking to each other. In addition, the learning environment was based on the principles of CL and equal participation so that every member of the group was assured of an equal opportunity to participate in a group project. Heterogeneous grouping, another aspect of CL, also helped create a complex social learning context that required learners to negotiate meanings and develop positive interdependence. The findings support the link between communicative language teaching, language learning and CL.

In sum, the study showed that this CMCL assisted the participating students to achieve many of the goals of CLT.
7.2.2 In Promoting Critical Thinking in Action

As discussed in the previous chapter, the CMCL learning environment investigated here appears to have the potential to promote CT in action. The major characteristics of the model that promoted CT in language learning will now be described.

First, group activities provided students with opportunities to use English in a meaningful and purposeful way. The students were required to communicate with their peers and other members of the community to complete tasks. The nature of the task has played a significant role in determining the presence of CLT, since, in the process, they had to negotiate meanings and such negotiation helped them become more aware of their own beliefs and to learn the target language more effectively (Long & Porter, 1985). This study showed that working in a group requires another set of complex skills; students needed to manage interdependence with others (Johnson & Johnson, 1994) and to reconcile differences for mutual benefit. Clearly, this CMCL has the potential to create a social context for the exchange of ideas and feelings among members of the community. Heterogeneous grouping in particular — that is, mixed ethnic and mixed ability groups — reinforced the demands on the students to deal with different perspectives (Cohen, 1997). Mixed grouping has also been shown to be a means of developing interracial trust and friendliness (Slavin, 2001). In Case Studies 1 and 2, for example, students with different nationalities worked successfully with each other with very few problems. All teacher collaborators agreed that this CMCL allowed the students opportunities to test their ideas and reasons for their viewpoints.

Secondly, in addition to CL, task complexity and content stimulated students’ higher-order thinking skills. Every student project demonstrated that the students had put a great amount of effort into their work. In Case Study 2 especially, the students had had to plan and carry out their own
studies or projects. In this study, the CL activities were such that students were required to be actively engaged in their investigations of environmental problems. They were able to learn through experience, and this entailed reflective elements (Kohonen, 1992). The study also showed that this CMCL environment could be used as a pathway to one type of CL called service learning. Service learning is a combination of students doing service for others, for example in their communities, and through this process learn according to their curriculum (Jacoby, 1996). Service learning provides students with opportunities to really participate in meaningful activities and encourages them to be reflective in their learning. In this study, the task and the content were part of the complex learning context.

Thirdly, computer technology required the students to create their own websites and determine effective ways to present their work. Technology also helped create a complex learning environment where output and input were shared and new knowledge could be co-constructed. It is commonly acknowledged that output helps enhance acquisition (Chan, 1996). The way of using the Internet was text-based, so there was need for information organization skills. According to Harmer (1991), writing requires greater information organization skills than speaking. It follows then, that because students had to create information websites they had to learn complex skills.

Finally, with the use of a student-centred approach to language learning, students were empowered, and confident to carry out their work in an autonomous manner, so they directed much of their own learning. Teachers, by positioning themselves as co-learners rather than knowledge givers, allowed students to seek out their own answers and find ways to deal with unforeseen problems. In this way, this CMCL promoted student problem-solving skills.
In sum, this learning environment, with its particular model of CT in language learning, has the potential to promote CT because of the benefits of experiential learning.

7.2.3 In Encouraging the Students to be Self-reflective in Language Learning

This CMCL has the potential to promote CT because it encouraged the students to be reflective in their language learning. They were reflective when they carried out their tasks in collaboration with peers and helpers. They were also reflective after their tasks were completed. Because the teachers positioned themselves as facilitators and co-learners, the students were empowered to be more autonomous in their learning. The students were also encouraged to be self-reflective in their learning, at least partly because the task itself involved linguistically or cognitively complex operations (Oxford et al., 2004) and because of group dynamics (Swain & Miccoli, 1994). In short, CMCL provided an experiential learning context for the students, and this type of learning environment has been widely acknowledged as being an effective way to learn how to think (Dewey, 1963) and how to learn another language (Nunan, 1981).

The students’ self-reflection process was evident from their overall work, online discussions, written reports and the comments from the teachers, and the interviews. As was mentioned in the previous chapter, the students reflected on both their language ability and their attitudes towards studying English (through the questionnaires). The comments from the teachers also helped reinforce the belief that this CMCL has the potential to encourage students to be self-reflective in their language learning. There was evidence to suggest that the students perceived themselves to have improved in their language competency. They had opportunity to reflect on their learning environment, and, from their writing, it was clear that many realized the value in learning as a group. Some became aware of their own methods of learning.
The computer technology used in this CMCL environment, being text-based, helped enhance students’ input. Because their language output was disseminated via their websites it served as comprehensible input for others; it allowed other students to notice the language in use. The asynchronous communication that the technology allowed meant that students had time to reflect on their language and what they had to say before posting.

In sum, this particular ecological approach to CMCL promoted the use of English for communication, promoted CT and encouraged the students to be self-reflective in their learning.

7.3 Potential of the Proposed Model for CT in Language Learning

The first aim of this study was to develop a learning environment that would promote CT in language learning. The proposed model, presented in Chapter 2, used a framework of CT in language learning that had three components: communication, reasoning, and self-reflection. The researcher obtained ideas and input from all the areas of the ELT literature, namely, L2 writing, communicative language teaching, the informal logic movement, language learning strategies, and critical discourse analysis, to develop the framework that was intended to be global in nature, and form the basis of a theory. The model was put into practice, and all stakeholders collectively evaluated the potential of the proposed model.

CT in language learning is a set of complex constructs. In this study, we (the collaborators and the researcher) agreed that the proposed model was suitable for many learning contexts. A learning environment was created that allowed the students to: (1) co-construct knowledge; (2) communicate their ideas and feelings appropriately; (2) reason appropriately, and (3) be self-reflective in their language learning. As the three cases have shown, the model was broad enough to be a viable one for teacher-teacher or researcher-teacher collaboration.
The model proposed has very good potential for enhancing students’ critical thinking in language learning. As was shown in this study, the model is flexible and viable. However, the proposed model needs to be subjected to scrutiny by other discourse traditions for a full evaluation. This preliminary study simply proposes it for consideration.

### 7.4 Reflections on the Collaboration between Researcher and Teachers

Upon reflection, the researcher and his collaborators realized that what we undertook was enormous, but success of the investigation could be highly significant for students’ language learning. We learned that one issue could lead to another and it was impossible to predict every eventuality. In fact, we were reminded of the notion of the ‘teachable moment’ as we needed to notice and respond to a language point, a global education topic or an issue of collaboration and collaborative skills that spontaneously arose.

This experience confirmed the belief that the teacher makes a difference. It also alerted us to the idea that collaboration should be regarded as a value as well as a method. This is in keeping with the view of Underhill (1989) who writes: “My proposal is that changing techniques while maintaining the same attitudes amounts essentially to more of the same, and that the quantum shift we search for in our ability to facilitate more effective learning lies in a shift at the level of our attitudes, our awareness, and our attention to process” (p. 260). Collaboration in this project has entailed just such a shift among teachers, a shift of attitude in favour of this innovative approach to learning.

One of the strengths of this CMCL reported in chapter 6 was the fact that this environment provided a platform that allowed teachers to engage in activities that enabled them to be reflective practitioners. It was evident in this study, as Vilmi (2003) and Boyle and Rigg (1998) (2003) found in their studies, that the teachers and the researcher had learned a great deal from each other in terms of teaching methods and worldviews. The collaboration
gave the researcher, the teachers and students opportunities to learn from other members of the Bamboo Enterprise.

In Case Study 3, for example, the researcher and the teacher admitted that, despite all our preparation, we did not adequately anticipate the linguistic demands of the task on the students. Through the investigation we came to realize that collaboration was challenging, but it was also, clearly, the key to success. A review of the literature shows that collaborating with one another is more effective than competing with each other or learning in isolation.

That learning was achieved as a result of collaboration can be seen from what one collaborator said:

What have I learnt? For me, this was the first time I guided a group of students through the process of preparing a PowerPoint presentation. Of course, I could not have done this without the technical know-how of my collaborators. I learned that it doesn’t matter if I cannot teach my students how to prepare a PowerPoint presentation, or that I cannot guide them through a communication exchange on a website, as long as I can recruit technical help. After all, one person cannot be everything!  
[Researcher’s italics]

Another reflection was on a similar note:

What have I learnt? Firstly, I have realised that there is a useful system called Yahoo Group in which students can share their ideas freely on the Internet. I have also realised that they begin to work both individually as well as by sharing their ideas with other classmates when they are given a group task. If they know exactly what they are supposed to do, they start searching information, prepare presentation slides, and even practice their group presentations on their own at the final stage of their project. All I had to help them with was just to make sure whether they were on the right track. Some of the students needed somebody to proofread their summary for their presentation. Other students needed some help about how to use PowerPoint. I helped some of them as much as I could, but I also saw them showing their own summaries to each other in order to get some feedback or by learning from each other with PowerPoint slides.

Here is another reflection:

What have I learnt? How I managed a long-term project that involves groups of students. I learned how to use this technology myself, for example, PowerPoint, website construction, Microsoft word, and chat rooms.
The CMCL investigated here clearly encouraged the students to be reflective about their work but it also encouraged the researcher and the teachers to be so.

Does this CMCL have the potential to promote CT in language learning? This initial investigation suggested that, despite difficulties, it had a great deal of potential. From this experience, its potential strengths appeared to come from five areas. First, there was evidence that this CMCL was a means of promoting students’ communicative use of English. It was demonstrated, in all three case studies, that English was actually used effectively for communicative purposes. Therefore, it can be said that using group activities with online and offline support can assist communicative teaching methodology.

Secondly, it seems that this CMCL promoted the students’ CT in language learning. The focus was on the environment, a global issue. The topics were interesting to the students, who were motivated to learn about them. It seems that such topics could provide appropriate content for learning in the ELT context.

Thirdly, this CMCL provided a means by which teachers can work together for mutual benefit, and so be a vehicle for professional development. Teachers can also use it to conduct classroom research, which is another way of undertaking professional growth (Freeman & Richards, 1996; Freeman, 1998; Richards, 2003). Collaborative research in the classroom has been a form of research widely-practised by language teachers (Brumfit & Mitchell, 1990; Freeman, 1998; Cardenas, 2003; Kincheloe, 2003) and this is a viable way of doing it. There are two examples of how teachers pursued their professional development ambitions as a result of their involvement in this CMCL learning environment. The teacher in Case Study 2 wrote a paper for a conference (Cambage, 2004); and one collaborator in Case Study 1
produced a related academic paper for her MA study (Kosaki, 2004). These examples show how this type of collaborative research might be a means for teachers and researchers to develop themselves academically and professionally through CMCL. In the field of TESOL, teacher-researcher collaboration has recently become an area of interest. There are, for example, two commentaries in the *TESOL Quarterly* where authors have noted insights gained from collaboration between teachers and researchers (Hawkins & Leger, 2004; O'Connor & Sharkey, 2004).

Online networks help make certain types of collaboration easier, and can enable the sharing of expertise on environmental issues that would not otherwise be possible. For example, a volunteer from Chile shared with a group of students in Bangkok his perspective on how Santiago had successfully resolved its water pollution problem. A global problem requires global efforts. Based on observational learning principles, sharing of success stories can help encourage others to do the same.

Kumaravadivelu (2003) urges ELT practitioners to work collaboratively with other stakeholders, for example fellow teachers, learners, experts in the field and community activists. He believes that teachers should move away from their traditional roles as passive technicians, to being involved in intellectual transformation. So far, there is nothing to suggest that his views have materialized into changes in practice, especially in the field of TESOL.

Progressive educationists and policy makers increasingly want to see more schools and communities working together to solve social and environmental problems. Jacobs (2004, personal communication), for example, would like EFL studies or classrooms to actually do something to protect the environment, in addition to just pondering on environmental issues. Amy Hemmert and Tammy Pelstring (2003), at the CATESOL 2003 Convention reported some examples of schools that had actually implemented environmental projects. They urged English teachers to help protect and
manage the natural environment. A language learning environment that uses Internet resources and other modern technology for language learning can help students become actively involved in environmental issues.

Lastly, this ecological approach to ELT has the potential to become a possible theme in second language education. This study showed that learning online and offline does not have to be done in isolation. CMCL is a means of developing independent learning capacity. There is a growing argument this new learning environment works best for learners if there is a mixed approach, where individual online work is combined with face-to-face elements.

It was noted also, that creating a strong sense of community was not an easy matter. It takes time and effort. A real sense of community was not strong among members of the Bamboo Enterprise. At most, what can be said about this study is that many members benefited from the support provided by the community even if they did not enter fully into the spirit of the community. Ideally, CMCL as a theme means working towards a true knowledge-building community where knowledge can be systematically archived and shared (Wenger, 1998).
7.5 Implications

There are three important implications drawn from the findings. These relate to (1) implementing an ‘ecological approach’ to language learning and teaching; (2) using technology to enhance language learning and teaching; and (3) integrating global issues into existing ELT courses.

7.5.1 Implementing an Ecological Approach to ELT

The study shows that the proposed model, together with its project-based collaborative language learning environment (CMCL) indicates that an ecological approach to language learning and teaching could be useful and valuable. Necessarily, such an approach would be somewhat fluid and interdisciplinary.

Results from the three cases implied that ELT could greatly benefit from expanding the existing boundary, and moving towards a more interdisciplinary and a more collaborative approach. On reflection, it can be seen that TESOL, now a growing field, began as a subfield of second language education (SLA) but has gradually moved to be an interdisciplinary field. As Ellis points out in the introduction to his seminal work *The Study of Second Language Acquisition* (1994), research in SLA has become ‘a rather amorphous field of study with elastic boundaries’ (p. 2). Arguing for the field to be reframed due to ‘new contexts and conditions’, Luke (2004) maintains that TESOL still needs conventional theories such as those of second language acquisition and literacy. This study employed an interdisciplinary approach, where cooperation was conceptualized as a theme in education. In terms of pedagogic principles this study may offer a signpost to the value of an ‘ecological approach’ to ELT. Being ecological means the inclusion of philosophical and methodological aspects: philosophically placing value on cooperation and collaboration; and methodologically applying principles of CL as vehicles to enhance language learning.
The three case studies that constitute this research project show that an interdisciplinary approach is a viable one. Teachers can work together well, regardless of their initial formal training.

7.5.2 Using Computer Technology to Enhance Language Learning and Teaching

This study also demonstrated that language learning could benefit from appropriate use of computer technology and the Internet. How this technology is to be used is thus one of the central issues in education. As education, the new media, including the Internet, are here to stay. It was mentioned at the outset of this study that new media with multi-modality are gaining more momentum in all fields of education. Future learning will depend on the creative and collaborative use of information and communication technologies. Teachers with web skills can make a great deal of difference in their teaching.

A follow-up study by the researcher and the teacher of Case Study 2 gives further evidence that technology has a significant role to play in language learning (Cambage, 2004). However, the focus should be on the learners, not the technology. Needless to say CMCL works because people make it work.

This study showed that there are many benefits in using computer technology to enhance language learning. For example, when the students expressed their ideas on the Internet, their language tended to be lexically and syntactically complex. It also revealed many examples of the students being more themselves, free of learning anxiety, when they were online. The Internet also provided a linguistic freedom that might not exist in any classroom. As Warschauer (1995) argues, the Internet provides the opportunity for ESL students to take risks with the language they are learning without fear of correction. For these reasons, writers in cyberspace may produce a different type of writing from that found in the classroom.
This study shows that the Internet is a viable means to promote the use of English for real, live communication.

Many participants reported that they observed other students’ projects in the Bamboo enterprise in order to form their ideas about their own projects. This revealed another important value of the Internet; it is useful as a database for knowledge storage and sharing. This factor may require some new thinking in terms of what and how classrooms are supposed to perform (Scardamalia & Bereiter, 1996). This research has shown some glimpses of what can be done and how members of the community can benefit from building their own knowledge. Also, it demonstrates that this is a viable way for teachers and students to jointly create knowledge, especially when it is done in collaboration with other communities. What was built and shared, although far from perfect, was alive and ready for responses and interpretations. It was found that many students benefited from sharing their work with each other and many saw how others used technology to communicate their ideas.

In this context, knowledge means “information that has been communicated and understood” (Green, 2001, p. 82). Knowledge in the context of TESOL can mean authentic material for other teachers and learners. Once such knowledge has been collaboratively built, and stored systematically in the system, others can utilize it. Such knowledge can then be shared more effectively. This research demonstrates that it is viable to not just capture or consume knowledge, but to collaboratively create it for everyone’s use. This is an implication worth pursuing.

7.5.3 For Integrating Environmental Issues into Existing ELT Courses

This study implies that language teachers should be involved in global issues. This is an oft-debated question. Some people will say that ESL students are not taking ESL to learn about the world; they are studying ESL to improve their English. We should be giving them what they or their
parents, are paying for, not what we teachers may think they should study. In contrast, Brabazon (2002), urged teachers to focus more on the content: “Without attention to social justice, critical literacy and social change, our students will know how to send an email, but have nothing to say in it” (p. xiii).

English for communication needs its content. ELT seems to lack meaningful and worthwhile content. Maley (1994) has said the following:

ELT has been bedevilled with three perennial problems: the gulf between classroom activities and real life; the separation of ELT from the mainstream of educational ideas; the lack of content as its subject matter. By making Global Issues a central core of EFL, these problems would be to some extent resolved.

Global issues, for example wars, pollution, and famine, are affecting every individual, including the ELT teachers (Jacobs & Cates, 1999). As teachers, we are in the privileged position of being able to choose the content of our lessons.

After their work together, the teacher from Case Study 2 and the researcher discussed the possibility of implementing another online activity using the Bamboo Enterprise as a platform. It would be viable to use mock United Nations activities where each student acts as a representative of a particular country. Global issues such as global warming could be raised for presentation and discussion. Students from other parts of the world could also be asked to participate. The features and functions of the Internet would enable the students to explain, persuade, and negotiate with each other.

TESOL teachers could make a substantive contribution to the well-being of the planet by linking their practice with global issues. Their aim could be to make a significant contribution to the development of citizens who have the ability to communicate their ideas and attitudes using English, so they become socially responsible global citizens.
In summary, the significant implications of this preliminary study relate to:
(1) implementing an ecological approach to language learning and teaching;
(2) using technology to enhance language learning and teaching; and,
(3) integrating global issues into existing ELT courses.

7.6 Recommendations for Future Research

Based on the research findings, the following recommendations for further study are made:

For the analysis, this study relied mainly on the participants’ written language. Future study could well focus on their oral communication, or a combination of the two.

This study reported that scaffolding was a significant factor affecting the success of the collaboration and the study. A future study could look specifically at effects of different types, levels, and conditions of scaffolding.

This study showed that collaborative skills, including social skills, played an important role and many students lacked those skills. To address these deficiencies a future study may wish to consider integrating collaborative skills into the research project.

As a preliminary investigation, the CMCL environment was implemented in a broad sense, entailing both an online and face-to-face context. An online-only study might be conducted to identify specific possibilities of the context.

This study proposed a model of critical thinking in language learning. Two languages may mean two sets of practices. Is critical thinking identical to cultural thinking? Can there be a unique concept of CT in L2 learning? What is the precise relationship between CT and second language proficiency? Such questions merit investigation.
The study revealed some directions of how and what could be done to actually address environmental problems. Creating awareness is just the first step. From an environmental education perspective, future researchers may wish to invite the participants to actually protect the environment, for example through a process of service learning within the context of ELT.

This study did not inquire into whether students had gained from the project in terms of their interest in, knowledge of, attitudes toward, or participation in global issues. Future research could address this question.

7.7 Conclusion

The main aim of this preliminary study was to evaluate the potential of the learning environment with its proposed model of CT in language learning. The learning environment called the Bamboo Enterprise (CMCL) was created in order to put the model into action. The study suggested the idea that collaboration be not just a method of teaching, but a theme in education. In addition it proposed that language learning should be extended beyond the classroom, involving the community. Critical thinking in language learning was proposed as an intellectual framework and as a construct having three main domains: communication, reasoning and self-reflection in language learning.

The Bamboo Enterprise was created using Yahoo Groups, with links to other websites as a support system, as a means to enable learners to engage in the ‘real world’. The students from different backgrounds were given many opportunities to create research projects. Facing problems from different perspectives, they looked for ways to deal with such differences. They questioned and thought about their own learning. The performance of each group was found to vary. Some variables affecting such performance were salient. The researcher and his collaborators came to the conclusion that the groups that performed well were those that were successful in their
collaboration. In addition, this study revealed that the groups that performed well were also those that were well supported.

CT in language learning is important because learning English, or any kind of learning for that matter, should enable learners to be free from imposed sets of beliefs, not just for immediate utilitarian purposes. Certainly, CMCL is a viable means to enrich the experience of the learners, a viable platform to promote their communicative use of the language, and their CT in language learning. This study suggested that the field of TESOL embraced CT elements when it directed its main emphasis towards communication.

The CMCL environment of the Bamboo Enterprise was found to have considerable potential in promoting communicative use of English and CT in language learning. On top of that, despite difficulties, it also has the potential to be a means for professional development of teachers through classroom research, as was discussed in Chapter 6. This CMCL also has the potential to be a basis for teachers and students to put CT into action. As one of the student websites put it, “Do Something about It, protect the environment”. Lastly, from a broader viewpoint, and from an ecological approach to language learning and teaching, CMCL has the potential to be a possible theme in education.

We (the researcher and collaborators) jointly concluded that learner collaboration was the key to success. As we noted: the groups that did well were those that worked well together. We observed that those students who worked alongside each other did better than those that divided the tasks, did the research independently, and came back to assemble their work at the last stage only. Groups that faced cooperation problems did not produce satisfactory projects. We also noted the significance of scaffolding, especially at the task level. Finally, we noted the importance of the task itself, with its theme of the environment, which prompted students to think
critically about environmental issues and their own language learning. These three factors appear to be essential to success in this version of CMCL.

In conclusion it may be said that this preliminary investigation has demonstrated that this CMCL learning environment has the potential to promote CT in language learning.
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APPENDICES
APPENDIX A: Self-evaluation Questionnaires

1. Attitudes towards Studying English

How do you like studying English? You can check your own attitudes by answering the following questionnaire. Consider each statement carefully. If you strongly agree with the statement, circle the number in column A. If you agree, circle the number in column B. If you are undecided, circle the number in the middle column or C. If you disagree, circle the number in column D, and if you strongly disagree circle the number in column E. Then add all the circled numbers together to obtain your score.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Undecided</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>I feel happy when I study English.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>English is boring.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I feel uneasy when I speak English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I am confused when I study English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Evaluation

<table>
<thead>
<tr>
<th>Score</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 - 20</td>
<td>You have positive attitudes towards studying English.</td>
</tr>
<tr>
<td>11 - 15</td>
<td>Your attitudes towards studying English are somewhere between positive and negative.</td>
</tr>
<tr>
<td>4 - 10</td>
<td>You have negative attitudes towards studying English.</td>
</tr>
</tbody>
</table>
2. Perceived English Ability

How do you perceive your overall English ability? You know yourself best. By answering the self-administered questionnaire below you can check your perception of your English ability.

The following table is a list of 27 statements relating to your own perception of your English ability. Consider each statement carefully. If the statement is very unlike you, circle the number in column (A). If the statement is very like you, circle the number in column (C). If you think your English ability is somewhere in between, circle the number in the middle column (B). Then, add all the circled numbers together to obtain your score.

<table>
<thead>
<tr>
<th>No.</th>
<th>Statements</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I can speak English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>I feel proud of my English ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>I enjoy searching for more information from English textbooks.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>When I study other subjects, I can also answer the questions in English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>In my English class, I can easily understand the teacher’s explanation in English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>I can answer most of the questions when I do my English homework.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>My English score is higher than my scores in other subjects.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8.</td>
<td>I can translate English into my own language, and convey the original meaning to my friend that way.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9.</td>
<td>I can read English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>I think learning English is fun.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11.</td>
<td>I can summarize the main points of my English lessons.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12.</td>
<td>I am confident when I study English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13.</td>
<td>I can quickly and correctly finish my English homework.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>No.</td>
<td>Statements</td>
<td>A Very Unlike Me</td>
<td>B</td>
<td>C Like Me</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------</td>
<td>---</td>
<td>---------</td>
</tr>
<tr>
<td>14.</td>
<td>I feel that I am not suited to learning English.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>I do not do well in English at all.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>16.</td>
<td>I do not like studying English.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>17.</td>
<td>I cannot do English homework by myself.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>18.</td>
<td>I do not understand the meanings of the English words when I study English in the classroom.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>19.</td>
<td>I do not enjoy studying English.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>20.</td>
<td>I feel that studying English is boring.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>21.</td>
<td>I lack confidence when I answer questions in English.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>22.</td>
<td>My English score is often lower than the average score.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>23.</td>
<td>I always think that I cannot compete with my classmates in English.</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>24.</td>
<td>I do well in English because I pay attention to the lessons.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25.</td>
<td>I have been successful in my learning of English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>26.</td>
<td>I think English is not too difficult to learn.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>27.</td>
<td>I can answer foreigners’ questions in English.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Score</td>
<td>Rating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75 – 81</td>
<td>You are very positive! You perceive yourself as having a very high level of English ability.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63 – 74</td>
<td>You are positive. You perceive yourself as having a high level of English ability.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-62</td>
<td>You perceive yourself as having an average level of English ability.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-50</td>
<td>Maybe you are negative about yourself and your abilities. You perceive yourself as having a below-average level of English ability.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27- 38</td>
<td>You are possibly too negative about yourself and your abilities.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B: Questions for Semi-structured Interviews

1. Questions for the teachers and volunteers.

In your opinion:

- How did learners form their groups/projects?
- How were decisions made, who decided what?
- How did learners spend their time?
- What happened when learner participants did not understand something?
- What were the main characteristics of the support provided?
- Was the support adequate?
- Tell me two adjectives describing the way you felt about the community.

2. Questions for the student participants.

- 1. How was your group formed? Why did you join that particular group?
- 2. How were decisions made in your group? Who decided what?
- 3. What did you think about the support available in the community?
- 4. To what extent did other community members listen to, and understand your ideas?
- 5. What were some of the main technical problems you encountered? How did you solve the problems?
- 6. To what extent were you satisfied with the performance of your group? The overall performance of the community?
- 7. Approximately how much time did you spend on the research project (hours per week)?
- 8. What did you do when you did not understand something?
- 9. Give two adjectives that describe the way you felt about the community.
APPENDIX C: Informed Consent Form for Participants

Doctoral Research Project

Enhancing Critical Thinking in Language Learning through Computer-Mediated Collaborative Learning: A Preliminary Investigation

INFORMED CONSENT FORM

I ……………………………………………………………………. (the participant),
(p participant’s name)
declare that I:

▪ Volunteer to participate in the study;
▪ Am aware of the purposes of the study;
▪ Understand that I am free to withdraw from the study at any time;
▪ Am aware that all information relating to my participation in the study will be treated ‘in confidence’;
▪ Agree to information collected about me being used in the study, and published;
▪ Wish to remain anonymous in the study’s report of findings.

Signature: ……………………………………………………… Date: …………………

Name: ………………………………………………………………………

Address: ……………………………………………………………………
……………………………………………………………………
……………………………………………………………………

Telephone number:
……………………………………………………………………

Email: ………………………………………………………………………
Appendix D omitted due to privacy legislation.