



Developing English as a Foreign Language students' critical
thinking during the process of collaborative writing

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Abstract

Based on a premise that critical thinking (CT) can be taught and assessed (Mason, 2008; Mehta and Al-Mahrooqi, 2015), this study examined the Critical Thinking (CT) application of English as Foreign Language (EFL) students. It focused, in particular, on the impact of mutual interaction with CT instruction during Collaborative Writing (CW) activities.

In order to promote EFL university students' understanding and application of CT, a collaborative learning environment and explicit teaching of CT were encouraged in EFL classes (Todd and Hudson, 2007; Jones, 2008; Lin, 2014). Within the CT instruction environment, this study integrated CW practices with CT pedagogy to encourage negotiation and collaborative interaction and to stimulate EFL students' CT (Lowry et al., 2004; Storch, 2013; Storch, 2016).

An eight-week CW intervention integrated with CT instruction was conducted for 24 EFL students in a Chinese university. Here, a mixed methods approach was employed, including pre- and post- tests of student argumentative writing and CT, classroom observation of peer interaction and CT application, and semi-structured interviews to investigate participant attitudes to CW and CT. In addition to examining writing and CT test outcomes after the intervention, this study observed interactions to explore participants' CT development during the CW process. In this regard, the dyadic interaction patterns proposed by Storch (2002; 2013) and the taxonomy of language functions adapted from Li and Kim (2016) were used to establish a comprehensive analytical framework.

The findings demonstrated that participants gradually developed a collaborative interaction pattern with high levels of mutuality and equality in task contribution. Through this, they produced more CT-related language functions, such as arguing and justifying, at the end of the eight-week intervention. Results from pre- and post- tests and participant interview responses also suggested that embedding CT into the CW process could improve participants' CT. As such, these findings contribute to an understanding of EFL student CT and learning processes within EFL teaching, and it can help to inform the design of EFL classes.

Declaration

I hereby certify that this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also certify that it has not been previously or currently submitted for any other degree at the University of Newcastle or any other university. I confirm that this submission is in accordance with University and School guidance on good academic conduct within the prescribed range of word length.

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List of Abbreviations

CT	Critical Thinking
CW	Collaborative Writing
EFL	English as foreign Language
ESL	English as Second Language
FL	Foreign Language
LREs	Language-Related Episodes
L1	First Language
L2	Second Language
TREs	Thinking-Related Episodes

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Chapter 1: Introduction

This thesis has investigated critical thinking (CT) in Chinese undergraduate EFL university students. To set the scene for the research, this chapter provides background information including an overview of the language policies and language learning environment at the university (in Section 1.1), and a statement of problem (in Section 1.2). This overview presents the context and identifies current educational concerns in China in this discipline area, and discusses and justifies the scope, research aims, and significance of this study. The chapter ends with an outline of the structure of the thesis.

Whether critical thinking (CT) can be defined, taught and assessed is a controversial issue among many researchers (Davidson and Dunham, 1997; Simpson and Courtney, 2002; Kuek, 2010). The stance of this study is that CT is definable, teachable and assessable in different contexts (Mason, 2008; Mehta and Al-Mahrooqi, 2015). Teaching CT or thinking skills in foreign language (FL) contexts is complex, but its importance has been emphasised in research recent decades (Floyd, 2011; Marin and Pava, 2017). Research emphasises that it is necessary to teach CT skills to students who study English as a foreign language (EFL) because thinking skills are essential for achievement in further education, at work and in social life (Stapleton, 2001; Lizarraga et al., 2010; Hu, 2017). Among the many definitions of CT, it has been described as a process of:

“actively and skilfully conceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.” -Binker, 1992, p84

The working definition of CT for this study is presented later in chapter 2 (see Section 2.1.1, p 20). Here learning CT and thinking skills help EFL students to acquire the new language more efficiently at different levels of language learning (e.g. in schools or universities). This is because they can select and analyse new information more effectively with CT, resulting in improved problem solving and language learning. Therefore, the promotion of thinking skills, especially CT, has also become a key issue for EFL teachers in some Asian countries, such as Malaysia (Fariza et al., 2015), South Korea (DeWaelshche, 2015), Iran (Shahini and Nouri, 2018), as well as China (Wang and Seepho, 2017). In particular, research in China illustrates that undergraduates showed relatively low levels of performance on CT, especially in writing (Gao,

2012; You, 2004; Heng, 2018). In order to promote EFL university students' understanding and application of CT, Todd and Hudson (2007) suggest that a collaborative learning environment is necessary, whilst Jones (2008) and Lin (2014) support the explicit teaching of CT in EFL classes. Accordingly, this study adopted a collaborative writing (CW) strategy. CW is a collaborative learning strategy that can encourage peer interaction and provide instant feedback during the writing process that is used widely and successfully in EFL/ESL contexts (Storch, 2016).

In this study, a CW intervention integrated with CT instruction has been designed and delivered to EFL first-year undergraduate students from one Chinese university. During the intervention, the students co-authored texts that were integrated with CT instruction to promote their CT. During the eight-week intervention, the study investigated the possibilities for promoting CT through integrating explicit CT instruction with CW practice in EFL classrooms, adopting sociocultural principles as the theoretical foundation. In the following section, the history, policy and practice of teaching English in China are reviewed.

1.1 A Brief Review of English Education in China

1.1.1 English education policy

Since the 1980s, the teaching and learning of English has become important and prevalent for higher education in China (Chen, 2011). English has been added as one of the major tests in the Chinese National University Entrance Exam in 1980 and is regarded as one of the most important exams to gain access to university study (ibid). Most Provinces in China apply the '3+X' test form for the National University Entrance Exam. This model confers 150 points each for Chinese, Maths and English, whilst 'X' apportions 300 points for discipline-based subjects (politics, history and geography for arts students; and physics, chemistry and biology for science students) (Zhang, 2012). The English test is one of the three major tests in the entrance examination, and is compulsory for both arts and science students, thereby illustrating the importance of English education in China. Moreover, although there have been a series of reforms to education and exam structures in recent years, the English examination continues to be of utmost importance within the education system and it remains compulsory for Chinese students to learn the language and pass different levels of English proficiency.

As part of the Tenth National Plan (2001-2005), the Chinese Ministry of Education (MoE) has published the National English Language Teaching Guidance to direct teachers and students in the teaching and learning English (MoE; 2001). This Guidance can be regarded as a milestone for English language education at all levels in China and includes both overall and specific instructions in English language education. It also demonstrates the importance given to English by the Chinese Government in comparison to other global languages such as Spanish or French. The document describes how EFL learning is a fundamental tool for students in learning science and world culture, and for the strengthening of international communication and cooperation – a policy that is central to the government drive for the global expansion of the Chinese economy, industry and society. In recognising this importance, new concepts such as critical and creative thinking, and individual learning competence were introduced, based on models from western countries. According to the National English Language Teaching Guidance, students should achieve the skills in independent thinking to obtain knowledge, apply knowledge, analyse problems, form arguments, and think creatively (MoE; 2001). This approach clearly supports the view that EFL teaching in China should not only involve applying English to real-life situations, but also promote the skills of exploration, negotiation, communication, and collaboration (Li, 2011). Such skills require the development of CT.

Within the Guidance document lay a prescribed temporal approach to language learning with students required to attend an English language course from the third year of primary school (8 to 10 years old). This policy has created a situation in which the predominance of English as ‘the’ second language in Chinese schooling has also been conveyed to higher education (Yuan, 2006; Chen, 2011). Following university entry, students are still required to attend English language classes and must participate in the College English Test (e.g. CET4 or CET6) or Test for English Majors (e.g. TEM4 or TEM8).

Concurrent with the introduction of the National English Language Teaching Guidance, the government has created and funded a series of programmes to support the teaching of English within higher education. These included an English Language Teacher Training Programme (TTP), which is completed by a great many teachers from primary schools to high schools across the nation; the production of curriculum reform-oriented National English Language Textbooks;

and the creation of the National English Language Curriculum Standard. With these supportive programmes, the quality of English language teaching is improved, and students are required to reach certain English levels at different stages of public schooling, from primary schools to universities. The curriculum standard has gradually replaced other policies used to guide English teachers, such as the Compulsory Education English Curriculum Standard (MoE; 2011; 2017) and the General High School English Curriculum Standard (MoE; 2003; 2017) and, according to the latest standards, students' thinking skills have been further emphasised. For example, the High School English Curriculum Standard (MoE; 2017) claims that "Language is a tool for both communication and thinking. Therefore, the process of learning and using language is closely related to the development of thinking ability" (MoE; 2017, p.4). As a result, EFL students are required to develop their CT when they are learning English in both schools and universities.

Therefore, in order to teach and learn English more efficiently, CT and other useful skills and strategies have been clearly emphasised. The term '21st Century skills' has been introduced and promoted widely in the education domain since the opening to the outside and reform in China in 2001 (You, 2004). These skills, such as CT, creativity, collaboration, leadership, and social and cross-cultural skills, are essential for all students across the world (Marin and Pava, 2017). Indeed, EFL teaching and learning has become an important arena for the development of these skills. For example, according to the requirements of the Chinese New National Curriculum the aim of College English in China is "to develop students' ability to use English in a well-rounded way", and to "enhance their ability to study independently and improve their general cultural awareness so as to meet the needs of China's social development and international exchanges." (College English Curriculum Requirements; CECR, 2007, p.1). Therefore, in addition to teaching language knowledge and skills, teachers also have the responsibility to promote learning strategies, CT skills, and cross-cultural communication skills (Yang, 2017).

As has been illustrated, Government drivers have created a situation whereby English is now the prominent foreign language for Chinese students. Backed by policy, guidance and support mechanisms, students are expected to become better language learners with well-developed 21st Century skills, especially thinking skills. CT is fundamental to this environment.

1.1.2 English language learning environment

English has become the main FL in all Chinese schools and universities. As such, how English is being taught or how the learning environment is provided to students has become an important concern. In China, the National Entrance Examination is of such importance that it now largely influences the teaching and learning of English in schools. As a consequence, most Chinese high schools focus more, if not entirely, on helping students pass various English tests, but less on improving students' real knowledge and proficiency (Liu, 2004; Yang, 2017; Zhang, 2012). As a result, many Chinese EFL students have low CT levels when entering university (Pu and Evans, 2018). This exam-oriented approach also continues in universities, although in recent years, there is evidence that teachers have also focused on the development of students' CT (Yang, 2017). Passing examinations remains the most crucial goal for both EFL teachers and students. English language examinations (e.g. Syllabus of College English Test, College English Test Bands 4 and 6) in Chinese colleges and universities emphasise the vocabulary and grammar aspects of English language (Zhang and Li, 2010) and, as such, English reading and listening skills receive more attention than speaking and writing skills. Accordingly, EFL university students can pass English exams successfully, but many of them actually have poorer English language proficiency compared with their test scores, especially in speaking and writing abilities (Zhang, 2012). This leads to a competency gap, whereby students who pass the exams are unable to use their English effectively in real life situations and the graduate preparedness laudably sought in the National English Language Teaching Guidance is missing.

Another typical teaching feature in general EFL classes in schools and universities in China is the teacher-dominant class. Lecturing is the dominant teaching style used by most Chinese EFL teachers in class (Yang, 2017). The so-called 'traditional grammar-translation method' is used widely, whereby teachers explain detailed word and grammar meanings and uses, while students learn new language knowledge with memorisation and paper exercises (Fang and Warschauer, 2004). Many English language teachers in China believe that this is a correct way to help students pass the English exams, suggesting that students have few opportunities to practice their speaking skills, communication skills, and other 21st Century skills (e.g. CT) within the classes (Yang, 2017). As a result, researchers have found that numerous Chinese students who have passed high level English tests cannot communicate with others in English fluently and confidently (Zhang, 2012). Such insufficient opportunity to practice language learning and

thinking development could be one possible reason for Chinese EFL students' low performance in CT.

In order to promote Chinese EFL students' CT, teacher and student awareness of CT and peer-interaction have been facilitated in EFL classrooms, rather than teacher-dominant teaching formats. Although an exam-oriented and teacher-dominant English teaching and learning approach is common in Chinese schools and universities, the learning environment in China has gradually become more flexible, especially in universities. According to the CECR (2007), universities should "remould the existing unitary teacher-centred pattern of language teaching by introducing computer- and classroom- based teaching models" (p. 6). In other words, a broader range of teaching methods, such as group work, role-play, and computer-mediated learning should be applied in EFL classes in Chinese universities. EFL teachers have gradually paid attention to developing 21st Century skills for students to help career prospects and linked success in the future (Chen, 2017; Hu, 2017). As a result of this interesting trend, EFL university students were deemed an appropriate subject in this study.

1.2 Statement of the Problem

Many Chinese EFL students and teachers within universities have gradually realised the importance of improving 21st Century skills and language proficiency in a comprehensive way rather than in order to simply pass the English language exams. More attention is now paid to developing such skills, especially for EFL students (Zhang and Zhou, 2010; Wang and Seepho, 2017; Zhou, Jiang and Yao, 2015). As such, CT is considered a crucial 21st Century skill, and is emphasised and encouraged in EFL classrooms in both schools and universities (CECR, 2007; MoE; 2001). However, when analysing the English learning environment in China, two obvious challenges emerge in the promotion of CT among Chinese EFL undergraduate students.

The first challenge is concerned with the understanding and acquisition of CT. CT is a challenge for many EFL university students in China. As discussed earlier, Chinese EFL undergraduates have generally shown relatively low performance in aspects of CT, especially in writing (Gao, 2012; Yang, 2017; You, 2004). Various explanations account for this low performance, and an inadequate understanding of Western CT has been identified as one of the key contributing

factors (Yang, 2017). The term ‘CT’ was originally a Western notion that has been widely introduced in China since 2001 (Chen, 2017; Zhang, 2017). It was found that many Chinese EFL university students held misconceptions about CT and thought of it as expressing adverse or disapproving comments (Guo and O’Sullivan, 2012). EFL teachers have also been identified as contributing to a misunderstanding of CT. Some teachers are seen to be unfamiliar with CT and have failed to teach or explain the concept of CT explicitly in classes (Atkinson, 1997). Accordingly, unambiguous explanations and understanding of CT are vital for both EFL teachers and students to achieve their goals in teaching and learning. More detailed discussion is presented later in Chapter 2 (see Section 2.1.2).

Secondly, insufficient opportunity for CT and English language practice in Chinese EFL classrooms is also a problematic issue. The teacher-dominant and exam-oriented educational style in China limits EFL students’ practice opportunities (Yang, 2017). Although the CECR has encouraged EFL teachers to apply more flexible teaching methods in universities, many still adopted lecturing as the main teaching method in class (Gao, 2012). EFL writing classes in particular are influenced by the English writing examination in universities. In English writing, a piece of good academic writing reflects good CT (Paul and Elder, 2007). To produce a good piece of academic writing, therefore, students not only need to write logically but also need to think critically. This should lead to a need for the teachers to reflect on their classroom practice to the extent that they provide opportunities in class to nurture student CT, including questioning, analysis and evaluation (Osana and Seymour, 2004).

However, EFL students in Chinese universities are only required to write one 100-150-word essay in the College English Test, making up 15% of the final grade (College English Test Syllabus, 2011). The writing style includes argumentation, expository writing, and practical writing and students are able to pass this test easily without much practice in CT. Therefore, many EFL writing classes are taught through lecturing and the teaching of writing knowledge to students, which is often treated as homework. This provides a limited opportunity for students to practice their CT skills in class (Yang, 2017). What is more, teacher-dominant classes with harmony-oriented communication styles (i.e. emphasising unity and peaceful relationships with less arguments) have constrained the opportunity for student-student interaction to develop CT skills in class (Guo and O’Sullivan, 2012).

Therefore, a clear understanding about the notion of CT, and a new teaching strategy that provides students with more opportunities to apply CT, are necessary for Chinese EFL university students. This study has applied a relatively new teaching strategy, named collaborative writing (CW) to promote EFL students' CT in China (Storch, 2013).

1.3 The Focus of the Study

This study aimed to investigate whether CW integrated with CT instruction can be effective for EFL students to improve their application of CT in writing class. It focused on EFL students' CT skills rather than their writing skills, as the writing class is applied as a manifestation of participants' CT. After individual pre-tests, 24 Chinese EFL university students were enrolled to attend an eight-week intervention. After that, they were asked to attend post-tests and interviews to explore whether their CT have improved or not after the intervention.

A CW strategy that the study applied was 'tasks' which involved co-authoring of a text by two or more writers (Storch, 2013). Further definitions and understandings of this term will be illustrated in the literature review chapter (see Section 2.2). As some research suggests that CT can be improved through different kinds of collaborations or group work, this study assumed that involving students in CW tasks promotes EFL students' CT through peer interaction during the process of collaboration (Odom et al., 2009; Storch, 2013). Unlike other group work such as peer review, CW provides a non-threatening environment for EFL students to interact with each other and to provide more instant feedback (Storch, 2013). This is one of the first attempts to combine CW with CT within Chinese context, and it applies CW intervention integrated CT instruction as a potentially useful strategy to promote EFL students' CT.

In addition, the study has focused on participants' peer interaction during the eight-week CW process. Few existing studies related to CW, such as Storch (2001) and Tan et al. (2010) have concentrated on the writing process (see Section 2.2). Storch (2002; 2011) is one of the few researchers who has focused on interactions, analysing the Language-Related Episodes (LREs) and summarising a model of interaction patterns during the CW process in EFL/ESL contexts. The idea of LREs and the model of interaction patterns has highlighted the importance of

exploring how EFL students interacted and applied their CT during the process of CW and assessed in this study. The term **TREs** (Thinking-Related Episodes) is also developed by Storch (2013). Here the notion of **LREs** was adapted in order to discover EFL student progress or development of CT during the process of CW interaction (see Section 2.3.3). The language functions captured through the TREs were analysed to explore the use of different thinking skills. A discussion of the adapted taxonomy of language function can be seen in Section 2.3.2. The interaction pattern adapted from Storch (2013) is utilised as part of the analytical toolkit in this study. Thus, the changes of EFL participants' application of CT in terms of interaction performance and language functions during the eight-week CW process have been investigated.

The eight-week intervention was used to explore EFL students' development of CT through the process of face-to-face CW classes in China. It was assumed that embedding CT into English writing class, with an emphasis on interaction, could enhance learning outcomes. This also suggested that the development of language functions can reflect the development of CT. By combining the analysis of interaction patterns and different language functions, this study has developed an analytical framework based on sociocultural theory, attempting to identify changes in students' CT during the collaborative process. Moreover, participants' pre- and post-test results and their responses in the interviews were compared and analysed to triangulate the findings from the CW process. The specific theoretical framework and research design for the study were set out in the literature review chapter and methodology chapter respectively.

1.4 Research Aims, Objectives, and Questions

This chapter discusses why it is considered necessary for Chinese EFL students to develop CT. Misunderstandings regarding what CT involves and the limitations of traditional teaching methods and the Chinese EFL learning environment in applying and developing CT are suggested as significant inhibitors of language proficiency and CT development in EFL students. Therefore, this study applied a CW strategy, which was relatively new for Chinese EFL students, with CT instruction to promote CT application. This intervention was conducted as an eight-week thinking and writing course with 24 EFL students. The study investigated the following research questions:

Main Research Question:

Can CW facilitate Chinese EFL university students' CT in class?

The study investigated whether EFL students' CT have been facilitated by their involvement in the CW tasks over a prolonged study period. In order to strengthen the reliability and validity of the results, findings from researcher observation and tests and participant perspectives were collected and compared. Two sub-questions were also designed to address changes in EFL students' CT and their perceptions of any impact of CW on their CT skills.

Question (1): Are there any changes in students' CT during the eight-week collaborative writing interaction?

The comparisons between pre- and post-tests were firstly analysed to provide a general understanding of participants' CT performance. EFL participating students' performance was observed and monitored during the eight-week CW process. The changes or application in participants' CT were monitored by analysing interaction patterns and language functions produced during the CW process. The interaction patterns and language functions captured through the TREs produced by participants during the interaction process reflected the use of CT skills. Therefore, participants' CT application before and after the eight-week intervention were examined and compared.

Question (2): What are students' perceptions of any impact of CW on CT?

This sub-question aimed to investigate whether participants perceived that peer interaction in the CW process has improved their CT after the eight-week intervention. It also explored participants' interaction with partners during the collaborative process, and whether they successfully completed the CW tasks. Participant understanding of CT, and their attitude towards CT in writing were also investigated.

In order to explore these questions, the researcher analysed the pre- and post-tests results, the dynamics of student interactions during the writing process, the language functions of student conversation, and participant responses to interviews. These data illuminated the key issues of CW facilitation of EFL undergraduate student CT.

1.5 Significance of the Study

As discussed above, CT has become a key issue for EFL teaching and learning in higher education (Marin and Pava, 2017; Moore, 2004). In China, according to the Ministry of Education and the deemed requirements of the curriculum, CT is one of the important skills that students should develop to enable them to become better learners, to achieve academic success, and skills for future work and life (Li, 2011).

Collaboration and group work are useful methods in promoting CT, especially in writing classes. A CW strategy provides students with greater opportunities to use their CT to provide more instant feedback to each other (Storch, 2013). This study has assumed that students have applied their CT to interact and co-author the text, and to provide instant group feedback. As a result, CT can be seen to improve with sufficient practice. Importantly, previous studies related to CW in EFL contexts, have focused on language aspects. Most of these studies conducted two or three tasks, and concentrated more on CW products (McDonough, De Vleeschauwer, and Crawford, 2018; Storch, 1999; Williams, 2003). There have been no previous longitudinal studies that have investigated the development of CT during the CW process. Besides, more recent studies about CW have tended to involve Wiki or computer-based settings (Elola and Oskoz 2012; Li and Kim, 2016; Kost, 2011). These studies focused on language learning and writing aspects, but the effect of CW on CT was omitted. It is suggested (Paul & Elder, 2007) that the produced writing is indicative of what participants think, and changes in their thinking influence their writing, suggesting that it is meaningful to explore the reciprocal development of CT and CW. Therefore, this study is one of the first attempts to explore EFL students' application of CT during the process of face-to-face CW in an eight-week intervention within Chinese context.

In order to explore the process of CW, a relatively comprehensive analytical framework is established in this study. It combines the dyadic interaction patterns proposed by Storch (2002, 2013) and the taxonomy of language functions adapted from Li and Kim (2016). This framework contributes to the discovery and analysis of student CT applications and changes during collaborative activities. It can provide a framework for the strategic development of approaches to promote CT in EFL learning environments. In doing so, the study also enhances the

understanding for English educators in the support and development of Chinese EFL students in interaction and writing tasks during collaborative activities.

1.6 Structure of the Thesis

The remaining chapters of this study are organised as follows:

Chapter Two: Literature review. This chapter critically reviews key issues related to CT and CW in the EFL/ESL context. It contains an overview of CT and CW concepts and the links between them in EFL practices. The theoretical framework for the study is also discussed to highlight how this study is theory-based. The chapter then introduces a model of interaction patterns that can be utilised in analysing peer interactions during the collaborative process.

Chapter Three: Methodology. This chapter describes the aims and research questions. It provides the rationale for the research design and the implementation of the eight-week intervention, named the Thinking in Writing Training Course. Data collection and data analysis procedures are presented in detail and the reliability, validity, originality, and limitations of this study are also discussed.

Chapter Four: Findings. This chapter discusses the research findings. These are organised by research questions in terms of three main aspects: tests results, class observations, and interview responses. It presents both quantitative and qualitative findings and analysis. The quantitative data emerges from pre- and post-tests and writing scores and the qualitative data is developed from class observations. Both approaches are used to offer analysis to answer the first sub-question in this study, whilst data collected from semi-structured interviews is used to explore the second sub-question.

Chapter Five: Discussion. This chapter summarises the findings in order to answer the research questions. It then discusses the key findings discovered from this study to provide some suggested pedagogical implications for EFL teachers and researchers.

Chapter Six: Conclusion. This chapter provides a summary conclusion to the thesis, highlighting the implications, contributions, limitations and recommendations of the study for future research.

Chapter 2. Literature Review

Introduction

To inform the investigation of critical thinking (CT) in Chinese undergraduate EFL university students in this study, this chapter provides a critical review of relevant literature. It explores definitions of CT and CW in higher education and establishes a working definition of CT that is used in this thesis. It offers a rationale for the sociocultural theoretical framework adopted to promote CT through this intervention study, involving collaborative interaction integrated with CT instruction in EFL classes. The chapter also provides a rationale for the analytical tool adopted to analyse student interactions in this study.

The following sections are organised accordingly: Section 2.1 reviews the definitions and conceptions of CT in higher education, and then presents a literature review on possible teaching approaches to enhance CT from different interventional studies. Section 2.2 explains why a CW approach was selected, subsequently discussing the main features of CW identified in the literature. This informs the design and practice of CW activities to enhance students' application CT during the CW process. Sociocultural theory was adopted for this study and is explained in Section 2.3, followed by a discussion of different models of language functions in Section 2.3.2, in order to aid in the analysis of the interaction and thinking development in this study. Finally, Section 2.3.3 introduces the model of dyadic interaction. This model is a significant tool for analysing peer interactions during the collaborative process in this study.

2.1 Thinking Skills and Critical Thinking (CT)

This study posits that thinking skills or CT is definable, teachable and assessable and addresses a gap in the research by exploring the potential to enhance CT through CW activities. Thinking skills, which refer to specific skills or techniques that involve mental processes, such as analysing and evaluating, has become a key concept for EFL teaching and learning (Kuek, 2010). Many educators argue that the development of the thinking skills of students are vital to success in their studies, and especially at a university level (Floyd, 2011; Moore, 2004; Shahini and Nouri, 2018). Some English teaching syllabuses in Asia have included the concept of thinking skills as an important element in higher education since the beginning of the 21st Century (Zhou et al., 2015). Different thinking-related terms, such as 'CT' (Ennis, 1962, 1987,

1992, 2011; Facione, 1990; Norris, 1992; Hager and Holland, 2006; Moore, 2011; Robinson, 2011); ‘higher order thinking’ (Bloom, 1956; Krathwohl, 2002; Leighton, 2011); ‘creative thinking’ (Florida, 2004; Beghetto, 2006, 2013; Jones, 2013; Kim, 2011) and ‘cognitive skills’ (Flavell, 1979; Cornoldi, 1998; Larkin, 2006; Esken, 2012), have been used according to different teaching objectives. Despite differing nomenclature, whichever thinking term or method of teaching is adopted, the ultimate goal of research is to illustrate the most appropriate approach to improve the quality of students’ comprehensive thinking (Wegerif et al., 2015). While the generic term ‘thinking skills’ may be used to describe the range of skills deemed essential to successful thinking, this study focuses on the development of higher order thinking skills, and CT in particular. This is because such skills are the particular focus of research into successful learning at university level.

Moreover, this study focuses on CT because the term CT is representative of thinking skills in China, and the concept of CT has become an important competence in Chinese higher education curriculum, as discussed in Chapter 1 (see Section 1.1.1). However, many Chinese students and even teachers have misinterpreted CT as criticising others’ point of view due to the interpretation of the term in Chinese language (a more detailed explanation follows in Section 2.1.2). As a result, this misinterpretation or misunderstanding of CT affects EFL students’ CT application in higher education. The following section, therefore, reviews the literature on definitions of CT, leading to the establishment of the working definition of CT for this study.

2.1.1 Definitions of CT

In higher education, the concept of CT has been the focus of research for many decades, and CT is defined from different perspectives for different purposes. For example, John Dewey, an American philosopher, educator and psychologist, proposed one of the earliest definitions for CT (Fisher, 2001). Dewey described CT as: “an active, persistent and careful consideration of a belief or supposed form of knowledge in the light of the grounds which support it and the further conclusions to which it tends.” (Dewey; 1933, p. 9). He emphasised the importance of reflective thinking as an educational objective, and conceptualised thinking skills as useful to the production of a sound judgement or solution for complex issues. His conception of CT resonates with the objectives of contemporary education and provides an idea of how thinkers evaluate received information and then accept them as knowledge (Nejmaoui, 2019). Subsequently, many

other researchers have also attempted to define CT under different contexts. After reviewing the literature, it is found that there is no agreed-upon definition of CT. Scholars have since attempted to define CT from different disciplinary perspectives: philosophical, psychological (cognitive) and educational perspectives (Lin, 2014). Some definitions are general, whilst others are reductionist, based on the context of interpretation and the level of knowledge and understanding (Atkinson, 1997; Davidson, 1998).

From an early philosophical perspective, CT is regarded as a fundamental component in philosophy and education. Lipman (1988) defined CT as "skilful, responsible thinking that facilitates good judgment because it relies upon criteria, is self-correcting, and is sensitive to context" (p. 39). Paul (1992), in contrast, described CT as "disciplined, self-directed thinking" and a "purposeful type of thinking" that can be applied in a systematic way to situations (p. 9). These philosophical perspectives focus on what thinkers are capable of doing under appropriate circumstances (Lewis and Smith, 1993). As such, a limitation of their definitions is that the concept of CT is aligned to qualities rather than actual behaviours (Thayer-Bacon, 2000). This represents an idealised view of the critical thinker that may not correspond with the reality (Fahim and Mirzaii, 2014; Lai, 2011). Accordingly, such definitions can be difficult to apply in pedagogical activities or interventions, such as in the CW integrated CT intervention designed for this study.

In contrast to philosophical perspective that focusing on the qualities of successful thinkers, researchers adopting a cognitive psychological perspective of CT place greater emphasis on how people actually think in educational activities (Lai, 2011). CT is defined by the types of behaviours in which critical thinkers engage and involves a range of thinking skills or procedures (Lewis and Smith, 1993). Sternberg (1986), for example, suggests that CT can be regarded as "the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts" (p. 3), whilst Burden and Byrd (1994) define CT as higher order thinking that contains a set of cognitive skills. Meanwhile, Halpern (1998) has conceptualised CT as using "cognitive skills or strategies that increase the probability of a desirable outcome" (p. 450). Such cognitive psychological perspectives of CT have, however, been criticised as reductionist by researchers who adopt philosophical perspective. Facione (1990) and Bailin (2002), for example, have argued that it is a fundamental misconception to

define CT as merely a set of skills or steps in terms of what is directly observable. CT should be understood as more than the sum of its skills (Van Gelder, 2005).

An educational perspective on CT has developed among educators seeking to develop teaching interventions to assess and develop students' thinking skills in higher education (Fisher, 2005; Lai, 2011). CT has become a vital skill in higher education and many syllabuses added CT as a desired teaching objective within many Asian countries (Du, 2012) and in European higher education (Hoskins and Deacon Crick, 2010). In China, for example, CT is regarded as one of the essential skills that benefits students' success in college and in future life (Peng, Tan and Xie, 2014). Nevertheless, there is the lack of consensus on the definition of CT to guide teaching practices. Most definitions of CT emphasise student awareness of multiple viewpoints and self-evaluation of their thinking processes (Haix and Reybould, 2005). Ennis, for example, defined CT as "reasonable reflective thinking focused on deciding what to believe or do" (1996, p. 166), providing 12 thinking skills such as to analyse arguments, identify unstated assumptions, make and judge value judgements etc (1991). Similarly, Linn (2000) conceptualised CT as a set of skills such as identifying sources of information, analysing its credibility, and drawing conclusions based on critical judgments. Educators tend to be more specific in categorising different CT skills to guide teaching practices.

As discussed above, the three perspectives of defining CT are distinct but also overlap with each other. A number of similar cognitive skills or thinking dispositions involved in CT are defined by scholars from philosophical, psychological and educational approaches. For example, analysing arguments (Ennis, 1991; Halpern, 1998), evaluating arguments (Facione, 1990; Case, 2005), and making inferences or deductions through reasoning (Paul, 1992; Willingham, 2007).

Accordingly, this study accepted that CT incorporates a set of thinking skills. The idea that CT involves particular skills has been applied to the measurement of levels of CT in higher education, as evidenced in established CT assessment tests, such as the California Critical Thinking Skills Test (Facione, 1990) and the Watson-Glaser Critical Thinking Appraisal (Watson and Glaser, 2012). Methods used to define and then measure students' specific CT skills have been developed (Kuek, 2010), which may be helpful for other researchers seeking to demonstrate that student CT skills can be improved in higher education. Watson and Glaser's (1980) Critical Thinking Appraisal incorporates three important elements of CT: attitude,

knowledge and skills of thinking. Here attitude involves being considered and thoughtful when making decisions or solving problems; knowledge refers to methods of logical enquiry; and skills refers to the ability to apply attitudes and knowledge. With the gradual development of their model for appraising CT, Watson and Glaser (2012) further identified five important CT categories of CT to enable teachers and students to decide what aspects of CT to teach or learn (Kuek, 2010): inferencing, recognition of assumptions, making deductions, interpreting, and evaluating arguments (see discussion in Section 2.1.5 and Section 3.3.3). The current study applied this particular revised CT appraisal in order to measure how students' CT was applied during the intervention.

In addition to specific thinking skills or dispositions, other researchers have drawn connections between CT and other 21st century skills such as metacognition. Metacognition has been defined as:

awareness of one's own thinking, awareness of the content of one's conceptions, an active monitoring of one's cognitive processes, an attempt to regulate one's cognitive processes in relationship to further learning, and an application of a set of heuristics as an effective device for helping people organise their methods of attack on problems in general.

(Hennessey, 1999, p3)

Metacognition can be regarded as thinking about thinking or "the monitoring and control of thought" (Martinez, 2006, p. 696). As such, metacognition has a close relationship with CT (Kuhn; 1999), and it can be regarded as one of the subskills of CT (Van Gelder, 2005; Willingham, 2007), involving strategic knowledge or selection of the right strategies and skills at the right time (Schraw et al., 2006). Others have defined the connection between CT and metacognition as self-regulation. For instance, Facione (1990) and Schraw et al. (2006) include metacognition as an element of the self-regulation of CT. Accordingly, metacognition can be considered a supporting condition for CT, which can be used to help an individual to monitor the quality of their thinking. In this study, CW activities and CT instructions were designed to encourage students to apply CT with awareness during CW process. In addition, the interviews after the CW and CT intervention required students to reflect on their thoughts during these activities, in an effort to enhance students' metacognitive awareness. In the last two decades,

both CT and metacognition have come to be regarded as important skills for Chinese students in higher education (Du, 2012). The application of these skills can help students become better learners. The application of CT in this study, for example, might help students to improve their writing, while the metacognitive awareness from the interaction or communication during the collaboration and interview might enhance their understanding of the CT that informed the writing process.

CT is significant in the context of writing, particularly in argumentative writing. It is necessary to provide a rationale for the application of CT in argumentative writing, as this study conducted a CW intervention that applied CT to argumentative writing tasks in class. According to Schafermen (1991), applying CT in writing tasks enables students to “organize their thoughts, contemplate their topic, evaluate their data in a logical fashion, and present their conclusions in a persuasive manner” (p. 7). Good writing incorporates CT to enable the writer to understand key information, distinguish main arguments, analyse or evaluate relevant reasons, and make a conclusion based on discussion (Daud, 2012). CT is regarded as “analytical or argumentative thinking ... and a logical, hierarchical structure” (Bean 2001, p 17) in argumentative writing.

The review of existing definitions of CT and the overview of the conceptual framework within which the various definitions are located, offers the opportunity to establish a working definition of CT for this study which will assist Chinese undergraduate students and teachers to understand and embrace CT in higher education. As evidenced above, many definitions of CT include different thinking or cognitive attitudes and skills. While there is no generally agreed upon definition of CT, some researchers agree that ‘abilities/skills’ and ‘dispositions’ are related elements of CT (Hager et al., 2003; Giancarlo et al., 2004).

Accordingly, the definition adopted in this study is, the application of an attitudinal perspective and a cognitive skills perspective in which students demonstrate reflective and open-minded attitudes, enabling them to solve problems and make decisions. This involves the skills of understanding or interpreting information, reasoning, inferring and deducing, analysing, critiquing and evaluating. The thinking, problem solving, and decision-making processes were analysed through observation and assessment during the collaborative writing process. This

definition guided the teaching and learning of CT during the intervention in this study. After defining the notion of CT, the following sections will discuss the Chinese undergraduate students and their CT application.

2.1.2 The Chinese undergraduate students and CT

As discussed in Chapter 1, Chinese EFL education has gradually paid greater attention to developing the skills required for independent learning within a 21st century EFL context. The idea of promoting independent learning, or similar terms such as autonomous learning and self-directed learning, is currently regarded as significant (Wang and Seepho, 2017; CMoE, 2010). As the expansion of knowledge accelerates, teachers and educators need to support students in becoming life-long learners who can think and learn independently (Wenden, 1991). Higher education, in particular, is not only concerned with teaching various aspects of professional knowledge, but also with cultivating the independent learning capacity of students, enabling them to become life-long independent learners. Here, for instance, Guidelines on College English Teaching concentrates on students' independent learning and personalised learning strategies (CMoE, 2016).

Critical thinking (CT) and metacognition, as two important 21st Century skills, assist students to become independent learners. As discussed in Section 2.1.1, the relationship between CT and metacognition is complex. For example, Halpern (1998) believes critical thinking is a product of metacognition, while Martinez (2006) claims that critical thinking is a type of metacognition. In general, metacognition is seen as a condition for CT (Magno, 2010), indicating that CT necessarily involves a certain amount of metacognition such as reflective thinking or self-regulation. Therefore, the development of CT can be seen as the development of metacognition, providing students with the ability to enhance their independent learning skills. As such, both CT and metacognition are important attributes in times of rapid social change, where independent learners are required to possess decision-making skills, including the ability to analyse problems, reflect on work and take purposeful actions independently and successfully (Kopzhassarova et al., 2016). Independent learning, in other words, involves student development of CT and awareness of thinking. To promote CT is to promote the student's awareness of thinking (i.e. metacognition) and then develop their capacity for independent learning, as both CT and independent learning aim to enhance students' ability to analyse and problem-solve. Cheng's

(2019) research concluded that students became more independent language learners if they frequently used learning strategies including cognitive and metacognitive strategies. Therefore, the development of CT, which involves both cognitive and metacognitive skills in the current study, is beneficial to independent learning among Chinese EFL students.

A number of researchers have confirmed that many Chinese EFL students' ability to learn independently requires further development. It is necessary to promote students' metacognition and CT in order to promote students' ability to learn independently. The capacity of Chinese EFL students to undertake independent learning remains weak, even though English teachers have adopted various teaching approaches such as task-based and project-based learning in class for a number of years (Gu, 2013). Some researchers (e.g. Liu, 2012; Miu, 2017; Yao & Li, 2017) found that Chinese undergraduate students were not fully prepared for independent learning. Liu (2012), for example, explored 280 EFL undergraduate students' readiness for independent learning. Questionnaire and interview findings suggested that students performed poorly in independent learning practice although they had positive attitudes towards independent learning. Their ability of independent learning needed appropriate support or assistant from teachers or more capable students. Yao and Li's (2017) findings further revealed that many students lacking self-discipline, and less than half of students in their study reported the use of metacognitive strategies in their learning practice. Therefore, it is necessary to promote independent learning among EFL students in China by integrating CT training and developing learning strategies and guidance in class. Explicit CT instructions and CT involved CW activities in the current study are one such way of addressing this issue.

Although independent learning requires students to take charge of their own learning, it does not mean that it is opposite to dependence. Independent learning also requires collaborations between teacher and students or among students (Cheng et al, 2018). Vygotsky (1978) believed that independent learning can be developed through collaborative activities with more capable peers. Little (1994) argued that all learning, which also include independent learning, came from social interaction. Benson (2001) found emphasising the significance of collaboration and social interaction can promote learner independence. Cui (2017) indicated that independent learning can be sociable and responsive, involving collaboration or communication with others rather than working in isolation. These dependence on teachers' guidance or others' support then shift

from dependence to independence (Cheng et al, 2018). Thus, teachers can promote students' independent learning ability by providing alternative learning environments which inspire social interaction and collaboration.

The demand for independent learning and suggested benefits of collaborative learning environments has led to a paradigm shift from a teacher-centred to a student-centred pedagogy. In a student-centred class, students are allowed greater responsibility for their own learning and are helped to understand more about their roles in learning if independent learning is incorporated into different courses (Reinders, 2010). As discussed in Section 1.1.2, the teacher-centred class is dominant in EFL in China (Yang, 2017). Therefore, this could be one possible reason for the poor performance of Chinese undergraduate students in terms of independent learning and CT. It is not the intention for this study to compare the relative value of teacher-centred pedagogy and student-centred pedagogy as both have strengths and limitations. The more important feature of this study is the consideration of whether student-centred pedagogy is more appropriate for students in promoting independent learning abilities and language learning strategies. The weaker CT performance among Chinese EFL students caused by the more frequently used teacher-centred pedagogy is discussed below.

A review of the empirical studies conducted by Chinese scholars reveals a number of possible explanations for the poor application and performance of CT found in Chinese undergraduate students. It is important to investigate whether CT is underdeveloped in other groups of Chinese students and to explore further possible reasons for this, so that methods for improving CT can be developed and proposed.

The lack of relevant training or learning on CT was reported as one of the reasons for the poor performance in CT of 224 university non-English major students' CT abilities in English reading classes in China (Zhou, Jiang and Yao, 2015). Zhou et al (ibid) defined CT as "a kind of essential thinking skill that aims to promote people's ability to criticize, question, evaluate and reflect" (p.83). The study reported that participants mostly lacked CT skills such as critiquing and evaluating English reading materials, and they suggested that relevant CT training was required urgently among Chinese undergraduate students. Hu's (2017) research on Chinese

English major students' CT performance in writing confirmed? [suggested] that teachers' intervention was necessary to develop students' CT skills. Hu (ibid) defines CT in writing as the skills of conceptualising, applying, analysing, synthesising, and evaluating information. He not only found that participants lack relevant CT skills in writing, but also suggested that the deficiency of CT skills is the reason for most writing problems. Hu, therefore, recommended that more opportunities to apply CT would be beneficial for both CT and writing improvement.

A second possible factor contributing to Chinese students' CT performance might be the late introduction of the concept in China. As discussed in section 1.1, the term CT originated from Western notions, and much of the CT relevant research before the 21st century was conducted with native students in English-speaking countries (Thompson, 2002). The concept of CT within the ESL/EFL context gained importance as a research field partly because of the growing number of international students in English-speaking countries who were required to demonstrate CT abilities in academic activities (Thadphoothon, 2005). Subsequently, the teaching or training of CT appeared alongside the teaching of EFL/ESL in higher education (Jin and Cortazzi, 2006), and researchers began to pay attention to CT development in students who come from non-English speaking countries (Pu and Evans, 2018), including China (Chen, 2011).

This late introduction of CT in China in the 21st century and the lack of familiarity with the concept among teachers and students is another possible factor affecting both teachers' and students' understanding and interpretation of CT and the critical pedagogy necessary to support independent learning (Guo and O'Sullivan, 2012). In Chinese language, CT is translated into 'criticise' implying negativity towards the views of others. Guo and O'Sullivan's (2012) study found some participants believed CT involved presenting the opposite position to others. Other finding demonstrates similar negative beliefs whereby participants considered CT involved "say bad things about others' work" (Qian and Krugly-Smolsak, 2008, p.75). These misunderstandings may affect Chinese students' attitudes toward CT, and consequently impact on their CT performance. Therefore, a clear definition of CT is necessary for students to understand this concept, alongside pedagogical interventions that support them to develop CT.

Another possible reason for weak CT performance among Chinese students is the lack of opportunity to practice CT. As discussed in Section 1.2, many Chinese students have limited opportunities to practice their CT in class (Yang, 2017). This is due to restrictive time allocations for collaborative discussion in class, and the formal, strict, and disciplined nature (He, 2001) of one-to-one or one-to-a-few interactions. Studies by Durkin (2011) and Gu (2011) found that listening to teachers and memorising what teachers have said are the main features in many classes, and small group activities or collaborative activities are rare in China compared with other English-speaking countries. In Chinese EFL writing class language accuracy and language construction rather than CT are emphasised (You, 2004; Zhang and Li, 2010). The majority of English classes in Chinese higher education institutions are teacher-centred and based on government-prescribed textbooks (Du, 2012). Therefore, it can be argued that the lack of opportunity to apply CT in writing may contribute to some Chinese EFL students' failure to demonstrate a critical voice in academic writing. Although some advanced teaching approaches have been introduced, such as task-based language teaching, in general it is clear that strategies for promoting the CT of Chinese students appear rare and inflexible (You, 2004; Zhang, 2012).

Researchers also suggest that insufficient English language proficiency might be a factor influencing Chinese students' CT application. The lack of L2/FL proficiency reduces the student's ability in CT and other higher order cognitive strategies (Koda, 2005). Floyd (2011), for instance, compared students' CT application in both L1 and FL, and found that participants had better performance when using L1 in CT tests (i.e. Watson Glaser Critical Thinking Appraisal-Short Form). This finding that EFL/ESL students might not demonstrate CT when using the foreign language as well as when using their first language can partly explain low performance in CT (ibid, 2011). Taking this into consideration, this study designs a CW integrated CT instruction intervention in order to provide students with a clear understanding of CT, multiple opportunities to practice CT, and a supportive environment which allows the use of L1 in class.

2.1.3 Can CT be taught to Chinese university students?

The issues discussed above raise the question of whether it is possible to genuinely engage students in CT in Chinese or Asian classrooms. Two schools of thought have emerged regarding this. Some scholars suggest that CT cannot be taught in Asian countries, as it is a very abstract

concept and can only be acquired unconsciously through social practice (McPeck, 1990; Atkinson, 1997; Simpson and Courtney, 2002). According to Atkinson (1997), since scholars have failed to reach a general consensus on a definition of CT, it is difficult for teachers to explain this notion explicitly in class. Without an explicit explanation, the teacher can only reiterate its social aspects. In this sense CT is culturally determined, and it may be seen as challenging for EFL students who come from Eastern or Asian countries to internalise this notion of CT given their cultural and educational backgrounds (Atkinson and Ramanathan, 1999). Teaching CT to EFL students may run the risk of exposing them to foreign cultural influences (ibid), although this argument has been disputed within the EFL domain (Stapleton, 2002).

The arguments from Atkinson and others have some merit, particularly with regard to EFL students' performance in reading and writing practices. Some EFL students tend to copy information in their writing texts, which might be regarded as customary practice in their own countries (Kuek, 2010). However, this would be regarded as plagiarism in Western universities, and students who are studying in Western educational systems are encouraged to develop a critical understanding of what they learn (Mehta and Al-Mahrooqi, 2015). Conversely, certain Asian educational systems originally considered memorisation as an appropriate and valued method of learning, rather than promoting CT (Kuek, 2010). These cultural and educational differences may make it more challenging to teach EFL students the notion of CT. However, it is difficult to identify the actual reason for EFL students' unease with CT. It could be a cultural, educational, cognitive or linguistic issue, but this remains unclear (ibid). This study challenges the notion that EFL students from Eastern or Asian cultural backgrounds cannot be taught CT by exploring students' application of CT when they are engaged in a CT integrated CW intervention in class.

This study aligns with those researchers who disagree with Atkinson's argument, claiming that CT is a definable notion that can be measured and taught in schools and studies (Ennis and Weir, 1985; Siegel, 1990; Davidson and Dunham, 1997). Benesch (1999), for example, argues that, whilst Atkinson and others believe that EFL students lack CT abilities, teaching CT is important to provide EFL students with good experience of cultural influences from other countries. Moreover, Davidson (1998) argues that it is too narrow a perspective to regard CT as a social practice rather than a universal phenomenon, arguing that EFL teachers should prepare EFL

students with CT as a graduate attribute, in readiness for future life and work in a global economy.

Moreover, researchers who advocate that CT can be taught also promote the cultivation of CT dispositions (Davidson, 1998; Mason, 2008; Jones, 2010). The importance of being disposed to use CT skills such as evaluating and justifying, are mutually shared by many communities and cultures, and even students who come from cultural backgrounds that encourage social harmony can apply these skills in practice and daily life (Kuek, 2010). It can therefore be suggested that it is socially prejudiced to imply that certain EFL/ESL students do not have CT abilities (Stapleton, 2001). It could be the case that EFL students may possess these thinking skills, but simply have not learned how to demonstrate them. Kennedy, Fisher and Ennis (1991) stress that knowledge or familiarity with the topic influences student thinking performance in learning activities. Stapleton (2001, 2002) found that Japanese students can present critical arguments about topics with which they are familiar, whereas some Asian students lack CT when facing unfamiliar topics, such as gun control in American (ibid). This suggests that content familiarity plays a role, and students may show more CT if they are acquainted with the topic. Thus, EFL tutors who wish to teach CT should carefully select the topic for the task in class. In this sense, the above arguments suggest that Chinese EFL students have the potential to think critically, and appropriate support can help to improve their CT performance.

Some researchers claim the concept of CT originally comes from the Western culture, and it is difficult for Asian EFL students to become critical thinkers because their educational tradition involves obedience to teachers' authority (Stapleton, 2001; Yang et al., 2006). It is assumed that many Chinese students are greatly influenced by Confucian values from birth, and that this predisposes students to value harmony, whereas in reality criticality is part of the Confucian heritage (Kim, 2003; Ryan and Louie, 2007). There is a false dichotomy between Eastern perspectives on ways of thinking and Western thinking patterns (Li, 2015). Asian or Chinese EFL students can cultivate or develop critical and creative thinking skills and dispositions. Evidence of CT can also be found in the work of Confucius and other Chinese philosophers (Kim, 2003). Li and Wegerif (2014) also argue that Confucian and other traditional Chinese values emphasize 'reflective thinking', which encourage people to think about their relationship to the whole community. Chinese EFL students also use thinking skills, such as gathering and

analysing information, in their daily educational activities. This suggests that Chinese students can think critically and can develop CT skills and dispositions with sufficient training or explicit teaching.

Therefore, teaching and promoting CT for Chinese undergraduate EFL students to realise their potential to think critically was emphasised by the Ministry of Education and the requirements of the Chinese New National Curriculum (as discussed in Section 1.1). EFL teachers have the responsibility to promote 21st Century skills to students, especially CT in higher education (You, 2004; MoE, 2011; 2017). EFL students in China are expected to develop CT as an essential ability to solve problems and to make good decisions during their studies (Simpson and Courtney, 2002; Tiwari et al., 2006) and to achieve academic success.

With this in mind, it can be considered both possible and necessary to teach CT for EFL students in China. The application of CT should be promoted among Chinese undergraduate students. Accordingly, the next section reviews and discusses possible CT teaching methods, and also provides a rationale for the CW integrated CT instruction intervention applied in this study.

2.1.4 CT teaching methods

This section reviews the literature regarding the teaching of CT in intervention studies, suggesting that the general instruction in CT promotes language learning and writing in EFL classes. In order to introduce CT to EFL students, teachers and educators define a set of specific thinking skills as learning goals of instructional interventions (Puig et al., 2019). In general, there are two main approaches adopted in CT intervention studies to develop CT: teaching it as a standalone course (Halpern, 1998; Van Gelder, 2005) or integrating it across the curriculum (Todd and Hudson, 2007; Gibson 2012). This study applied the latter approach, conducting an intervention study with CT instructions and CW tasks in class, which is guided by sociocultural theory, to promote EFL undergraduate students' understanding and application of CT.

General instruction in CT is necessary for CT intervention studies. Previous CT intervention studies had mostly applied an immersion or infusion approach, integrating instruction in CT with the teaching of subject knowledge (Silva, 2008; Puig et al., 2019), or with CT instruction in basic

language skills such as reading and writing (Lipman, 2003; Zhao et al., 2016). This occurred in both L1 and L2/FL contexts. The application of CT instruction can promote subject learning and, in an EFL context, can also promote language learning. For example, Lizarraga et al. (2010), applied the Thinking Actively in an Academic Context (TAAC) method to encourage high school students to think critically in social science classes. The research concluded that instruction could improve learner performance in reasoning, creativity and academic achievement, improving both knowledge and thinking skills through this integrated teaching method in L1 contexts. Although student thinking capacity in the TAAC method is referred to in a non-subject related sense of thinking or cognitive skills, this method of instruction is helpful for other activities with the design of instruction being further developed to provide a more targeted intervention to enhance CT and subject knowledge.

A number of intervention studies with explicit instruction of CT across the curriculum in FL/L2 university and high school classes have been reported (Rao 2007; Shahini and Riazi 2011; Lin, 2014). In these studies CT is defined as a set of skills that are useful in language learning or other social practices, and the researchers provided CT instruction to guide students to apply CT skills. A common finding through these studies was that students were more energetic during the activities, with some of the studies suggesting that CT instruction enabled L2 students to recognise their linguistic and cognitive limitations. This implies that integrating CT instruction with the teaching of language skills is a promising way for EFL teachers to promote both CT development and language learning. However, Puig et al. (2019) reported that most of the existing CT intervention studies are short-term and focus on CT only, suggesting that a longer term and more comprehensive CT intervention with CT instruction would be required in future studies. To fill this space, this research study attempts to conduct a relatively long-term intervention programme with specific CT instruction to promote undergraduate students' CT application and language learning in EFL classes.

This study explores the benefits of CT instruction for language learning from different standpoints. It investigates ways in which CT instruction enables EFL students to gain both language skills and thinking skills effectively and explicitly (Halpern, 2001). With detailed and explicit instruction, EFL students can be guided step by step in thinking, and subsequently improve their language learning efficiency by using their developed thinking skills. As Lin

(2014) reported, EFL students' language learning outcomes were positive when students received CT instruction in class. Similarly, Nippold et al. (2005) found that EFL students who received CT instruction in English writing class not only showed thinking development but also exhibited improvements in English writing, such as using more complex sentence structures and a richer vocabulary. These findings suggest that the involvement of CT instruction in EFL classes can help to improve English language learning. Therefore, in this study, English writing, as a specific skill of English language learning, was selected. An intervention to enhance CT through explicit instruction in the writing class was designed with the aim of promoting EFL students' CT development and language learning efficiency.

In order to achieve better CT outcomes, two aspects of CT instructional interventions are important for researchers to consider: the instructional environment (e.g. teaching strategies) and student-related factors (e.g. age and prior academic performance) (Tiruneh, Verburgh and Elen, 2014). Tiruneh et al (ibid) found that there was a lack of systematic design of instructional interventions that are in line with empirically valid instructional design principles. This study, therefore, guided by sociocultural theory, bases its design on empirically valid instructional design principles. It incorporates the design of a teaching intervention based on a clear definition of CT and specific CT instruction in class. Collaborative writing classes were selected as an appropriate context for the development of students' CT, where students can think and reason together before representing their thinking through written language (Surd-Büchele, 2011). The selection of collaborative writing (CW) activities provides multiple opportunities to observe and analyse students' CT application, writing products and collaborative interactions during the writing process.

The current interventional study mainly applies persuasive/argumentative writing as CW tasks to promote students' application of CT. As Lei (2008) argues, the process of writing involves cognitive processes as writers explore and construct knowledge and information in order to present their own ideas. Compared with narrative and expository writing tasks, a persuasive/argumentative essay can help students to develop and evaluate their CT and writing abilities to produce sound and supported arguments (Botley and Kakim, 2014). This presents EFL students with opportunities to use CT. For example, Todd and Hudson (2007), Kuek (2010), and Lin (2014) all selected writing classes, especially persuasive or argumentative writing (Paul

and Elder, 2007), as a positive context for the manifestation of CT. They suggested that to practice writing is to practice the use of thinking skills to enhance language learning. Persuasive/argumentative essay writing can be used as a powerful tool to promote or examine students' ability to construct sound and reasonable arguments with logical thinking (Botley and Kakim, 2014). This ability is also vital for students in higher education as required by the Ministry of Education in China (see Section 1.1.1). Accordingly, it can be assumed that persuasive or argumentative writing tasks that involve CT processes can aid writers when comparing and analysing different ideas. The writing class can be seen as a means to manifest CT, especially when it involves a collaborative discussion. Therefore, this intervention study involves persuasive/argumentative writing activities in both the CW class and the CT test, and evaluates argumentative essay writing for evidence of individual students' CT development in language learning.

Different teaching strategies have been recommended to facilitate the development of CT, such as explicit teaching and group or collaborative activities. A number of researchers (Facione, 1990; Halpern, 1998; Case, 2005; Abrami et al., 2008; Slavin, 2011; Lin, 2014; Zhao et al., 2016) emphasise that explicit instruction or teaching of CT is essential for EFL students to develop their thinking skills. As discussed in Section 2.1.2, a clear understanding of the expectations for CT is important to enhance students' application of CT, so explicitly teaching or explaining how to use CT should be helpful for EFL students' CT development.

The method of using these collaborative or group activities is also supported by the Vygotskian tradition which suggests that cognitive development can be promoted by social interactions (Dillenbourg et al., 1996). Group or collaborative activities are recommended strategies for CT promotion in class (Nelson, 1994; Heyman, 2008; Shahini and Riazi 2011; Jones, 2013; Fung and Howe, 2014; Campbell, 2015; Hajhosseini et al., 2016). Here, most studies found that students were more active during collaborative activities in which they reflected upon their thinking and language skills. Vygotsky's sociocultural theory and Zone of Proximal Development (ZPD) (see Section 2.3.1), suggest that social interaction and collaborative activities help and encourage students to practice their CT, and provide opportunities for researchers to observe students' CT application through analysing collaborative peer interaction. Students' CT is evident not only in the written outcome but also in their spoken interactions.

The current interventional study, therefore, involves collaborative writing (CW) activities in writing class to promote students' CT in both oral and written aspects. CW is a form of collaborative learning, which refers to 'a small group of students working together as a team to solve problems, complete a task, or accomplish a common goal' (Graham, 2005, p.11). The emphasis is on providing immediate feedback, including both positive and negative feedback, during the process of co-authoring a text (Storch, 2013). During the CW process, weaker students can learn with the help of more capable students (Gabriele, 2007) through such approaches as peer review and group discussion (McWham et al., 2003; Albeshier, 2012). CW can also enable students to develop numerous skills such as thinking skills, organising skills, and motivating skills (Gunderson and Johnson, 1980; Hill and Hill, 1990). The process will be discussed in Section 2.2 with specific details.

Previous interventional studies have suggested that integrated CT and collaborative activities within writing classes can promote both thinking development and language learning, emphasising the benefits and outcomes/products of students' CT. How students develop their thinking skills during the collaboration process was not explored. Accordingly, this study addresses a gap in the literature, exploring specific features of EFL students' CT application during the CW process. This study, therefore, investigates whether an eight-week face to face CW integrated CT instruction intervention and observation of students CT application in action during classes can produce evidence of enhanced language learning.

2.1.5 Assessments of CT

As discussed in Section 2.1.1 and 2.1.3, this study takes the position that CT is definable, and that it can be taught and measured. Assessing students' CT allows for a comparison of results and provides explicit identification of whether the students CT improves after teaching. There are a number of existing published assessments of CT, such as the Watson-Glaser Critical Thinking Appraisal (Watson and Glaser, 1980), the Ennis-Weir Critical Thinking Essay Test (Ennis and Weir, 1985), and the California Critical Thinking Skills Test (Facione, 1990). These can be divided into two categories: tests involving multiple-choice questions and assessments of written text production.

The Watson-Glaser CT Appraisal (W-GCTA), developed by Watson and Glaser in 1937, has a long and distinguished history of development compared to the other such tests. The US and UK versions of the test were developed in 1980 and 1991 respectively (Hassan and Madhum, 2007) and they involve multiple-choice questions to identify five important thinking abilities: inferencing, recognition of assumptions, making deductions, interpreting, and evaluating arguments (Cavdar and Doe, 2012). The five thinking aspects can be related to Bloom's hierarchical taxonomy of the cognitive domain (Section 2.1.1). Although researchers such as Ku (2009) are critical of the test for its focus on thinking abilities/skills rather than thinking dispositions, many relevant studies and later tests have benefited from this focus, as it provides valid and reliable test results on CT (Brown et al., 2001; Hergovich and Arendasy 2005; Mehta and Al-Mahrooqi, 2015).

Later tests, involving multiple-choice questions, are influenced by, and further enhance the value of the W-GCTA. For example, Facione et al. (1994) designed a set of CT tests to measure both thinking skills and thinking dispositions - The California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI). These are also widely used tests and are found to be valid and reliable (Phillips et al. 2004; Miri et al. 2007; Yang et al. 2008; Blondy, 2011). However, these tests have also been criticised in that the CCTST cannot reveal test-takers' actual thinking abilities, because they can get the right answers by guessing instead of deep thinking (Facione et al. 1995; Lin, 2014). Similarly, people who are tested by CCTDI may select desired responses to get higher marks, which means the marks cannot reflect their authentic thoughts. As such, the test was not applied in the current study.

Other research developed a second category of CT test, based on the assessment of written products. As discussed above in Section 2.1.3, writing itself can be integrated with teaching thinking skills and is a manifestation of CT. Moreover, writing can also be used as an assessment method to examine writers' CT abilities (Lantolf, 2006; Pu and Evans, 2018). Ennis and Weir's (1985) Ennis-Weir CT Essay Test (EWCTT) was developed to test students' abilities in making judgements and arguments and has been used in many studies to reveal students' CT abilities and dispositions ((Dunham 1997; Williams and Worth, 2009; Ku, 2009). However, this test is mainly designed for native English speakers and so the actual CT abilities of EFL students from certain

Asian countries have not been explored (Dunham, 1997). As Asian EFL students are unfamiliar with the writing topic, such a test may restrict their thinking performance (Stapleton, 2001).

To conclude, each of the two kinds of CT test (i.e. multiple-choice test and assessment of individual writing products) has its limitations, so the current study combines them together to assess students' CT performance (see detailed explanation in Section 3.3.3). The study takes the position that CT is definable and that it is necessary and possible for CT to be taught and assessed in Asian students. Although it can be challenging for Asian EFL students to develop CT, they can benefit from collaborative activities, tasks and interactions that integrate CT in CW classes.

2.2 Collaborative Writing (CW) in relation to CT

After reviewing different teaching methods for CT in Section 2.1.4, a number of choices were made as to the approach needed in this study. This section introduces the idea of CW and interactions that have been designed and developed in this study. It explains why this strategy was selected, then analyses why CW is a useful strategy for EFL students, and finally reviews previous research into students' attitudes towards the practice of CW. In this way, the rationale for the focus on CW in this study is demonstrated.

2.2.1 *Why CW?*

As discussed in Section 2.1.4, writing is a possible manifestation of CT, as what people write reflects what they think (Surd-Büchele, 2011). Thus, the practise of integrating CT with writing classes has been adopted by many researchers, generating positive results (Todd and Hudson, 2007; Lin, 2014). EFL students develop their thinking skills in the writing classes and, at the same time, their improved CT ability can benefit their writing products (Paul and Elder, 2007). Their thinking and writing are mutually beneficial during the process. Meanwhile, collaborative discussion and interaction can encourage students to verbalise their thinking processes, which provides researchers with a more direct way to explore the CT development of students. Therefore, the collaborative activities are incorporated instead of individual writing, since writing and discussing with partners seemed more suitable to address the research questions in the current study.

The use of different group or collaborative activities is encouraged by a number of researchers to develop EFL students' thinking skills and language learning (Heyman, 2008; Shahini and Riazi 2011). Peer review and peer evaluation are two frequently used collaborative activities for EFL students to promote their thinking development in both writing and speaking classes (Kuek, 2010). These studies also suggest that collaborative activities enable students to develop both thinking and language skills (Odom, Glenn, Scanner and Cannella, 2009). Therefore, CW, as both a writing and collaborative activity, was selected as an appropriate way to promote EFL students' CT in the study.

CW requires students to work together to complete a shared piece of writing during social interaction processes (Rice and Huguley, 1994) that involve negotiation, coordination, and communication (Lowry, Aaron and Rene, 2004). CW can include writing activities or stages such as brainstorming, planning, drafting, revising and editing (Rice and Huguley, 1994). CW can also involve "peer feedback" (Storch, 2005; Grami, 2010), "peer response, editing and evaluation" (Berg, 1999; Lundstrom and Baker, 2009), and "peer learning" (Chen, 2017). CW, as involving those activities, encourages peer interaction rather than teacher-student interaction during the whole writing process. Therefore, this study focused on observing student interactions and CT application during the CW practices.

CW is unlike cooperative writing, in which students group together to produce writing but disregard interaction with each other (Storch, 2013). In addition to emphasising peer interaction, Storch (2013) further highlights the main feature of CW as "the co-authoring of a text by two or more writers" (Storch, 2013: p2). The shared responsibility for the production of a single text is a key feature so that participants interact with each other during the whole writing process in order to co-author the text. Although cooperative writing also asks writers to co-construct a text, the writers have divided responsibilities. Writers can complete individual tasks without necessarily interacting with other students in the group or pair (Dillenbourg et al., 1996; Storch, 2013). Thus, unlike cooperative writing in terms of the division of jobs between individual writers (Dillenbourg et al., 1996), CW encourages interaction, mutual engagement and contribution throughout the whole productive process. Generally speaking, co-authoring is the main characteristic of CW, and peer interaction is crucial in its practice. From this perspective, rather

than other collaborative activities, this study was concerned with the processes of thinking, discussing, reasoning, negotiating etc. during the student interactions that preceded and culminated in a CW product. However, a review of previous literature on CW reveals little detail of the features of such interactions. This study, therefore, attempts to identify more specific features of student interactions with partners during the CW process in EFL classes.

The promotion of collaborative activities has been supported by both theoretical and pedagogical research. On the theoretical side, the use of pair and small-group activities is supported by sociocognitive perspectives on learning. Vygotsky's (1978) sociocultural theory in particular claims that development and learning take place in social situations and interactions. Students can provide scaffolding assistance to each other when they interact collaboratively (Ohta, 2001), constructing knowledge and skills from collaborative activities with a more capable individual, as every learner has different strengths and weaknesses. In this study, CW class involves two or more students working and interacting together. This is because, according to sociocultural theory, both the teacher and more capable peers can offer help to complete tasks more efficiently.

From a pedagogical perspective, collaborative group work provides students with more opportunities to practice their target language, which is supported by the communicative approach in L2 education (Storch, 2016). Communicative language teaching is one of the most prevalent teaching approaches in second language education (Littlewood, 2011). The essence of this approach is 'the engagement of learning in communication to allow students to develop their communicative competence' (Savignon, 2005: p635), which refers to students' ability to interact with other speakers and use language meaningfully, and to exchange knowledge, information, opinions, and feelings with others (Savignon, 1983). The learner is regarded as the centre of the teaching-learning process when teachers adopt the communicative language approach (White, 2007).

Thus, considering both theoretical and pedagogical features, this interventional study was designed to encourage applications of CT through collaborative activities and peer interaction among undergraduate students in FL/L2 classrooms. The study focuses on the process of CW to

promote students' CT development. The reviewed studies related to CT mainly focus on test results (Rao 2007; Gibson 2012; Lin, 2014). The features of how students develop their thinking skills during the collaborative activities are relatively unexplored. Existing studies relevant to collaborative activities also concentrate on students' language learning demonstrated by writing results rather than the thinking skills developed during the writing and interaction process (Williams, 2003; Storch, 2005; Li and Kim, 2016). Therefore, this study, mainly focuses on students' CT application during the CW process, and aims to contribute to the research gap. Different CW task types are analysed in the next section in order to explore suitable types of writing task for this study to promote CT.

2.2.2 *The CW task type*

A review of the relevant literature reveals various kinds of writing tasks that have been adopted in CW studies (Eckerth, 2008; Fortune, 2005; Storch, 2005; Abadikhah, 2012; Li and Kim, 2017). All of these tasks encourage peer interaction during the collaborative process, but most neglect the effect of peer interaction on CT development. Therefore, it is crucial to decide which types of CW tasks are more appropriate in accordance with the learning purpose (Storch, 2013), as this study aims to promote student CT abilities.

In general, Storch (2016) categorises the writing tasks in terms of being either language-focused or meaning-focused. Language-focused tasks, such as dictogloss, passage editing, and text reconstruction, can bring a learner's attention to a set of predetermined language forms. According to Storch (2013), the most commonly used language-focused task in CW studies is the dictogloss. This is a procedure for listening, taking notes, and re-constructing together (Wajnryb, 1990). Other language-focused tasks include passage editing and text reconstruction, which can be regarded, strictly speaking, as grammar exercises rather than writing tasks because they concentrate more on grammatical accuracy (Storch, 2013). These tasks do not require students to produce a written text. For example, students are asked to edit a given passage for accuracy in an editing task (Storch, 2009). The given passage may be created by a researcher or written by others. Therefore, these grammar tasks are more controlled and try to encourage students to learn pre-determined language forms rather than use the target language in an authentic context. Accordingly, these language-focused tasks were not applied in this study, as

this study mainly focused on the application of CT during the collaborative process rather than grammar or language forms.

Meaning-focused tasks involve composing a written text based on a pictorial or written prompt, and the attention to language form is incidental (*ibid*), such as jigsaws, data commentary reports, and argumentative compositions. A Jigsaw is an information gap task in which each student in one group or pair has partial information and has to exchange their information in order to complete the task (Swain and Lapkin, 1998). The task has been commonly used in oral tasks in order to promote negotiations of meaning (Gass and Mackey, 2007), and it can also be used in CW classes by asking students to write a story or narrative based on the information they have exchanged (Storch, 2013). The data commentary report task usually asks students to present their summary in graph or table form (Storch, 2005). It focuses more on content rather than language form and can be used in both oral and written formats. Argumentative compositions or essays have been used by many researchers in teaching writing (e.g. Wigglesworth and Storch, 2009; Tan et al., 2010). Wigglesworth and Storch (2009), for example, applied an argumentative essay as a CW task for advanced students. They found that students paid more attention to lexical issues rather than grammar in this type of task, and their CW products showed better vocabulary and thinking performance. Although there are different kinds of meaning-focused tasks, the argumentative essay was selected as the CW task in this study. Other tasks, such as jigsaw and data commentary reports, are relatively simple for undergraduate students in this study. Meanwhile, as discussed in Section 2.1.4, argumentative essay writing would provide students with opportunities to practice their CT to produce reasoned and logical arguments in writing.

Earlier research with EFL students has focused on different priorities to the present study. Studies by Garcia Mayo, (2002) and Storch, (1998; 2001) have focused on exploring which writing tasks are more effective for EFL students to learn the target language, and they compared the number and type of LREs produced in different types of tasks. They proposed the idea of LREs. ‘LREs’ refers to ‘language-related episodes’, and these are considered the unit of analysis in CW research (Storch, 2013). It is a segment of the students’ conversations, where they discuss language use during the writing process (Swain and Lapkin, 2001). After analysing the LREs, previous studies on CW reported that more controlled grammar tasks produced more LREs than meaning-focused tasks (Eckerth, 2008). However, the meaning-focused tasks can generate more

meaningful segments, such as utterances containing meanings, during peer interactions than language-focused tasks (Leeser, 2004; Kim and McDonough, 2011; Abadikhah, 2012). Conversely, meaning-focused tasks are more suitable and flexible for all levels of EFL students (Fortune, 2005).

As the existing research discussed above has concentrated on how EFL students discuss language use (LREs), investigations of how EFL students develop CT during the interaction are lacking. Thus, as the study focused on CT, it proposed the term ‘Thinking-related Episodes (TREs)’, adapted from ‘LREs’, to explore EFL students’ performance in thinking during peer interactions. Similar to LREs, TREs refer to the segments in which students express their thoughts or present their thinking during the conversation.

To conclude, in order to explore students’ application of CT, this study paid attention to the analysis of TREs rather than LREs. Meanwhile, meaning-focused tasks are more suitable than language-focused tasks in this study which aims to promote Chinese EFL students’ CT application. More specifically, argumentative compositions, which are regarded as one type of meaning-focused task, are adopted. As discussed in Section 2.1.4, argumentative essay writing encourages students to use CT to think and write critically (Botley and Hakim, 2014). Moreover, Chinese students are more familiar with argumentative compositions than other meaning-focused tasks in class (You, 2004). Applying argumentative compositions as CW tasks provides a flexible environment for students to express their thoughts and interact with peers, while TREs are analysed to assess CT performance during the collaborative process.

2.2.3 A rationale for the selection of CW

This section provides a rationale for the selection of CW to promote EFL undergraduate students’ CT in class. Both the benefits and limitations are presented below.

The benefits of using collaborative group work in FL/L2 classrooms for all stages of EFL students have been well documented by earlier research. The main forms of collaboration in EFL writing classes to promote interaction between students and CT development include peer review activities, peer evaluation activities, cooperative writing activities, and CW activities (Storch,

2013). Peer review and peer evaluation are two types of collaboration commonly used by EFL teachers. Todd and Hudson (2007) found that students' CT could be enhanced through peer evaluation activities in writing. Another similar study by Odom, Glenn, Scanner and Cannella (2009) showed that 95% of undergraduate students reported benefits in terms of CT in writing gained from peer evaluation activities. Thus, both peer review and peer evaluation can promote collaborative interactions that are beneficial for developing CT.

However, one limitation of peer review and peer evaluation activities is that students may be reluctant to give negative feedback to their peers (Odom, Glenn, Scanner and Cannella, 2009; Todd and Hudson, 2007). Sometimes students were found unwilling to provide negative feedback or show disagreement in order to respect and not discourage their peers' work. However, negative feedback plays a facilitative and essential role in language acquisition and CT application for students (Schmidt, 1990, 1992; Long, 1996). Ur (2006) also suggests that negative feedback is constructive as long as it is provided supportively and warmly so it does not discourage others. That is to say, negative feedback is necessary and as important as positive feedback. Without negative feedback, students' CT may not improve in their practice, and the peer review or peer evaluation activities would not be used to their full potential if any weaknesses were ignored.

This intervention study, therefore, has selected CW for undergraduate students to apply their CT in class. There are many benefits of applying CW activities in EFL classes. Firstly, the application of CW activities in the EFL/ESL writing classroom has been suggested as beneficial for writing products (Berg, 1999; Suzuki, 2008; Storch, 2013). Storch (2005), for example, compared the effectiveness of writing individually with writing collaboratively in groups with undergraduate ESL students in Australia. She found that compared with students who wrote individually, students who wrote and interacted collaboratively produced shorter, more concise written texts that were better formed in terms of grammar and text complexity. Other researchers concur that students who wrote and interacted collaboratively produced better-quality written texts, particularly in terms of grammar (Noël and Robert, 2003; Williams, 2003). Ferguson-Patrick's study (2007) suggested that both the quality (positive outcome) and productivity (amount written) of writing skills and language learning and found both elements were improved by applying CW activities. L2 children in Australia worked in pairs to encourage individual

accountability in an effort to increase the number of different words used. This improved both children's writing output. A more recent study conducted by McDonough, De Vleeschauwer, and Crawford (2018) compared EFL university students in Thailand writing in three conditions: CW, collaborative pre-writing, or no collaboration. Students' texts were assessed by content, organisation, and language and it was found that students who were involved in CW produced more accurate texts than students under the other two conditions. These studies demonstrate that CW is a useful learning activity for all stages of EFL students to improve writing skills and produce better written texts. This also partially explained why this study applied CW rather than individual writing. Students' writing performance were improved after practicing CW and interacting with each other, but these studies mentioned above did not investigate whether CT were also evident in the process of producing complex written texts.

The second benefit of using CW relates to how the EFL students themselves interact and support each other's learning. Gabriele (2007), for example, investigated upper elementary EFL students and claims that weak students could learn more effectively with the help of expert students when they work and interact collaboratively. Students can find new ideas together and receive instant feedback from their partners through interaction during collaborative activity. McDonough's (2004) study also argues that collaborative activities promote autonomy and self-directed learning among EFL undergraduate students in Thailand. The interactions reduce students' anxiety so that they become more confident during the class. In other words, CW can be helpful to facilitate student motivation and self-confidence. CW in the EFL class provides a learning environment that encourages students to act socially and cognitively (Storch, 2002), so that the social interaction more actively contributes to the co-construction of knowledge. In this study, CT is a relatively complex cognitive concept for students, which may have brought many difficulties and pressures for students in learning. Drawing on findings from the studies mentioned above, this study applies CW to provide a supportive and encouraging learning environment for the application of students' CT over time.

Storch (2002, 2011) conducted an influential project with ESL university students that examined the effectiveness of using CW. She analysed the LREs during the CW process and developed a model of peer interaction, which named dynamic interaction patterns (see Section 2.3.3). These two notions of LREs (referring to when students talk about their own or others' language use)

and dynamic interaction patterns have been widely used by other researchers who are interested in CW or collaboration. One important finding in Storch's (2002) study was that patterns of student interaction influenced their writing products and learning outcomes. Watanabe (2008) later arrived at a similar conclusion, suggesting that involvement in a collaborative interaction pattern led to a positive impact on the CW result. The main focus of these studies was on the written products although they discovered different interaction patterns produced by students during the writing process. Whilst much research has been undertaken in this area additional reasons for producing collaborative interaction patterns, as well as the potential links between these patterns and writing results, remain unexplored. This study, therefore, builds on previous research and investigates the interactions during the CW process to explore how students' CT is performed or developed during the collaborative tasks and writing process.

Due to the increased development of technology, more recent studies concerning CW also explore computer-mediated CW environments (Elola and Oskoz 2012; Li and Kim, 2016; Kost, 2011). These studies reveal the effectiveness of using a CW strategy for EFL students in technology-mediated contexts (Li and Storch, 2017). For example, Li and Kim (2016) investigated the dynamic interaction pattern in a wiki-based CW environment with two groups of ESL university students. They reported that both groups were able to complete the writing task successfully, and that small groups' interaction patterns could change across different writing tasks. Similar findings were discovered in another study by Rouhshad and Storch (2016), who compared student interaction patterns in face-to-face CW tasks and in a Google-doc writing context. They noted that, although all students completed their CW tasks, students in the face-to-face environment tended to show more collaborative patterns than those in the Google-doc writing context. Therefore, in order to encourage more peer interaction during the CW process, this thesis focuses on face-to-face CW only.

Although CW provides many opportunities for interaction, it also presents limitations. Some researchers claim that the effectiveness of using CW can only be seen in the final stages of writing, such as the revising and editing stages (Elbow, 1975; Murray, 1978). Such arguments support the view that it is valuable to work and interact collaboratively at the final stages of writing rather than during other stages of the process. Gebhardt (1980) however suggests that CW has a positive effect on both the beginning and the final stages where CW strategies are best

employed to find a topic, generate topic details, and locate the intended audience for a paper. Storch (2002, 2005) also explored the effectiveness of using CW activities in the beginning stages of writing, such as brainstorming and group discussion, as well as in the final stages of writing, such as peer review and peer editing. Despite these stage-based arguments, it is generally considered that interacting collaboratively is encouraged throughout and CW activities should not be limited to the final or any other single stage of writing. In this sense EFL students should adopt CW during the whole writing process. This study therefore requires students to work collaboratively throughout the whole writing process in order to improve the effectiveness of the CW activities.

To conclude, previous studies have primarily paid attention to the language aspects and writing products, rather than CT aspects and writing and interaction processes, leaving a research space to be explored (Storch, 2005; Kost, 2011). In addition, the duration of those studies was relatively short, and only involved two or three writing tasks (Storch, 2005; Li and Kim; 2016). There is a lack of investigation of the writing and interaction process in relatively longitudinal CW studies, especially when addressing the question of whether students can develop CT with more practice during the process. This study, therefore, pays attention to whether, and how, students develop their CT during the process in the CW class in relatively long-term practice.

2.2.4 *Student attitudes towards CW*

Another notable limitation of CW is the reluctance of students involved in CW or collaborative activities (Storch, 2013). This is related to students' attitudes towards CW, which are now discussed.

It is important to review relevant literature of student attitudes towards collaborative activities, to guide this study and to design an appropriate CW class with CT instructions. Whilst several previous studies reflect student attitudes towards collaborative activities, there are few that relate this to the evaluation of CW with Storch (2013) citing only four relevant studies of CW (Roskams, 1999; Storch, 2004; 2005; Shehadeh, 2011). Therefore, EFL university student attitudes toward CW are also gathered from research on their attitudes toward different

collaborative activities such as group work in oral and writing tasks (ibid). The findings from these studies are discussed below.

Most collaborative activities involve collaborative oral tasks and attitudes towards these tasks are therefore valuable in assessing perspectives on collaborative activities. The studies exploring EFL/ESL students' attitudes towards collaborative activities in oral and writing tasks report mixed results. Some research has observed that students perceive group work unfavourably (Brown, 2009; McDonough, 2004; Riley, 2009). McDonough's (2004) study with Thai EFL university students, for example, reports that, although students' performance was improved by using pair work activities in oral tasks, 75% of participants felt the pair work was not useful for language learning. The participants worried about learning incorrect grammar from their peers during the collaboration, although the actual results of the study indicated that they provided correct and supportive feedback for each other. Storch (2013), also observed that some students were reluctant when required to work or interact with peers in pairs or groups for writing tasks, preferring to work individually. This attitude might influence the effectiveness of student interactions during CW tasks in class. Teachers should try to address the student's reluctance by providing clear instruction and explanation regarding interactions during the CW process.

However, other studies found contrasting results, in that EFL/ESL students at all stages showed positive attitudes towards the use of collaborative activities (McDonough and Sunitham, 2009; Littlewood, 2010; Trinder, 2013). Mulryan (1994) investigated both student and teacher attitudes towards collaborative small-group instruction and interaction in elementary schools in the USA, and results indicated that both students and teachers had positive attitudes. The students felt their mistakes were minimised by working and interacting with peers in activities such as exchanging ideas, while the teachers found that the collaborative activities provided students with opportunities to help each other and become more active in class. Similarly, McDonough, who constructed a study in the Thai EFL context with Sunitham (2009) found that university 90% of students preferred to work collaboratively rather than work alone during an activity. These Thai EFL university students noted that they received assistance with vocabulary from their peers, but the test results of the study indicated very little evidence of language learning. Thus, it is reasonable to argue that student attitudes towards their experience of collaborative activities may

be related to their own feelings about those experiences rather than to the actual learning outcomes.

Storch's (2005) study, however, reported that while 16 of the 18 participants were generally positive about CW, believing CW could help them to compose ideas by learning from their peers, five of the 16 students also showed some reservations about the collaborative activity that were largely because of their evaluation of their FL/L2 proficiency. In other words, they had low self-confidence in both speaking and writing skills in FL/L2 which may have influenced their performance during the CW process. Shehadeh (2011) implemented a longitudinal study, over a 16-week semester, and found that the majority of the participants were very positive about the CW experience. Students gradually realised the benefits of using CW, and they began to enjoy it. Therefore, it can be assumed that student attitudes towards CW may change with experience during a longitudinal study. Meanwhile, more language support or opportunity to use L1 during CW interactions might reduce their reluctance to work collaboratively in CW class.

A recent study also reveals that most EFL participants have positive attitudes towards the use of CW "in terms of motivation, peer feedback, comprehensive view over the topic, changing ineffective writing habits, and learning more vocabulary" (Khodabakhshzadeh and Samadi, 2017, p. 119). Accordingly, this relatively longitudinal study was designed to provide EFL students with sufficient collaborative learning and interaction opportunities and explored their perceptions of these experiences.

Student attitudes towards collaborative activities in earlier studies are mixed. Most students showed positive attitudes, but some were reluctant, possibly due to low self-confidence in their FL/L2 proficiency (Storch, 2005). Allowing students to use both first (L1) and second language (FL/L2) in class may promote confidence and active participation (DiCamilla and Anton, 2012; Lantolf, 2000; DiCamilla and Anton, 2004; Swain and Lapkin, 2000). Based on the sociocultural tradition developed by Vygotsky (See Section 2.3.1), L1 can be regarded as a facilitator of FL/L2 acquisition in social interactions (Swain and Lapkin, 2000). Storch (2013) advocates the use of both L1 and FL/L2, as both are regarded as helpful tools for cognitive development. These findings suggest that the use of L1 during collaborative activities and interactions in EFL/ESL

classes can be useful for both language and thinking development, reducing the influence of a student's FL/L2 language proficiency on their CT application (see Section 2.1.2).

To conclude, the discussion of students' attitudes toward collaborative activities above provide a guidance for teachers to design a CW class. First of all, a relatively long-term study of CW was undertaken as, according to the reviewed literature, students' attitudes are related to their own experiences (Shehadeh, 2011; Storch, 2013) and may change over time according to their CW experience. Secondly, the usage of L1 is recommended, as it can enhance the student confidence to communicate with others in collaboration. This study investigated Chinese EFL students' attitudes toward CW in a relatively long-term intervention (eight weeks), engaging with L1 during these CW activities. Few previous studies have focusing on this issue, as discussed previously. CW can be regarded as a relatively new teaching method for Chinese EFL students (You, 2004; Du, 2012) and it is therefore interesting to consider Chinese EFL students' perceptions of their CW experience. Finally, the investigation of student perceptions may help researchers to understand and manage students' behaviours during the interactions (Storch, 2013).

2.3 The Theoretical Framework

This section discusses the theoretical framework which has been applied in this study as a vehicle to guide the research and teaching design. There are three principal concepts: Vygotsky's sociocultural theory, Swain's language mediation theory, and peer interaction as scaffolding.

2.3.1 *Sociocultural theory*

This study adopted a sociocultural theory perspective to explore students' CW experiences and CT development. It draws on Vygotsky's (1978) sociocultural theory in terms of verbal interaction; the notion of the Zone of Proximal Development (ZPD), in which learning is scaffolded by advanced individuals (including both teachers and more capable students); and Swain's (2006, 2010) notion of language mediation theory, focusing on students' social interactions, produced language, and CT development during the writing process.

Vygotsky's sociocultural theory regards language learning as having both social and cognitive dimensions (Vygotsky 1978, 1981; Au, 1998; Lantolf, 2000; Vanderburg, 2006; Storch, 2013). Strictly speaking, Vygotsky's theory was originally regarded as a psychological theory which explains the development of complex human mental processes, rather than a language learning theory (Vygotsky 1978, 1981). Vygotsky's sociocultural theory has only been recognized in Applied Linguistics research and Second or Foreign Language acquisition research relatively recently.

According to Vygotsky's (1981) social interaction theory, students are social beings, who develop cognitive abilities through social interactions, or CW in this study, which include language learning and thinking development. The importance of verbal interactions is emphasised for learning, and language interactions play a crucial role in cognitive development, particularly between expert participants (e.g. an adult or more capable peer) and novice participants (e.g. a child or less capable peer). Vygotsky's social interaction theory supports the use of CW approaches to develop CT, as CW provides students with opportunities for repeated social interactions (Kessler, 2003) to promote cognitive development.

Since Vygotsky (1978) found that not all assistance provided by the expert during social interaction leads to cognitive development, he proposed the concept of the ZPD. The ZPD has come to be regarded as a theoretical background for collaborative learning in the FL context (Van Lier, 1996; Guerrero and Villamil, 2000). It refers to the distance between the novices' current state of knowledge and the potential state they can achieve with assistance from experts (Guerrero and Villamil, 2000). The role of the expert is to be responsive to the novice, and to encourage the novice's participation and contribution to the activity. Wood et al. (1976), suggests that encouragement and assistance, also referred to as scaffolding, can help students to achieve their potential level of performance during the activity.

Scaffolding can be defined as "a metaphor for a structure that is put in place to help students reach their goals" (Dennen 2004, p. 185). According to Vygotsky (1986), students can learn when they interact with advanced individuals who can scaffold them effectively. In other words, teachers' instruction, teaching materials, and peer interaction all can be used as scaffolding that

help weak students to learn and to develop thought. In the classroom, the teacher plays a crucial role in shaping the learning environment by providing teaching materials and establishing rules for student interactions (Water and Bateman, 2013). The role of teacher is often regarded as a facilitator for the student's peer interactions and to scaffold positive student interactions in class (Farmer, McAuliffe Lines, and Hamm, 2011). According to the importance of teacher scaffolding for peer interaction, this study contained CT teaching material and CW instruction provided by the teacher in order to help students interact with each other effectively.

Scaffolding in social interaction mainly occurs through language or speech, so language itself is the mediation tool used by students to communicate and negotiate with each other during the social interaction process (Wells, 1999). Vygotsky (1986) claims that students produce social speech during social interaction and develop it into their own private speech to help structure their own thoughts (Lantolf, 2000). This is considered to be thought without words, or the deep thinking or understanding that occurs within individuals (Swain et al., 2011). In this sense, students produce social speech together during interactions, then transfer this into their own ideas, thoughts or cognition. Social interaction is helpful for thinking development, and this is why this study conducts a CW course, as it provides opportunities for peer interaction, potentially leading to CT development.

However, research in the L2/FL acquisition area conducted a number of relevant studies which found that students with similar language proficiency were also able to assist each other with natural scaffolding during social interactions (Ohta, 1995; Villamil and De Guerrero, 1996). Here, except teachers, there is no identifiable or constant role of expert, suggesting that the role of expert is fluid (Ohta, 2001). Students may take turns in adopting the role of the expert during interactions, when they have similar levels of knowledge and language proficiency. This can be described as collective scaffolding (Donato, 1994) when students co-construct knowledge and thinking through fluid expert-novice relationships during peer interactions (Lantolf, 2000). In order to explore language learning and CT development through CW processes, this study chose 24 EFL students with similar levels of language proficiency to be involved in the CW course. Thus, sociocultural theory has informed this study through the application of class discussion, small group collaboration, and clear CT and CW instruction from teachers as helpful teaching strategies for students' language learning and CT development in class.

Swain's notions of collaborative dialogue and language mediation theory (2000, 2010) are also useful theoretical frameworks for this study. The way students use language in social interaction can mediate language learning and thinking development. Swain's (2006, 2010), term 'linguaging' describes the notion of using language as a mediation tool in the SL/FL acquisition domain. It is a process that uses language to explain complex information or to complete difficult tasks. Linguaging is also the representation or articulation of one's thinking and occurs when students attempt to express their thoughts (Lantolf and Thorne, 2006). There are two forms of linguaging: private speech and collaborative dialogue (Swain et al., 2011). Private speech is described as self-directed; while collaborative dialogue is similar to social speech, which occurs when students talk collaboratively to solve a problem.

Both private speech and collaborative dialogue with others are forms of linguaging as sources of learning. During the process of CW, students are linguaging when they express their ideas to reach an agreement and to complete the task. From a sociocultural perspective, the social interaction between FL/SL students provides opportunities for linguaging, and this helps EFL students to learn language and develop thoughts (Swain, 2010). During the process, students pool their knowledge and linguistic resources together by verbalising the ideas to co-construct new language and thoughts, or to reflect and consolidate existing knowledge and thoughts. Verbalised thoughts and co-authored texts are two important features of CW (Storch, 2016) that are explored in this study. Both English (FL) and students' first language (L1) are regarded as mediation tools, which can be used by students to verbalise their thoughts to complete their tasks.

After reviewing the theories of Vygotsky (1978, 1981, 1986) and Swain (2000, 2006, 2010), the importance of verbal interaction and the use of language are clearly emphasised for learning. This study, therefore, designed CW activities with clear instructions from the teacher to provide opportunities for participants to interact verbally with their partners in the class (Storch, 2013), so students could exchange ideas with peers to promote their cognitive development, including CT and language learning (Vygotsky, 1978). The eight lessons were designed to provide a non-threatening environment for students that could encourage them to express their opinions, so that they were better prepared for the writing activity (Storch, 2013; Swain and Lapkin, 1998).

Participants in the study received different kinds of mediation (e.g. teaching material, teacher and peer students, and their own language) in the class to enable them to communicate and coordinate their actions (Swain, 2010). Students could use both their L1 and FL/L2 during the CI in collaborative activities, because their own language is also regarded as a tool to mediate their cognitive development (Storch, 2013; Swain, 2010). Because language is the articulation of thinking, the more students talked, the more thinking could be inspired (Swain et al., 2011).

2.3.2 *The language functions*

According to Swain (2006), language itself is an important social and cognitive tool for people to communicate with others in daily life. When people use language, it has different purposes or functions, such as expressing feelings or asking for help. It serves both social and cognitive functions that can be analysed to reflect a student's thinking. Scholars have categorised language function from different perspectives. In a collaborative environment, language functions can be seen as mediating tools of the language used in peer conversation during the writing process (Li and Zhu, 2013). In order to understand student interactions more specifically, students' conversations were coded into different categories of language functions.

In the language learning domain, in particular, researchers have discovered more specific language functions to analyse peer interactions in class (Stanley, 1992; Mendonca and Johnson, 1994; Zhu, 2001; Li and Zhu, 2013; Li and Kim, 2016). Mendonca and Johnson's (1994) study with ESL students, for example, indicates that students use a number of language functions during pair work. These language functions include asking questions, offering explanations, giving suggestions, restating their partners actions, and correcting mistakes. Students involved in these language functions negotiate their ideas and thoughts to improve the effectiveness of their communication and interaction (ibid). Zhu (2001) conducted a study with both native English speakers and ESL students in a writing class to analyse their peer interactions. The study adopted Stanley's (1992) coding of language functions to categorise students' produced language into two main roles: reader roles (e.g. pointing, advising, and questioning) and writer roles (e.g. responding, eliciting, and clarifying). The idea of further categorising language functions into responding and eliciting is helpful to explore student interactions in the writing process. This has been further developed in Li and Kim's (2016) study. They investigated ESL student interactions

in wiki-based CW and focused on the analysis of language functions. They have produced (past-stick to one-add 'have' and you avoid any tense switch) language functions help them to understand and analyse peer interactions in detail. Accordingly, language functions play an important role during peer interactions in language learning contexts. The studies mentioned above, however, have not focused on the CT aspects in language function. They paid more attention to organising or writing aspects rather than thinking. This study, therefore, further adapted the existing categories of language functions from previous studies with CT aspects.

In this study, a taxonomy of language functions is constructed which is chiefly adapted from Li and Kim's (2016) existing categories (see Chapter 3). Li and Kim explored two small group (groups of three or four students) interactions during two CW tasks in a Wiki-spaces site at an American university. They aimed to build a systematic coding framework to understand and investigate the Wiki-based CW process and focus on four aspects: language functions during negotiation, writing change functions during text co-construction, scaffolding strategies, and changes of interaction patterns. Their nine-week study included introduction, group formation, pre- and post- task surveys, two Wiki-based CW activities, semi-structured individual interviews, students' reflection papers, and follow-up interviews. Results show that different groups demonstrate different interaction patterns, and the patterns change with each group across two CW tasks. They also identify different language functions in terms of initiating and responding functions produced by different participants, such as Student A produced 8 initiating acts while Student B produced 5. The observation and analysis of language functions in this study contribute to an understanding of how participants interact with each other by using the target language during the process of collaboration. However, the category of language functions in the study is very general and does not contain CT-related language functions.

Therefore, this study developed a taxonomy based on Li and Kim's categories. Each category of language function in this study was demonstrated with a definition. The taxonomy was helpful for understanding how participants thought, interacted and co-constructed writing in terms of their conversation during the process. As language could represent thinking, the more language functions were discovered, the more thinking elements were involved during the conversation (Swain et al., 2011). Therefore, analysis of language functions could help to address the main research question (regarding whether CT develops or not during CW).

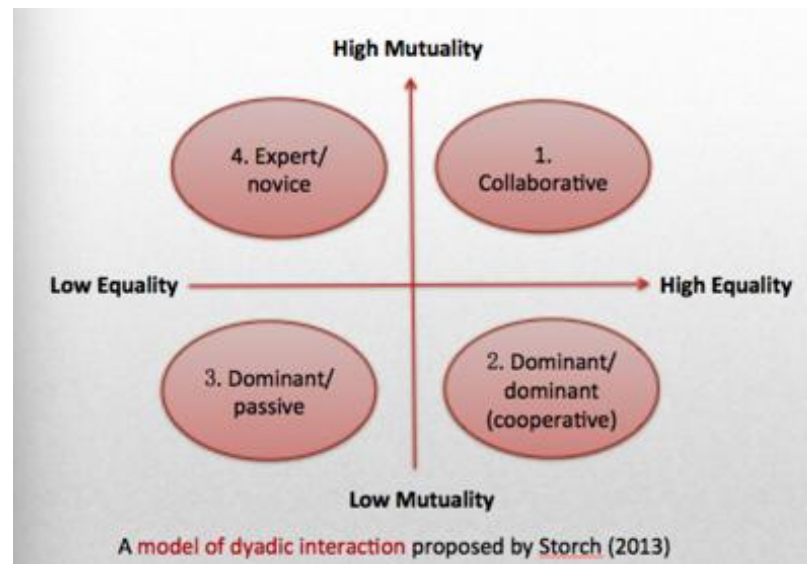
2.3.3 Model of dyadic interaction in CW

As discussed in Section 2.3.1, to promote student interactions in class is a useful teaching strategy. This study, therefore, promoted student peer interactions during CW activities, and analysed the process of peer interaction to explore how students apply CT and interact with their partners in class.

To my best knowledge, Storch's model of dyadic interaction is the only study to consider the interaction model in CW. To apply this model can help researchers understand how students interact with their partners and how they contribute to the tasks during the CW process (Storch, 2013). Therefore, to conceptualise the nature of student collaboration and interaction during the CW process, Storch's (2002, 2005, 2013) model of dyadic interaction is adopted as a useful framework for this study. The model was developed to explore peer interaction during CW. Storch (2002) conducted a CW project with ESL university students and concluded a model of dynamic interaction pattern. According to the dynamic model, students' writing and interaction performance were examined in two dimensions, equality and mutuality. Equality refers to the degree of the individual's contribution to writing and the control over the direction of the task, whilst mutuality reflects the level of engagement with one another's contribution (Storch, 2013). Based on the degrees of equality and mutuality, Storch (2002) categorised four interaction patterns: the collaborative pattern, the dominant/dominant or cooperative pattern, the dominant/passive pattern, and the expert/novice pattern, and reported that in the collaborative pattern and expert/novice pattern the pairs showed a high level of mutuality in writing.

As demonstrated in Figure 2.1, the two intersecting continua (equality and mutuality) form four quadrants that represent the four interaction patterns. The collaborative pattern in quadrant one has a relatively high degree of both equality and mutuality, which signifies that all students contribute equally to all aspects of the writing task during the process. More importantly, they also frequently engage with each other's contributions, as illustrated in the Examples below.

Figure 2.1: A Model of Dyadic Interaction Pattern proposed by Storch (2013)



Example 1: Collaborative pattern of dyadic interaction (Storch, 2001: 38-39)

- 1 Charley: This (reads instruction) ... What is this?
- 2 Mai: From the chart
- 3 Charley: This chart about
- 4 Mai: The data
- 5 Charley: With percentage and ah ...
- 6 Mai: Describe the percentage of
- 7 Charley: English language fluency
- 8 Mai: English language fluency between two counties yeah?
Vietnam and Laos
- 9 Charley: Yes, and compare before they came here and now
- 10 Mai: Yes

Example 1 is representative of the type of interaction that occurs between collaborative pairs. The two students produced highly cohesive conversation by repeating (e.g. turns 2-3, 7-8) and completing (e.g. turns 3-4, 6-7) each other's ideas. The students generated ideas jointly and responded to each other, so they demonstrated making joint contributions. The example of the collaborative pattern presented 'highly cohesive' pair talk, repeating and elaborating on each other's utterances. Students contributed jointly to all aspects of the task, in activities such as idea gathering, structure organising, and idea expressing. They also assisted each other by providing instant feedback. The interpretation of Example 1 above focused on mutuality and equality of writing contribution, while the CT element is missing. This study attempted to examine language function and CT elements to the analysis of student conversations. Therefore, Example 1 can be analysed as: the two students applied the skill of interpreting information to supplement each

other coherently during the conversation. They supplemented and confirmed each other's ideas in order to understand the information of the writing task. Except for interpreting information (e.g. turns 3-4, 7-9), these two students did not show ample use of CT during the short conversation. However, the high level of mutuality and equality of the student's engagement might support the CT application under the collaborative interaction pattern. The following three examples below also did not analyse student interaction with the CT element.

In quadrant 2 (Dominant/dominant pattern), although the degree of equality is high, it shows a low level of mutuality as Example 2 presents. This indicates that, although all students contribute to the task, they do not engage or are unwilling to engage effectively with each other. The example of the dominant/dominant pattern showed a high level of 'disagreement', in which the participants often reject each other's opinions or contribute to the task separately. There was not much evidence of providing feedback during the process. Lisa and Ivan discussed what to write and how to write by using current Chinese characters (translations of the Chinese words are given in square brackets after each turn). They both contributed to the task (e.g. turns 77-78), but they had a high level of disagreement (e.g. turns 67-74, 78-79). From the CT perspective, students in Example 2 do not illustrate any CT, as they present disagreement without reasons. However, they have the potential to use their CT to support their disagreements with each other.

Example 2: Dominant/dominant pattern of dyadic interaction (Tan et al., 2010: 27.)

- | | | |
|----|-------|--|
| 67 | Lisa: | I know, that is what I saw |
| 68 | Ivan: | I didn't find |
| 69 | Lisa: | Yes, it is |
| 70 | Ivan: | No, it is not |
| 71 | Lisa: | Yes, it is |
| 72 | Ivan: | No, it is not |
| 73 | Lisa: | Look, it is exactly ... hm |
| 74 | Ivan: | What ... come on, I mean things have legs |
| 75 | Lisa: | I mean this too, in the middle it's like that |
| 76 | Ivan: | Yeah |
| 77 | Lisa: | So you got that, you just need a horizontal line |
| 78 | Ivan: | Danshi women hai xuyao xiaban ... zuoyi women meiyou
jihua (laugh) [But we still need work ... therefore we don't
have plan] |
| 79 | Lisa: | (laugh) no, you can't write it |

Example 3 illustrates examples of interactions in quadrant 3 (Dominant/passive pattern), when degrees of equality and mutuality are low. This refers to situations where one student controls the

whole task, while others contribute very little or are unwilling to contribute. The passive students showed minimal contribution in terms of both quantity and quality. Students formed dominant/passive patterns, for example ‘long monologues’ mainly because of the actions of one participant, while passive students had limited expression or just expressed ‘agreement’. To analyse with CT element, the student who controls the conversation might show CT when he is self-elaborating with more information, while the passive student does not show any CT during the conversation.

Example 3: Dominant/passive pattern of dyadic interaction (Aldosari, 2008)

- 3 Talal: Aaa the other thing the second is sport ... We have to do sports every day we have to do the exercise every day ... Third is to keep ourselves away from the pollution sources.
- 4 Saber: Yes
- 5 Talal: We we'll talk about all of these things ... First food we have to take food or to make our food I mean we have to take more than one kind of food every day, specially fruits and aaa we must we must eat foods every day and drink milk in the morning and I think those are very important for us. Aaa the other thing is the aaa sport we have do the sport every day ... aaa walking and playing football and and do any do any kind of sports ... aaa.
- 6 Saber: Write?
- 7 Talal: Yes you can write now.

In quadrant 4 (Expert/novice pattern), the level of equality is low but there is a high level of mutuality. Although the level of contribution and the control over the task is unequal, they engage well with each other's contributions. The dominant student acts as a tutor who encourages other students to contribute to the task. As Example 4 demonstrates, although Gamal, who has a higher language proficiency, contributes more, he seemed to encourage Sahafi to participate in the task. Gamal asked Sahafi to provide or confirm ideas (e.g. turn 75), and Gamal also provided corrective feedback for Sahafi (e.g. turns 75, 77). The expert/novice pattern revealed that the person in the role of expert expressed themselves more, but also encouraged the others and provided instant feedback. From the CT perspective, students show the application of CT in terms of elaborating, supplementing and analysing argument. Although the task contribution is not equal, both students more or less use their CT during the conversation to provide useful ideals.

Example 4: Expert/novice pattern of dyadic interaction (Storch and Aldosari, 2013)

- 71 Gamal: What else? Umm ... following some kind of books, they are
 forbidding a lot kind of food. Like that, like milk ... ok? Let
 see what else what about the food what else. Health also about
 the food ... also sport or food. (writing) also sport are
 important.
- 72 Sahafi: Important
- 73 Gamal: To keep
- 74 Sahafi: To keep health
- 75 Gamal: To keep your health. Health good. What kind of sport for
 example?
- 76 Sahafi: Walked
- 77 Gamal: Walking what else ... biking ... you know biking ... bicycles
- 78 Sahafi: Yeah

An important finding in Storch's (2002) study is that patterns of student interaction influence their writing products and learning outcomes. Students' involvement in a collaborative orientation interaction pattern positively impacts on the CW result (Watanabe, 2008). This model has been widely adopted by researchers in both face-to-face and wiki-based CW activities (Li and Kim, 2016; Rouhshad and Storch, 2016). However, these studies only use the model of interaction patterns to examine LREs produced during individual writing tasks, rather than TREs. Moreover, Storch (2013) believes that interaction patterns tend to persist once formed by participants, regardless of task type. However, this claim is questionable. For example, Li and Kim (2016) found that participants showed different interactional features in two similar wiki-based CW tasks. Why the same participants can produce different interaction patterns in two similar tasks has not yet been explored. One possible reason would be the participants attitude toward the collaborative activities during the process. For example, Shehadeh's (2011) 16-week study, reported a change in participant attitudes toward CW. Students gradually enjoyed the process and became more active during the CW process and came to believe that the activities were beneficial. Their changed attitudes may also have influenced their interaction patterns during the CW and interaction process.

Thus, this study argues the interaction patterns in CW may change positively if students receive more CW practice in a relatively long-term collaborative learning environment with CT instruction. It also argues that the development or change in interaction patterns may influence or have a connection with a change in thinking skills. Accordingly, this study adopts the model of

dyadic interaction pattern to explore TREs produced by Chinese EFL students during an eight-week CW process. Student interaction patterns and CT are analysed, to explore whether participant interaction patterns and application of CT changed during the eight-week CW course.

2.4 Summary

In this chapter, after reviewing literature related to CT and CW, research gaps were identified. Firstly, how EFL university students use or develop CT during collaborative activities requires further investigation. Secondly, how EFL university students interact with each other during the process of CW tasks has not previously been researched in detail. Thirdly, whether CW integrated with CT instruction is a useful strategy to promote EFL university students' CT has been unexplored. This study, therefore, applies CW integrated with CT instruction intervention as a potential strategy to promote EFL university students' CT, and mainly focuses on the process of CW classes. It also adopts the view that CT is definable, teachable and assessable, and explores how students apply CT during CW activities. In doing this, this study adopted a sociocultural theoretical framework to support the teaching of CT and the use of collaborative learning in EFL classes. The literature supports the adoption of an interventional study that involved CW activities for EFL students' CT application in class.

Chapter 3: Methodology

Introduction

This chapter presents the methodology used in this thesis. It begins with the research questions and is followed by a discussion on the methodological basis, including the position held by the researcher, the mixed-method approach used in the study, the designed intervention, and methodological issues. The third section describes the research procedure and justifies the data collection methods. The fourth section discusses the main instruments used for data analysis, followed by a discussion of the reliability and validity of the study. Finally, the chapter considers the research gap and the contribution made by this thesis to knowledge. The limitations of the methodology are considered.

3.1 Aims and Research Questions

This research aimed to explore the process of CW and its effects on the development of the CT of EFL students in China. Specifically, the study investigated the following questions:

Main Research Question

Can CW facilitate Chinese EFL university students' CT in class?

Question 1: Are there any changes in students' CT during the eight-week collaborative writing interaction?

The study explores the frequency and quality of students' CT application in language learning and whether CT instruction and increased opportunities for peer interaction during CW activities improves CT thinking in terms of interaction patterns and language functions, as well as positive CT tests results after the eight-week study.

Question 2: What are students' perceptions of any impact of CW on CT?

This question is addressed by investigating whether students have positive attitudes towards their experience of CW activities in the language learning classroom, and whether they perceive that their CT have been facilitated and developed during and after the language learning process.

3.2 Methodological Basis

This section first discusses different philosophical standpoints of a research. Research methods can be traced back to an ontological position through methodology and epistemology (Scotland, 2012). Therefore, both the philosophical and methodological standpoints of this study are discussed below.

3.2.1 *The methodological position: Pragmatism*

In order to address the research questions, the most appropriate methodological position for this study is considered to be pragmatism. This research focused on a CW strategy with integrated CT instruction in writing classes in China. It aimed to investigate EFL students' application of CT during the CW process. The research questions are addressed through an analysis of student interaction and language use during the process of CW, and the test results after the CW. This study therefore mainly takes the ontological and epistemological position of pragmatism to explore the data from both qualitative and quantitative perspectives. The rationale for taking this position is explained by the discussions of different philosophical standpoints and the nature of pragmatism.

The philosophical standpoint of a study is the starting point when researchers are designing their study (Glogowska, 2011), and there are different philosophical underpinnings that may be adopted according to the researcher's ontological, epistemological, and methodological stance (Mack, 2010). The ontology of research refers to assumptions about the nature of social reality (Scotland, 2012). It relates to the researcher's beliefs that shape their views of the world and the nature of research. Epistemology is concerned with 'what it means to know' (Cohen et al., 2007, p.7), and thus, it influences the choice of research methods. The different ontological and epistemological positions often lead researchers to apply different approaches such as quantitative, qualitative or mixed-method approach in their research (Creswell, 2009). The paradigm debate between quantitative research and qualitative research has existed for decades

(Bryman, 1988; Oakley, 2000). The incompatibility of quantitative and qualitative research is stressed because of their fundamentally opposing worldviews (Glogowska, 2011). In general, quantitative research takes a positivist philosophical underpinning which seeks prediction, generalisation, and approximate truth (Creswell, 2014); while qualitative research links with an interpretivist viewpoint that questions absolute truths and acknowledges the importance that an individual's own understandings of reality based on life experience (ibid). Therefore, positivism and interpretivism are two typical paradigms that are widely applied by researchers.

Positivism emphasises objectivity, accepting that there is only one truth, but this truth is always impossible to be fully perceived and apprehended (Guba 1990). Positivists attempt to discover approximate knowledge about an objective reality and, thus, researchers who adopt a positivist approach are required to gain a greater approximation of the truth or reality by using quantitative research methods. Specifically, positivists often apply quantitative research (e.g. using experimentation or correlational studies) to investigate causes and factors that influence outcomes (Creswell, 2009). In most cases, such researchers apply deductive approaches to reduce complex interactions. Most valid evidence is collected through statistical or scientific methods, which involves controlled variables, random sampling, and empirical testing (Cohen et al., 2007). Conversely, Interpretivism, takes a relativist approach, which believes that truth or reality is multiple and subjective and is socially constructed by the individual through lived experience and social interaction (Guba and Lincoln, 1994). As Frowe (2001) suggests, interpretivists emphasise that meaning is constructed through the interaction between human consciousness and the world. Interpretive methodology often conducts qualitative research that focuses on exploring interactions among people and the "historical and cultural contexts" which individuals "inhabit" (Creswell, 2009, p. 8). It usually refers to in-depth and prolonged-period studies, including case studies, phenomenology, hermeneutics, and ethnography, which generate interpretive theories through analysis of gathered data (Cohen et al., 2007).

Researchers acknowledge the contrasting philosophical standpoints between quantitative and qualitative research methods (Barbour, 1999; Patton, 2002; Bryman, 2006). They choose paradigms according to their aims and focus on those best suited to explore their individual research inquiries (Patton, 1988; 2002). The research inquiries in this study, however, cannot be fully explained through either positivism or interpretivism. This study aims to explore EFL

students' constructive knowledge of CT and their application of CT in a language learning intervention. Therefore, a philosophical position of pragmatism, which contains both quantitative and qualitative research methods, has been taken in this study, adopting a mixed-method approach. The rationale for applying this approach is explored in Section 3.2.2 which discusses the selection of quantitative and qualitative methods and expands on the advantages of this approach.

Pragmatism is concerned with action, intervention, and constructive knowledge (Goldkuhl, 2012). Unlike interpretivism and positivism, pragmatism emphasises a successful application and solution to problems (Patton, 1990). It was first developed in the United States in the late 19th century, supporting the notion that a research philosophy is determined by the research question. Both subjectivist and objectivist epistemologies can exist at the same time in one research study depending on the subject being studied or explored (Xian and Meng-Lewis, 2018). Similarly, a research study can combine both positivist and interpretivist points of view, in terms of the nature of the research questions. As Peirce (1878) states:

Consider what effects, which might conceivably have practical bearings, we conceive the object of our conception to have. Then our conception of these effects is the whole of our conception of the object

(Peirce, 1878/1992: p132).

This suggests that people can only fully understand a concept if they understand the definition of it, the real effect of using the concept in daily practice, and the possible consequences of believing the concept to be true. Although the vagueness of the explanation of practical consequence was admitted by Peirce, the emphasis on consequence is a starting pointing for most pragmatists. According to pragmatism, the best way to explore and understand a philosophical topic, such as science, education, belief, and language, is through its practical use and successes (Mounce, 2000). The usefulness and practicality of concepts or ideas are important, and they emphasise the priority of action over belief and experience over fixed theory. Pragmatism regards thoughts and ideas as essential instruments for solving problems in authentic words (Gutek, 2014). As such, its philosophical underpinnings have influenced the study of law, education, religion, political and social theory etc.

Regarding ontology, pragmatists do not always follow the same ontological perspective (Xian and Meng-Lewis, 2018). Pragmatism believes reality is the practical effect of ideas (Crotty, 1998). The central tenet to pragmatist ontology is actions and change; with people acting in a world of constant change. Unlike interpretivism or positivism, reality, according to pragmatism may be either subjective or objective, and it can interpret the world in different ways.

Pragmatists claim that reality is renegotiated and interpreted constantly in light of its application in new situations (Biesta, 2010). Although there are claims in the literature for the application to CW, this study applies the strategy in a relatively new situation, focusing on observing the process of CW and its effects on CT. Moreover, this study also aims to investigate participants' constructive knowledge of CT during the intervention. The question is whether or not CW is a useful strategy to promote EFL students' application of CT. Taking pragmatism as the starting point, both objective findings from class observations and subjective responses from participants are explored when an eight-week intervention in a normal university classroom is conducted.

From the epistemological position, pragmatism argues that any way of thinking or doing that leads to practical solutions is useful (Biesta, 2010). There is no 'best way', but effective methods are the ones that solve problems or bring about desired changes. Meanwhile, Hall (2013) reminds us that investigation is the means and change is the underlying aim for pragmatists. No single point of view in research can present the entire reality. Therefore, this study is inspired by literature claiming that Asian students cannot be taught CT as Western students are due to the existence of different educational backgrounds and teaching methods (see Chapters 1 and 2). This study attempts to find a learning method to address the problem by providing an opportunity for Asian students to experience this new concept (i.e. CT and CW in this study) and new teaching methods and to explore the changes that occurred.

Following ontological and epistemological considerations, research methods should be selected carefully. Pragmatic research usually integrates more than one research method, including both quantitative and qualitative methods, within the same study (James, 1995). It focuses on the design, construction, implementation and adoption of a learning initiative in a real context. Many pragmatists select research methods according to the purpose of the research questions in different research domains (Creswell, 2003). Researchers do not have to adopt a fixed research

design with wholly quantitative or qualitative methods. The research design and research purposes are the most crucial factors that influence the choice of research methods, rather than philosophical commitment (Darlington and Scott, 2002). Thus, pragmatism provides researchers with more freedom and choice in selecting appropriate research methods for their studies. The most important question to consider is whether the research methods or research intervention will help to answer their research questions.

As discussed above, a pragmatist view facilitates understanding of multiple social realities by renegotiating and interpreting the idea or concept in social practice. Researchers who follow this paradigm do not dominate participants, but rather, provide the participants with opportunities to be involved in the process. As a result, participants can provide learning results through quantitative methods (e.g. pre- and post-test) and generate explanations for their actions and perspectives in detail through qualitative methods, such as observations, focus groups, and open-ended questionnaires or interviews (Ritchie and Lewis, 2003). In this research context, a pragmatist approach is useful to construct collaborative techniques and to understand participants' perspectives when applying CW in class. In this way, both the overall statistical findings and more detailed and in-depth answers to research questions can be generated. According to the nature of this research inquiry, a mixed-method approach was deemed appropriate.

3.2.2 Mixed-Method approach

In general, research questions determine the choice of research methods (Scotland, 2012). In order to investigate the extent to which CW is a useful strategy to facilitate EFL students' CT, a mixed-method approach was adopted for the data collection, based on pragmatist arguments and the limitation of an individual research method. Mixed methodologies combine both qualitative and quantitative research methods in data collection and analysis. This approach was selected so that the researcher could combine elements of qualitative and quantitative approaches to bring both breadth and depth to an understanding of the situation (Johnson et al., 2007). Therefore, it provided more comprehensive evidence to address the research problem, as compared to only using qualitative or quantitative research methods (Creswell, 2009).

The mixed-method approach has become increasingly popular in social and educational fields (Johnstone, 2004; Moran-Ellis et al., 2006). Consequently, a number of arguments to justify the advantages of using the mixed-method approach have emerged. A mixed method approach was selected for this study to help to build a comprehensive picture, increase the validity of the findings, and develop one method by the use of another (O’Cathain et al. (2007). The use of a mixed-method approach increases the strengths of the findings while eliminating the weakness of one method, enabling a multi-level analysis of complex issues and improving the validity of the research outcomes (Dornyei, 2007). The combination of quantitative and qualitative methods is very useful to reach multiple audiences

The mixed-method approach in this study mainly focused on in-class observations, pre- and post-tests, and semi-structured interviews. Although quantitative analysis was used, most of this data require qualitative analysis to explore the specific case or group of population in detail (Glogowska, 2011). This study aimed to analyse the cognitive effects of CW on EFL students’ application of CT during the activity process. The process of collaboration during essay construction, the results of tests, and the consideration of EFL participants’ reflections were all very important. Therefore, evidence from these different perspectives was provided using a mixture of methods.

The use of mixed-methods, however, can be challenging. The findings from mixed-method research can be problematic and complicated when some of the findings appear isolated, and do not support each other. Here, researchers need to further explore the possible reasons for such incidences, and to reflect on study design. Moreover, such studies may be too complicated for a single researcher to carry out both quantitative and qualitative research (Hesse-Biber and Leavy, 2006), especially if two or more methods are used concurrently. Moreover, for large and complicated studies it may require a research team to analyse quantitative and qualitative data separately. Secondly, mixed-method can be time-consuming. Transcribing the data can be tedious and challenging. However, to avoid these issues in the study, only a small-scale database was used. Some of the data from sample participants were analysed specifically, so it was manageable to apply the mixed-method approach. The mixed-method approach is a useful way to investigate a phenomenon that cannot be fully explored by a single method, and it enables researchers to answer their specific research questions comprehensively.

In order to investigate the research questions of this study, a combination of potential factors that might have influenced participants' performance were examined. Those factors, as discussed in Chapter 2, included participant' language proficiency, explicit instructions regarding CT, and the supportive classroom environment, each of which might be significant to the success of the study. Therefore, it was difficult to isolate each variable and examined their impact independently. It was more effective to examine them together to see how they contributed to participants' CT. Table 3.1 presents a summary of the research questions and the data sources used to answer them. A more detailed explanation of how these different research tools worked together in this study are presented in Section 3.3 later.

Table 3.1: Data sources employed to answer the research questions

Research Question	1 Are there any changes in students' CT during the eight-week collaborative writing interaction?	2 What are students' perceptions of any impact of CW on CT?
Data Source	<ul style="list-style-type: none"> • Pre- and Post- tests (amended W-GCTA and individual writing) • Audio (70) recordings of student interactions on tasks. 	<ul style="list-style-type: none"> • Interviews with a sample of students after the intervention
Data Analysis	<ul style="list-style-type: none"> • Statistical analysis of pre- and post- tests results; • Observed participants' performance during the process of CW in classes. 	<ul style="list-style-type: none"> • Students' opinions in an interview designed by the researcher
Analysis Focus	<ul style="list-style-type: none"> • The changes and application of participants' CT. • Detailed features of participants' CT performance in interaction patterns and language functions during the writing process. 	<ul style="list-style-type: none"> • Students' subjective feelings and attitudes towards their CW experiences

3.2.3 The intervention

Intervention design is a popular way for researchers to adopt a mixed-method approach (Creswell, 2014). The intervention can also be described as an experiment, as researchers intervene at certain points throughout the study to assist in more effective results formulation (Thiese, 2014). One of the common interventional designs is the pre-post design, which examines the research findings before and after a particular intervention (ibid). It can help researchers to explore a problem by conducting an experiment or an intervention while also collecting qualitative data during the intervention. For example, qualitative data can be collected in order to investigate participants' performance during intervention activities, or it can be collected after the intervention to provide more detailed explanations than the statistical

outcomes of the post-test (Creswell, 2014). Creswell also suggests a number of procedures for the intervention:

1. Determine how qualitative data will be used in the experiment or intervention trial according to the basic design: before (exploratory sequential), during (convergent), or after (explanatory).
2. Conduct the experiment: Assign groups to control and treatment; determine pre- and post-test measures; gather the data; and assess whether the treatment has an effect.
3. Analyse the qualitative results to determine their impact.
4. Interpret how the qualitative results enhanced the experimental results.

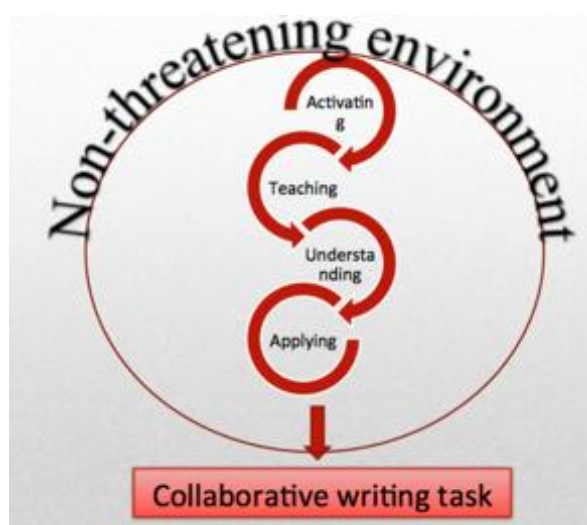
(Creswell, 2014, p. 57)

To apply this research design, the researcher carefully considers when and how to gather qualitative data. This study involved an eight-week intervention. CT was integrated into each week's CW practice in class. Reviewed of the literature (see Chapter 2) suggested that explicit instructions and subject-related practice lead to better learning outcomes regarding the development of CT. Therefore, in this study, the writing class was combined with CT teaching intervention. Each lesson (except the first and the last lesson) focused one particular CT skill such as analysing arguments and recognising assumptions. The particular CT skill was taught and then encouraged to use during the CW process. No control group was used to compare performance between participants who experienced a CW strategy and CT teaching intervention and those who did not. This is because this study concentrated on process rather than product by comparing participants' behaviour at the beginning and at the end of the course. After the eight-week CW and CT intervention and post-test, semi-structured interviews were then conducted to provide more detailed and qualitative responses as supplementary support. These qualitative findings could be combined with the quantitative results from the tests to enhance the reliability of the research findings (Bryman, 2006; Creswell, 2014).

In this study sociocultural theory influenced the design of the intervention. In sociocultural theory, it is acknowledged that verbal interactions can enhance learning (Vygotsky, 1981). The eight CW and CT lessons provided EFL participants with opportunities to interact with their

partners in class, so that they could assist each other during the process of CW and, as a result, potentially improved their individual performance on CT and language learning (Donato, 1994). A non-threatening environment (see Section 2.1.4 and 2.3.1), was chosen as a better learning environment for EFL participants, rather than the traditional teacher-centred approach (Storch, 2013; Swain and Lapkin, 1998). This non-threatening environment (as illustrated in Figure 3.1) could encourage peer interaction and collaboration, which were beneficial for thinking development and language learning (Heyman, 2008; Shahini and Riazi 2011). The teacher was regarded as a facilitator during the peer interaction, and to mediate students with guidance and instruction. To enable participants to use their CT to express opinions or to evaluate each other's ideas during the CW, each of the eight lessons was designed with a teaching procedure, including a preparation stage and a CW stage. The preparation stage consisted of activating, teaching, understanding, and applying. During the preparation stage, the researcher guided and mediated participants step-by-step, and prepared them with relevant knowledge of CT before they moved on to the CW stage, where they produced a written text.

Figure 3.1: Stages of lesson development



Preparing Stage

Activating. Each lesson started with an activating activity, which was a simple task to activate participants' interest in the topic and the introduced CT skill, and then encouraged them to think

(Mason 2008). From a sociocultural perspective, participants' existing knowledge of the topic and relevant thinking skills were activated when they communicated and interacted with peers during this activity (Vygotsky, 1978; Storch, 2013). Unlike the traditional teacher-dominant teaching approach, the activating stage was entirely student-centred (Entwistle, 2003; Yang, 2017; Merrill, 2002). Meanwhile, the participants were mediated by the teacher through giving prompts and asking questions that took participants through various steps until the important issues in the lesson were addressed. For example, the teacher showed pictures in one of the sessions, trying to elicit participants' existing skills of 'inference' when they had discussions with their peers, without explicit teaching of 'inference' at the beginning of the class. Through this guided activity, participants were able to share and expand their understanding of the topic.

Teaching and understanding. The target CT skill was introduced and explained with examples in this stage. Some of the relevant literature (discussed in Section 2.1) suggested that CT was unfamiliar for most Chinese EFL students. Hence, it was necessary to teach this concept explicitly before participants applied it in their writing task (Mason 2008; McGuinness 2006; Yang, 2017). In order to avoid the teacher-centred approach, the teacher showed examples of CT, and tried to elicit more possible answers or summaries from participants rather than giving them the answer directly (Long and Porter, 1985; Harklau, 2002). According to Vygotsky's ZPD (1978), EFL students can acquire new knowledge with the assistance of a more capable person, prior to learning independently at this level. The teacher, or a more capable student in class can facilitate teacher-student interaction, and student-student interaction, rather than teacher-centred interaction (Mashburn et al., 2008; Brown et al., 2010). The teacher provided knowledge input for participants and established the participants' understanding by asking several simple questions. Through the activating, teaching, and understanding steps, the teacher tried to mediate participants, eliciting participants' current understanding so as to extend this by building on their existing knowledge and understanding of CT (Swain, 2010). For example, when teaching about 'inference', the teacher provided illustrations 'inference' to guide participant understanding of its meaning, and then offered definitions of 'inference'. Subsequently, participant understanding of 'inference' was checked by practicing inference activities.

Applying. Participants were required to apply the taught CT skills to complete the group activities. They were divided into small groups to complete thinking tasks collaboratively,

including reading passages critically, simple thinking activities and problem-solving activities. During the stage, the teacher only monitored the process of collaborative tasks. These tasks were completed by participants to demonstrate their understanding and ability to apply CT. At the same time, opportunities were provided for participants to exchange ideas with peers and to mediate each other (Vygotsky, 1978). This non-threatening environment encouraged participating students to think critically by interacting with their peers (Ebersole, 1993; Storch, 2013; Swain and Lapkin, 1998). During the collaboration, participants expressed their ideas freely by using both L1 and FL. As there were no definite right or wrong answers for the discussion tasks, participants expressed their ideas freely to demonstrate CT. The preparation stage was a knowledge construction process, in which participants not only acquired new ideas but also reflected on any misunderstandings and became conscious of their own strengths, weaknesses and thinking processes. The aim was for participants to gradually achieve higher cognitive development within this non-threatening environment (Ebersole, 1993; Vygotsky, 1978). After the group discussion, participants presented their answers in front of the whole class. The teacher provided feedback for such answers and their application of CT. Participants were asked to comment on other group presentations, expressing their views on the merits or weaknesses of given answers, particularly if they had disagreements. This allowed participants to access more shared ideas, feedback, and thinking.

Producing Stage

CW activity. Participants were encouraged to apply the taught CT skills during the CW process. After the participants had been exposed to CT in various activities, they were asked to produce CW in pairs or small groups. They were asked to complete a piece of academic writing in English of 120-200 words within one hour on topics related to their studies in daily life. They were told to use the CT skills they had learned. This producing stage was the last, but most important, stage for every class. The use of CW was supported by sociocultural theory as it encouraged students to interact with each other (Shahini and Riazi 2011; Ohta, 2001). The teacher mediated participants by explaining what CW is and how to do it in the first class and observed whether participants did it correctly during the collaboration. Teacher monitored the whole CW process and observed how participants used their CT. It is considered normal if participants could not implement CW efficiently at the beginning, because not all CW activities could be completed successfully (Storch, 2013). Participants were made aware that CW is not

simply grouping together to produce texts. They were encouraged to communicate, negotiate, and interact with their partners, in order to exchange ideas (Lowry, Aaron and Rene, 2004). Participants were asked to complete joint paperwork at the end of the class and they were informed that the whole CW process would be audio recorded.

The four teaching stages described above explain how sociocultural theory guides the teaching procedures for each lesson in the study. Teacher would guide students to understand and apply different CT skills step by step in each class. The teacher played an important role of facilitator and mediator in class. An example of more detailed information about lesson planning will be described in Section 3.3.2. It will present how teachers operationalised CT in class, how each lesson linked with the working definition of CT in this study, and how taught CT skills were linked with CW task in each lesson. The lesson plan for all eight lessons applied in this study can also be found in Appendix A.

3.2.4 *The semi-structured interview*

Traditionally, interviews are a qualitative method that can be categorised in terms of the structure and whether they involve individuals or groups (Richards et al., 2012). This can also be extended into other forms of interview such as telephone interviews, email interviews and online focus groups (Genovese, 2004; Gibson, 2010; Kenny, 2005). Each of these forms of interviews has advantages and disadvantages. In general, there are three types of interviews based on the level of structure (Bryman, 2004). These are: the structured interview, the semi-structured interview, and the unstructured interview.

Many studies involve the semi-structured interview (Dornyei, 2007). These allow interviewees to talk freely, to answer open-ended questions (e.g. what is your understanding about CT?) while researchers can control and guide the interview and let interviewees elaborate on certain topics (Denscombe, 2003). The semi-structured interview is suitable for studies where the researcher has a good understanding of an issue and prepares broad questions related to the issue in advance but is still interested in encouraging interviewees' responses without the limitations of ready-made response categories (Dornyei, 2007). The interviewer asks each interviewee the same questions but not necessarily in the same words or order. The preparation of the interviewer can

determine the success or failure of the interviews (Richards et al., 2012). There are three stages of preparation: establishing the aim of the interview, listing core topics/questions, and identifying lines of inquiry. Once the preparation is completed, it can guide researchers to elicit participants' responses during the interviews.

This study, therefore, selected semi-structured interviews to encourage interviewees to express their feelings and views about CT and using CW in class freely. This qualitative data provided more detailed explanations than statistical test results to answer the second sub-research question.

3.2.5 *The methodological issues*

As this study applied a mixed-method approach, some methodological issues required consideration and explanation.

One methodological issue in this study concerned the sample size. The mixed-method approach involved both quantitative and qualitative methods and had different requirements for sampling. A large sample might be collected in quantitative research in order to generalise the results from the sample to a particular population, while qualitative research requires a smaller scale of sample to establish individual perspectives (Creswell, 2014). The researcher needs to consider sample size options if applying both qualitative and quantitative methods in one study. Creswell (ibid) suggested three options. Firstly, selecting the same sample size for both quantitative and qualitative data collection: a large amount of qualitative data will take a great deal of time to analyse. Secondly, selecting equivalent qualitative data to the quantitative data, which is complicated to achieve. The third option is to select different sample sizes for the quantitative and qualitative data. As the quantitative and qualitative data reveal findings from different perspectives, it is unnecessary to have an equal sample size. Therefore, this study chose different sample sizes for quantitative and qualitative data.

The second issue was time. It was time-consuming to conduct the whole eight-week CW intervention with both quantitative and qualitative methods (Dornyei, 2007). Interviews, for

example, took time to set up, collect data, and transcribe (Fontana and Frey, 2000). This study mainly focused on qualitative data, which required significant time to transcribe and analyse. This is why a relatively small sample was selected for qualitative data collection and analysis.

The last methodological issue to be addressed concerned the validity and reliability of the study. The teacher who designed this thinking and writing course and the first to mark participants' CW papers was the researcher herself. This fact might lead to negative effects such as bias and subjectivity, which could affect the validity of the qualitative data (Dornyei, 2007). In order to improve the reliability and validity of the data, another experienced EFL teacher was invited to be the second and main marker. The second marker had completed her PhD in EFL education in the United Kingdom, as well as having sufficient knowledge about CT and CW.

With regard to the CT aspect, the researcher had prior knowledge of CT and was accomplished in English language teaching, while the other teachers in University J were not familiar with teaching CT. As it was not realistic to train the teachers due to time constraints, the researcher delivered the eight-week intervention and marked the participants' work. Markers evaluated the written essays based on a marking criterion, named 'A Guide to Rating Critical and Integrative Thinking in Writing' from Washington State University (2009). This particular rubric emphasised CT aspects in writing, (see Section 3.3.3 and 3.4.1). The essays were mostly evaluated from the CT dimension, which required the marker to have knowledge of CT. The work was anonymised during marking, and the use of the particular rubric also reduced bias. Therefore, the researcher, as a teacher and the first marker in this study, ensured that participants receive useful feedback on CT and writing during the study.

Regarding the CW learning method, CW was regarded as a new learning strategy in Chinese universities. Most academic writing classes in China still applied the traditional product-oriented teaching approach (Du, 2012). Therefore, since many Chinese EFL teachers and students had no experience in CW, they would need guidance in order to apply CW effectively and successfully in the class. Teachers in University J, and in other universities in China, had no experience in teaching CW. In addition, the conducted intervention of this study required three months. This length of time was considered to be too long by many of the other teachers. According to the

researcher's own experience, collaborative learning is quite a familiar learning pattern. As Carver et al. (1992) suggested, the key element for a teacher to teach design skills is the combination of teacher familiarity and facility with techniques and the model of design skill. That said, with experience in both using and researching this learning method, the researcher herself was an appropriate person to teach this special training course.

Another important reason was related to the research focus in this study. As highlighted previously, the main purpose of this study was to explore the process of collaboration rather than the writing outputs of collaboration. It aimed to investigate how participants interacted with each other in order to find out how they thought and collaborated during the writing process. While this did not mean that the products were insignificant, they were treated as supplementary data to support the main findings. The role of the teacher during the writing process was more facilitative and observing. In this way, the risk of subjectivity and bias from the researcher as the teacher was reduced. Moreover, the participants were not aware of the specific research purpose. If participants were to know about the research focus of the study, the teaching could be affected (Paulus, 1999). In this study, participants only knew of the main concepts of the study, and they were provided with basic information about the study at the beginning. As a result of this anonymity, the validity and reliability of this study were strengthened.

3.3 Research Main Procedures and Data collection

Enhancing undergraduate students' application of CT in language learning was the main object of data collection for this study. As discussed in Section 1.1.1, the Ministry of Education mandated that CT skills should be included as a teaching objective in the EFL curriculum at university level. A strength of this research focus was that it addressed one approach to include CT in the EFL curriculum. Therefore, this study aimed to collect data on participants' application of CT during the CW process, and to compare CT test results to explore whether students' CT had improved after engagement with the eight-week intervention. The research design and data collection in this study included pre- and post- tests, as well as audio recordings of student interaction during CW practices, and semi-structured interviews. To ascertain whether collaborative writing tasks would foster CT in language learning, an academic writing course that applied a CW strategy integrated with explicit CT instruction was designed and offered as an extra training course for EFL students in one Chinese university.

The study was initiated at the beginning of the second semester with two pre-tests; the Watson-Glaser CT Appraisal was followed immediately by an individual English academic writing test (Section 3.3.3) generally determining the extent to which the participants were being critical during the learning. After these pre-tests, the intervention started and lasted eight weeks in the second semester. During the eight-week CW and CT course, the researcher facilitated the activities carried out by all participants and recorded their performance to collect evidence on important aspects (e.g. social interaction and language functions), promoting participants’ CT and the effectiveness of the learning activities. Towards the end of the semester, after the intervention finished, the post-tests were administered using the same instruments as in the pre-tests. Interviews were then conducted with selected participants and data analysis followed. The procedures are summarised in the table below. A detailed description of each step follows.

Table 3.2: The Summary of Research Procedures



This study applied various data collection tools (i.e. pre- post- tests, teaching intervention, class observation, and interview). All of this data worked together and interrelated to answer the research questions. The pre-tests results helped to reach a clear understanding of participants’ original CT level, and set up a baseline for the researcher to compare their understanding at the end of the course. Then, the tested CT skills were taught in class before participants started to practice the CW tasks. Some of the pre-test questions were also analysed or used as examples to help participants understand CT. The observation and audio data collected participants’ CT performance during CW process. This helped to examine whether or how participants used the taught CT skills when interacting with each other during the CW process. This also helped to

investigate whether CW practice promoted participants' application of CT in language learning. After the eight-week intervention, the post-test results illustrated whether participants' application of CT in language learning had improved or not. Comparison of pre- and post- test results provided statistical data, which supplemented findings from the classroom observations. Finally, participants' responses from interviews further explained their application of CT during the CW process. This information contributed to a better understanding of participants' behaviour and performance, and it provided a useful reflection from participants toward the whole intervention.

3.3.1 Research context and participants

English learning is a very important subject in China, and undergraduate students are required to pass a specific English test, regardless of whether they are English or non-English major students. Students are always required to attend some form of English course in their university, such as College English, English for Academic Writing, and Intensive Reading. University J was selected for this research because it is one of the key national public universities in China that contains both English and non-English major students and those students were willing to attend extra training classes. This means that University J had more potential participants for the research.

After University J agreed for the researcher to conduct the research in the university, the researcher contacted Teacher F who is the professor of English education at the university. Teacher F was interested in the research and helped the researcher to invite possible volunteers. The invitation to the research participants was sent out by announcement to students at the end of the first semester with the help of Teacher F. Consent was sought from the participants by providing them with information letters and consent forms (see Appendix I and Appendix K). Participants in the study involved both English major and non-English major students, so that the influence of language proficiency on the results could be minimised. As discussed in the literature (see Section 2.1.2), one possible reason for Chinese students' weak performance in CT might be low language proficiency. All participants were first-year undergraduate students and voluntarily attended the CT and CW course. Since they had finished only half a year of university studies, they were considered to be at the lower-intermediate level of English proficiency. The study contained 60 EFL students at the beginning. However, only 24

participants (10 English major students and 12 non-English major students that were taught separately) attended for most of the eight-week intervention in the study. This was because the course was an extra-curricular training course that took place every Saturday, and participants voluntarily attended. Some withdrew because they lost interest, while some of them were sometimes absent when they had other school or social activities. Therefore, this study was based on the performance of the aforementioned 24 participants (aged 18-20).

3.3.2 The intervention (Eight-week CW programme)

The intervention lasted eight weeks, from 12th March to 4th June 2016, with two hours of class per week each Saturday. Each lesson focused on a specific CT skill and CW task on a chosen topic as shown in Table 3.3 below.

Table 3.3: Summary of the Intervention

Week	Title	Objective	Topic	Writing Task
1 12 Mar	Pre-test	Assessment	CT skills	<ul style="list-style-type: none"> CT skills test Individual argumentative writing task
2 19 Mar	Lesson One	Introduction	Introduction to CT and CW.	<ul style="list-style-type: none"> CW: Attitude/perspective
3 26 Mar	Lesson Two	Analysing Arguments	Beggars	<ul style="list-style-type: none"> CW: Personal preference-1
4 9 Apr	Lesson Three	Assumptions	Shopping online	<ul style="list-style-type: none"> CW: Personal preference-2
5 16 Apr	Lesson Four	Assumptions in context	Telling stories	<ul style="list-style-type: none"> CW: Recognising assumptions
6 23 Apr	Lesson Five	Inferences	Being detectives	<ul style="list-style-type: none"> CW: Inferencing
7 7 May	Lesson Six	Deductions	Loving relationships	<ul style="list-style-type: none"> CW: Attitude/perspective
8 14 May	Lesson Seven	Interpreting Information	Job recruitment	<ul style="list-style-type: none"> CW: Decision-making
9 21 May	Lesson Eight	Conclusion/Reflection	Conclusion of CT	<ul style="list-style-type: none"> CW: Problem solving
10 28 May	Post-test	Assessment	CT skills	<ul style="list-style-type: none"> CT skills test Individual argumentative writing
11 4 June	Reflection	Interview	10 participants	<ul style="list-style-type: none"> Semi-structured interview

As illustrated in Table 3.3 above, each lesson focused on one particular CT skill based on the amended W-GCTA test and the working definition of CT applied in this study, such as ‘analysing arguments’ and ‘interpreting information’. This study applied the amended W-GCTA test as one CT measure because the skills in this test were closely related to the CT defined for

this study (see Section 2.1.1 and Section 2.1.5). Another rationale for teaching these CT skills is because of the pre-test.

Below is one lesson plan as an example:

Lesson One: Introduction

Objective: To have a general understanding of concepts of CT and CW

Teaching content: Introduction to various interpretations of critical thinking and collaborative writing procedures

Step 1: Activating activity (10 min):

Examples from Watson-Glaser critical thinking test were selected to activate students' interest in their own CT ability, and to encourage them to think. A short video clip of Sherlock Holmes and John Watson's conversation is then used to allow students to discuss and exchange their ideas about critical thinking and critical thinking skills Sherlock Holmes and John Watson had used. After the discussion, students might have some ideas about CT.

Step 2: Teaching and understanding (15 min): Some definitions of critical thinking were introduced to help students understand what CT is, and why it's important (as discussed in literature the understanding of CT is important). Some examples were presented to guide students specifically.

The teacher shows some definitions of CT according to different perspectives:

- reflective thinking that is focused on deciding what to believe or do (Norris, 1989).
- Sternberg's (1986: 3) definition emerged from cognitive psychological approach, "the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts."
- "Seeing both sides of an issue, being open to new evidence that disconfirms your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available facts, solving problems, and so forth" (Willingham, 2007, p.8).
- Bloom's revised hierarchical taxonomy of CT skills.

Therefore, teacher explained that students would focus on different critical thinking abilities and practice these skills in the future classes respectively.

Step 3: Application: Group work - Odd one out (20 min) A brain-storming activity for students to think from different perspectives, think critically with reasoning skills, and to provide students opportunity to practice CT

Sample: 'Colourful', 'Behaviour', 'Centre'

Answers:

'Colourful' is the odd one out. Both 'behaviour' and 'centre' can be noun.

'Behaviour' is the odd one out. The spellings of 'colourful' and 'centre' are British English.

'Centre' ([ˈsentə(r)]) is the odd one out. Both 'colourful' ([ˈkʌləfəl]) and 'behaviour' ([br'hervjə]) contain three vowels.

Question: 'Reply', 'Reaction', 'Analyse' which one is odd one out?

Answers:

'Analyse' is the odd one out. Both 'Reply' and 'Reaction' can be nouns.

'Analyse' is the odd one out. Both 'Reply' and 'Reaction' have similar meanings.

'Analyse' is the odd one out. The first letters of 'Reply' and 'Reaction' are R.

'Reply' ([riˈplai]) is the odd one out. Both 'Reaction' ([riˈækʃən, ri:-]) and 'Analyse' ([ˈænəlaɪz]) contain three vowels.

'Reply' is the odd one out. Only 'Reply' can be both noun and verb.

'Reaction' is the odd one out. Both 'Reply' and 'Analyse' can be verb.

Question: '3', '8', '12' which one is the odd one out?

Answers:

'3' is the odd one out. '3' is odd.

'3' is the odd one out. '3' is the smallest.

'3' is the odd one out. '3' is not divisible by 2 or 4.

'8' is the odd one out. '8' is not in the 3x table.

'12' is the odd one out. '12' is a 2-digit number.

'12' is the odd one out. '12' is the biggest.

Students were divided into small groups to complete the task:

- Find out which one is the odd one out
- Give reasons to support your arguments
- Find out as many possibilities as possible
- To evaluate other students' arguments in your group

During this activity, students were encouraged to interact with their peers to exchange ideas. There was no right or wrong answer as long as they could justify themselves. More possible answers were encouraged from students.

Step 4: Feedback-Group presentation (5 min) Students presented their answers. Due to time constraints, only two groups were selected at each class to share their answers with the class. After the presentation, the teacher provided some feedback to students' answers and to the extent they had applied their thinking skills.

Step 5: CW (10 min): Teacher introduced CW and demonstrated how to practice it. According to the approach, the whole process of CW is:

- Pre-writing stage: including collecting, planning, organising ideas, finding new words and vocabulary and producing an outline.
- Drafting and writing stage: with the emphasis on writing a draft of the whole essay from beginning to end. The main priority of this process is to use the ideas and vocabulary they had collected together during the pre-writing stage in their writing without paying any attention to grammatical, spelling or punctuation mistakes.
- Revising stage: concentrating on the consistency of sentences: for instance, the use of tenses, changing unsuitable vocabulary and reorganising paragraphs or sentences.
- D-Editing stage: concerned with issues of linguistic accuracy such as spelling, grammar and punctuation.

The collaborative writing exercise required students to produce a jointly writing product at the end of class. They followed the same procedure of the individual writing process. However, students needed to work together with their partners during the whole writing process. They were encouraged to apply the taught CT skills in class such as: interpreting information, analysing arguments, reasoning, analysing etc. They could use those CT skills to share or exchange their ideas, negotiate or compare their ideas, and persuade each other to complete one writing essay collaboratively.

Step 6: Writing activity (1 hour): Students worked in pairs to try to complete an argumentative essay. (This was their first practice of CW, so students did not have to finish the writing in class.) They were asked to write about the following topic (at least 120/200 words) in pairs: 'Some scholars believe that Asian students are not good at CT and prefer to wait to be told the answers like John Watson. Do you agree or disagree? Why?'

This was the producing stage when students wrote collaboratively to complete one joint task. The process was audio recorded in order to analyse their performance during the process of CW.

In summary, Lesson One was an introduction to CT and CW. The researcher tried to provide participants a general understanding of CT and CW, which introducing definitions of CT, the experience of using different CT skills, and examples of CT. The activity “Odd one out” is used to facilitate the participants’ interest and use of CT (e.g. interpreting information, reasoning and analysing) in practice. The whole lesson plan and teaching materials are attached in appendix (see Appendix A).

3.3.3 Data collection-1: Pre- and post- tests

Two instruments were used to collect data regarding participants’ CT before and after the eight-week intervention. The Watson-Glaser Critical Thinking Appraisal was used to assess participants’ CT skills, and individual argumentative writing was used to examines participants’ CT in writing. Each is described below.

As discussed in Section 2.1.5, because each type of CT test has its own limitations, this study combines the two (i.e. multiple-choice test and assessment of individual writing products) in order to strengthen the validity and reliability of the test results. The study selects the W-GCTA as one of the CT tests because the thinking skills this test examines align with the working definition of CT employed in this study, as proposed in Section 2.1.1. CT involves the skills of understanding (interpreting information), reasoning (making deduction or inference), analysing (recognising assumptions), and evaluating and criticising (evaluating arguments) – skills that are all interrelated. The second CT test instrument applied in this study is that of individual argumentative essay writing. One reason for selecting this type of writing is that it encourages students to use CT to produce sound and reasoned arguments, as discussed in Section 2.1.4. Additionally, based on Vygotsky’s (1978) sociocultural theory, student cognitive or CT development in collaborative interactions can be transformed into independent outcomes or products. This suggests that, in this study, individual essay outcomes could witness certain CT improvements if the students CT presents improvement during collaborative activities in writing

class. The observation and analysis of the students CT application, in different but accordant ways, produced evidence-based and reliable findings.

A. Watson-Glaser Thinking Appraisal

The Watson-Glaser CT Appraisal (W-GCTA) was selected as one of the test instruments because this study focused on EFL undergraduate students and the development of some CT abilities. These CT abilities, such as “Interpreting information” and “Analysing arguments” are considered significant for EFL undergraduate students in solving problems. The W-GCTA is based on the RED model of CT (Watson and Glaser, 2009) As the model has logical appeal and provides interpretational ease, it is one of the most widely used tests for evaluating cognitive ability. There are three crucial CT factors in the model, which include Recognising Assumptions, Evaluating Arguments, and Drawing Conclusions. This CT test was selected for this study primarily because of its reliability and validity, and because it measured elements of interpreting information, reasoning, inferring and deducing, and analysing arguments, which were involved in the CT definition applied in this study.

The W-GCTA contains five subtests emphasising different CT skills and these have 83 multiple-choice items in total. The five subtests are: 1. ‘Analysing Arguments’, which requires students to decide if each argument is strong or weak; 2. ‘Assumptions’, asks students to identify the absence or presence of an assumption in a statement; 3 ‘Deductions’ require students to determine whether given conclusions necessarily follow the provided information; 4 ‘Inferences’ invite students to consider the correctness or incorrectness of a statement; and 5 ‘Interpreting Information’, focuses on the students ability to clarify and interpret given information. These concepts are very similar to the CT definition applied in this study, and they were key skills for students in constructing their writing. These five subtests were used to measure participants’ general CT skills improvement through the practices of CW in the study.

The test had good reliability and validity as a CT measurement. A number of methods, such as internal consistency of the test items, test-retest, and alternate forms analysis, were used to estimate the reliability of the W-GCTA with different populations. Overall, most of the results estimated reliability is above 0.8, which provided a good indicator or reliability (Watson and

Glaser, 2012). The validity of the W-GCTA had also been examined in different ways, including content validity, construct validity, and criterion-related validity. These also illustrated positive results regarding validity. It has thus been demonstrated that the test can be used with different groups, irrespective of specific disciplines (Watson and Glaser, 2006; Kudish and Hoffman, 2002). Within the area of this study the validity and reliability of using W-GCTA have been performed by a number of studies (Wagner and Harvey, 2006; Gadzella et al., 2006). The test has also been validated for use with Chinese students and has been applied in many Chinese contexts with its validity as a CT measurement adequately demonstrated (Floyd, 2011).

Within this study the tests were shortened from 83 to 67 questions due to time constraints and unsuitable topics (i.e. gun policy and other unfamiliar topic for Chinese students) identified in the pilot (a sample test can be viewed in Appendix E). According to the original W-GCTA test requirement, only 30 minutes were allowed for 40 questions and 60 minutes for 80 questions. This required that more than 1 hour was allocated for 83 questions on the original test. However, at University J in this study, the timetable permitted a maximum of 50 minutes per class to complete the test, meaning that participants would have insufficient time to complete all 83 questions. In addition, students' responses to 83 questions in the pilot study revealed that some questions were too difficult to answer due to the unfamiliar nature of the topics covered. For example, one question discusses whether public servants in healthcare and education should have the right to go on strike. The social phenomenon of strike action is unfeasible within a Chinese context, and, therefore, the unfamiliarity of the issue would clearly influence the Chinese student's ability to think critically about the topic. Thus, due to a combination of time limitations and topic unsuitability, it was decided to shorten the original W-GCTA items to 67 items by removing certain culturally incompatible subject areas, thereby providing students with sufficient time to answer the more relevant questions and demonstrating CT skills.

Although the original W-GCTA was shortened, the validity and reliability of the test among Chinese students have not been undermined. The W-GCTA was modified in such a way that the five subtests were retained, and each subset contained 12 to 16 questions. The amended version of W-GCTA was administered for all participants before and after the eight-week intervention. Form A was administered before the eight-week intervention, while form B was administered after the intervention. Form A and Form B are two set of tests but contain the same category of

five subtests. Both form A and form B consisted of 67 questions and scores would range from 1 to 67.

Moreover, the tests were adapted and translated into Chinese, as all participants were Chinese EFL undergraduate students. This translated version was intended to minimise any misunderstanding of the test questions that may have been caused by language factors. As Hu et al. (2020) discovered, Chinese students who took a Chinese version of W-GCTA showed higher test scores than those who partook in an English version of W-GCTA. This result indicated that language factors can notably influence Chinese students' CT performance on the test. Therefore, in the current study, the original W-GCTA was translated into Chinese in order to facilitate a more authentic CT performance from Chinese students.

The participants were asked to write down their names on the answer sheets, but they were then anonymised by the researcher before marking the tests. Participants were given 50 mins to complete the test and they were allowed to ask the researcher if they had questions. Participants' answers to the amended W-GCTA were hand-marked. At the end of the eight-week intervention and after the interviews were completed, both the pre- and post-test results were entered into an Excel spreadsheet programme and revealed to the participants via social communication tools. The results were disclosed to individual participants only, meaning that participants would not know each other's test scores.

B. Individual Argumentative Writing

All participants were asked to write an argumentative essay individually prior to and after the eight-week intervention. The topic for the pre-test was 'Some people critique that the Chinese learning style is out of date and not as beneficial as the Western learning style. Do you agree or disagree? Why?' A similar topic was chosen for the post-test: 'Which do you prefer as a university student, online teaching or traditional face-to-face teaching? Use specific reasons and examples to support your opinion'. The writing topics were chosen because they were relatable for the EFL undergraduate students, as confirmed by Teacher F. Before the participants started writing, they were asked if they had any questions about the writing topics, such as understanding of the key terms. Participants wrote about the same topics, but they received

different requirements regarding the essay word limit. Non-English major participants were required to write at least 120 words, while English major participants wrote at least 200 words, as they had higher language proficiency. This, to some extent, minimised the influence of different language proficiencies on writing results. After participants completed the amended W-GCTA test, they were given 60 minutes to complete their essays.

The ‘Critical and Integrative Thinking Rubric’ (Washington State University, 2009) was used as the marking criterion to assess the essays. This Rubric was developed by Washington State University (WSU) to assess their undergraduate students’ CT skills across curricular boundaries and can therefore be used to assess the CT performance of undergraduate students regardless of their major subject. More importantly, the rubric was also designed to discover undergraduate CT ability in writing outcomes, being used to assess paper assignments at some universities. The broad usability of this rubric was utilised in this study as a tool to assess student CT performance in writing tests and CW tasks in class.

3.3.4 Data collection-2: Audio/video recordings of interaction in writing

During the collaborative activities, observations were carried out, with the permission of all participants. Audio and video recordings of participants’ classroom behaviours were captured, focusing on how participants interacted and facilitated each other during the writing. Wragg (1999), provided an observation technique called ‘critical events’, which guided the researcher to capture and preserve some of the essence of what was happening in classes. This technique was adopted by the observer to note simple things that could play a significant role in class observation in different context.

The observations and recordings were carried out throughout the drafting stages from the beginning of the CW task until after producing a written text. The video recordings were used to capture how participants interacted with each other, while the audio recordings were used to record the detailed conversation between participants during the process in CW classes. On completion, the in-class observations were then analysed.

According to the working definition of CT applied in this study (see Section 2.1.1), the video and audio recordings should help the researcher to explore participants' CT attitudes, and to determine whether they showed reflective and open-minded attitudes. The thinking, problem solving, and decision-making process can be observed by using video and audio recordings. Video and audio recordings were useful tools to collect data about participants' performance and reactions during activities (Flewitt, 2006; Lewis and Anping, 2002). The data from the observation and recordings were very important to the main focus in this study, the process of CW. Using the video and audio recordings was helpful in revealing how participants expressed, negotiated, understood and constructed meaning while collaboratively accomplishing their writing tasks. In particular, the interaction patterns and produced language during the collaboration assisted the exploration of the CT development during the process of CW. To explore changes in participants' use of language and interaction patterns, the researcher traced any improvements in the patterns and flow of their thinking. In addition, the recorded data also indicated how participants scaffolded each other to resolve differences and achieved an agreement as a group during collaborative classroom tasks. However, due to the classroom settings, video recordings of some participants were difficult to recognise or were missing. Therefore, the video data was used to provide an overall understanding of how the class looked, and how participants interacted with each other during the collaborative process. The detailed findings from the class observations were mainly based on the analysis of audio recordings.

3.3.5 Data collection-3: Semi-structured interviews

The data collected from interviews was an important piece of evidence to determine whether or not CW can promote students' CT.

The interviews in this study were used to explore participants' attitudes and perceptions concerning CT and CW. As discussed in Section 3.2.4, there are three kinds of structured interviews, with this study adopting the semi-structured approach (Bryman, 2004). 10 participants were voluntarily interviewed individually after the post-tests. The interviews were conducted in early June 2016 after the completion of the eight-week intervention. Having recently completed the eight CW tasks, it was helpful to investigate participants' attitudes based on their CW experience. The interviews were face-to-face, and each lasted approximately 20-30 minutes. All interviews were audio recorded with participants' permission and were transcribed

later. The participants were free to use either L1 or L2, or a mixture, in the interview to best express their opinions clearly. The researcher asked each interviewee for their preference for using L1 or FL at the beginning of each interview in order to make them feel relaxed.

The open-ended interview questions were formulated around notions of CT, interaction and CW. The first part consisted of four main questions related to knowledge of CT, starting with a general background discussion about prior knowledge and perceptions of CT. For example:

1. Did you know what critical thinking was about and how to use it before this study? (Probe: Were you taught about critical thinking? What was your definition of critical thinking previously?)
2. Did you consider yourself a good critical thinker previously? (Probe: How did you think about things during your study previously? What do you think about yourself as a critical thinker now?)

The second part of the interview questions contained nine main questions concerned with CW and its influence on CT. This part focused more on participants' experience in CW, and their attitudes toward CW integrated with CT. It also started with a general background discussion about interviewees' prior writing experience and progressed to a more practical focus on participants' current CW experience. The sample questions were:

1. Did you know what collaborative writing was about before? (Probe: Have you experienced collaborative writing before? How did you write essays before?)
2. Which writing style do you prefer in class? Individual writing, cooperative writing, or collaborative writing?
3. How do you evaluate the collaborative writing activity according to your experience? Give examples and reasons.

In order to gain more feedback from participants, the last question from the interview asked participants if they had any suggestions to improve the whole teaching intervention. The whole interview questions are listed in Appendix D.

The semi-structured interview was regarded as a second qualitative method in this mix-method research and the interviews provided additional important information about the attitudes of participants regarding the effectiveness of CW and the teaching intervention to promote EFL participants' application of CT in Chinese universities. It added depth and richness to the findings, allowing the researcher to probe issues that were noted in the observations.

3.3.6 Pilot study

In order to examine the possibility and reliability of the instruments for this study as described above, a pilot study for this eight-week intervention was conducted in two phases. In the first phase, Chinese participants were asked to complete a simple collaborative writing task. Two pairs of Chinese participants studying undergraduate courses at University N in the United Kingdom to attend one CW activity. They had similar educational backgrounds in high school in China, although their English level may have been a little higher than the students in China in general. They were asked to complete a 150-word argumentative writing task collaboratively in one hour with their partner. Some guided CT questions were provided, as in Figure 3.2.

Figure 3.2: Sample of CW task for pilot study

Please write about the following topic (at least 150 words) in pair: 'Some people think the opportunity is rare and unequal, while others believe everybody has the opportunity and is equal in front of the opportunity. Which one do you agree? Give reasons and examples to support your answer.'

The input of guided critical thinking questions:

1. Do you have many opportunities in your life? (If yes, give examples.)
2. What is your view on opportunity? Equal or unequal? Why?
3. How do you think people can get opportunities?

The time allowed to complete the essays are 60 minutes, divided as follows:

A- Pre-writing stage (10 minutes): including collecting, planning, organizing ideas, finding new words and vocabulary and producing an outline.

B- Drafting and writing stage (25 minutes): with the emphasis on writing a draft of the whole essay from beginning to end. The main priority if this process is to use the ideas and vocabulary they had collected together during the pre-writing stage in their writing without paying any attention to grammatical, spelling or punctuation mistakes.

C- Revising stage (15 minutes): concentrating on the consistency of sentences: for instance, the use of tenses, changing unsuitable vocabulary and reorganizing paragraphs or sentences.

D-Editing stage (10 minutes): concerned with issues of linguistic accuracy such as spelling, grammar and punctuation.

After they finished the writing task, an immediate interview was used to collect feedback. The purpose of the first phase pilot study was to examine whether a CW task could work successfully, to determine how participants felt about it, and to request any suggestions for improvement.

One of the most important findings from the pilot study was that all participating students used their CT during the CW, and they completed the task successfully. This suggests that CW can be effective as a teaching strategy to promote EFL students' CT in the class. Another important finding was that participants were a little confused about what CT is, because they had never been taught about it. Although they used CT during the activity, they mainly used them unconsciously and infrequently. Their CT might be promoted more by explicit input on CT and more practice opportunities. According to these findings, the main teaching plan was revised. The design of the CW and CT course was an iterative process, during which the researcher modified subsequent classes according to the responses of the participating students in week one.

In week one, the first class of the eight-week CW course was used to find out whether the revised CT teaching intervention was useful for participants in the study. The initial targeted students in University J in China were first-year students. They were asked to apply CT in written assignments, but these CT skills were not usually emphasised in Chinese high schools. Therefore, they were more willing to attend an additional CT and writing training course to improve their CT and CT skills in writing. Their intellectual level and English standards were also considered appropriate to cope with demands of the study.

The CT test was also piloted with the undergraduate students in University N who attended the pilot CW. For the G-WCTA tests used in this study (see in Section 3.3.3), participants took a long time (about 90mins) to complete all 83 questions as some of the questions were not relevant to Chinese culture or students' daily life. These questions confused participants and influenced their scores. For example, one cluster of questions was related to management consultancy, which is an unfamiliar topic for EFL students in China, so they hardly provided any correct answers. According to these two reasons, the CT tests were shortened to 67 questions. The

English individual writing assessment was initially piloted with targeted students in University J. All of the students were able to finish the essay within one hour, regardless of the scores.

3.4 Data Analysis Procedures

Both quantitative and qualitative data were collected and analysed. As discussed above, the main focus of this study was the development of CT during the process of CW, so the main data for analysis was the audio recordings from the observed classes during the eight-week intervention. The findings from other two sources; pre- and post- tests and interviews, were used to integrate or support evidence from in-class observation in this study. The data from the pre-and post-assessments were analysed first in order to provide an overall result of the eight-week intervention and an overall change in participants' application of CT by comparing the results from pre- and post- tests.

3.4.1 Pre- and post- intervention tests of CT

The results of pre-tests and post-tests were gathered and analysed through a SPSS (Statistical Package for the Social Sciences) programme. SPSS is a useful quantitative analytical tool that provides reliable evidence (Dornyei, 2007). Various statistical analyses were conducted on the pre- and post- tests data from the amended W-GCTA results and individual English argumentative essays. For instance, the descriptive analysis included an assessment of performance distribution, and variability of the groups' performance using mean, variance and standard deviation. Other quantitative data on the number of different language functions produced during the collaborative process were also compared and analysed.

Participants' results from the amended W-GCTA test were analysed by comparing their test scores from the pre- and post- tests. W-GCTA is scored only for correct responses and so the score of the amended W-GCTA ranges from 1 to 67. According to the test report from the official W-GCTA test website (2017), there are five levels of students CT scores: well below average (a score range of 10% and lower of the maximum possible score); below average (a score range of 11% - 30% percent of the maximum possible score); average (a score range of 31% - 70% of the maximum possible score), above average (a score range of 71% - 90% of the maximum possible score), and well above average (a score range of 91% of the maximum

possible score). For example, if a student obtained a total raw score of 60 out of 67 on the amended W-GCTA, his or her score was considered well above average and better than or equal to 91% of the individuals in the norm group (i.e. undergraduate students in this case). More detailed explanations are shown in the table below:

Table 3.4: Scores of amended W-GCTA for each Level

Level		No. of correct answers (n=67)	% score
1	Well below average	6.7 or lower	10% or lower
2	Below average	7.4 - 20.1	11% - 30%
3	Average	20.8 - 46.9	31% - 70%
4	Above average	47.6 - 60.3	71% - 90%
5	Well above average	61 or higher	91% or higher

The results of the individual writing assessments were analysed according to the ‘Critical and Integrative Thinking Rubric’ (Washington State University, 2009). The rubric consists of seven aspects in writing critically and each aspect has a range of seven scores from 0 to 6 (0= absent, 6=mastering). The seven aspects include: issue identification and focus; context and assumption; sources and evidence; diverse perspectives; own perspective; conclusion; and communication (for detailed explanation see Appendix B). These seven aspects were related to attributes of the CT definition developed in this study, such as interpreting information and analysing arguments. The writing scores and performance in the pre- and post- tests were compared. The Paired Samples Test in the SPSS were used to reveal the average number and whether the comparison presents a statistically significant result, so that general trends in participants’ application of CT might be explored. The statistical results provided overall guidance on participants’ performance, which were enriched with more detailed findings from the qualitative data.

3.4.2 Observed collaborations during the writing process

The main data to be analysed was from the transcriptions of observed classes. After the statistical findings from the pre- and post- tests, the qualitative data from the observed classes provided more detailed findings to address the first sub-question (Are there any changes in students’ CT during the eight-week collaborative writing interaction?). The analysis of data collected from the observed CW process adopted a data driven approach. The data were coded by the researcher (myself) and a second coder to ensure reliability (see the comparison of coding in Appendix G). The second coder had sufficient knowledge of CT and classroom interaction and was also

provided with clear instructions and guidance to support an understanding and interpretation of the CT functions applied in this study. Participant's conversation and discussion were audio recorded, and then the produced language functions during their conversation were coded according to the definitions of each language function. The full taxonomy of language function is in Appendix C, and some of the definitions and examples of language functions will be illustrated later in this section.

In order to explore student performance during the CW process in class, two aspects of the student's discussions were analysed: produced interaction patterns and produced language functions. These aspects were analysed through captured students' thinking-related episodes (TREs) during their discussions in class. The TREs, as discussed in Section 2.2.2, refer to segments of discussion where students begin a dialogue about their own or others' thoughts and ideas. They are different from Non-TREs (i.e. LREs), which are segments that focus on the discussion of language use (e.g. grammar, word spelling or vocabulary choice) as illustrated below.

Example of non-TREs (i.e. LREs)

1. Y: ['People are...' How to pronounce it? 'cau...tious?']
2. S: ['Cautious, cautious'...]
3. Y: ['cautious... are very cautious helping...']
4. S: ['beggars']

In this example of non-TREs (i.e. LREs) students were discussing the pronunciation of the word 'cautious' when constructing a sentence. The example above does not involve CT, as the students only exchanged their knowledge of English. Different from LREs, TREs were identified when discussing ideas and thoughts during collaborative writing task. In the following example Student S and Y were discussing their views and arguments, which represent their thinking and so examples of TREs are evident during their conversation.

Example of TREs

1. Y: [Do you prefer help or not help (the beggars)? Ha-ha]
2. S: [I think we should help the beggars. How about you?]
3. Y: [Help? Ha-ha]
4. S: [You don't want to help them, do you?]
5. Y: [No, it depends... I won't help the man who is an adult but not elderly. He is not the disabled, but also begging on the street. He even has the money to buy cigarette.]

Sometimes, LREs might also involve CT, which would also be categorised as TREs. For example, when students discuss word choices, and if they provide reasons to explain their choices, they express CT. This type of episode is also categorised as TRE in the current study. As a result, the TREs in this study are further categorised by different aims: TREs for language use, TREs for sentence or essay structure, and TREs for developing arguments or ideas. The above example of TREs is an example of TREs being used to develop arguments or ideas. Below are two examples of TREs for language use and TREs for sentence or essay structure:

Example of TREs for language use

1. Y: do me a favour, Ha-ha, [Can we change another word?]
2. S: do me a favour, [it means to ask for help, why (you want to change) ...]
3. Y: [it sounds not professional in writing.] (how about) give, give me a hand? Ha-ha
4. S: Okay, give, need to be given...

Example of TREs for sentence or essay structure

1. Y: [People usually put forward the idea in the first paragraph, then write this directly... background (information)]
2. S: [firstly... and then present our point of view, and the reasons...]
3. Y: [Hey, I think we can put this in the first paragraph and this in the second paragraph. This one, in the first paragraph, and this one in the second paragraph, because it makes our point right at the beginning.]
4. S: Okay, okay, you are right.

To conclude, within this study, the dynamic interaction patterns and language functions produced by participants were investigated through capturing the TREs in CW tasks during the eight-week intervention. Student performance in the second and last weeks were compared in order to investigate the CT development of participants during the collaborative interactions in class.

A. The Interaction patterns

In order to analyse participants' interaction patterns, their conversations were recorded and transcribed. In this study, Storch's (2013) model of dyadic interaction (see Section 2.3.3) was adopted to interpret student interactions during the CW process. Participants' interaction performances were examined in terms of equality and mutuality. Their interaction patterns were analysed and categorised into different patterns according to Storch's interaction model. The interaction patterns produced by the same participants at different stages (e.g. in Lesson Two and

in Lesson Eight) during the eight-week CW were compared to explore whether their patterns changed or not. As discussed in the literature, the interaction pattern has potential links with participants' writing outcomes and CT performance (Storch, 2002). Therefore, to some extent, the investigation of interaction patterns reflected participants' application of CT during the process of CW.

This study focused on Lesson Two and Lesson Eight to compare participants' interaction performance features, to find out whether their interaction patterns changed, and to analyse the potential link between interaction patterns and CT development.

B. Language function

The language functions produced during the interactions were analysed in order to understand the student interaction and CT development. The conversations were coded into different categories of language functions, as language functions served both social and cognitive functions to reflect how participants verbally managed their thinking (Li and Zhu, 2013). In the present study, the language functions were coded by two coders according to a taxonomy of language function. The taxonomy of language functions was constructed and adapted from Li and Kim's (2016) existing category. Li and Kim (ibid) investigated group interaction during wiki-based CW, and their original taxonomy distinguished the instances of language functions in terms of initiating and responding to explore students' mutual engagement in the writing process. They defined each language function according to the participants performance during the CW process and their taxonomy of language function summarised the most frequently used language functions produced by students during the CW process. This is illustrated in figure 3.3 below:

Figure 3.3: Li and Kim's Taxonomy of Language Function

Language functions	Definitions & examples
Acknowledging	Recognizing or praising others' ideas, comments, helpfulness, and capabilities. E.g., <i>Nice job!</i>
Agreeing	Expressing agreement with others' viewpoints. E.g., <i>I agree with you.</i>
Disagreeing	Expressing disagreement with others' viewpoints. E.g., <i>—We should focus on one company because we should narrow the topic. Focus on Apple. —Apple could be just an example and I think it will be too narrow.</i>
Elaborating	Extending and elaborating on self or others' ideas about writing. E.g., <i>There're some more subtopic I come up with:[...]</i>
Eliciting	Inviting or eliciting opinions, comments, etc. from group partners. E.g., <i>How you think about that?</i>
Greeting	Greeting group members. E.g., <i>Hi, guys.</i>
Justifying	Defending one's own ideas/comments by giving reasons. E.g., <i>(we can choose Coca-Cola as our target.) Cause it owns wide-range consumers and its successful development experience has made it standing over 100 years.</i>
Questioning	Asking questions that one is not clear about. E.g., <i>What is the difference of wiki comparing to Google doc?</i>
Requesting	Making direct requirements or requests. E.g., <i>Please respond and add something.</i>
Stating	Stating one's ideas and the ideas groups have discussed earlier; posting writing contents or sharing information. E.g., <i>As I knew, Starbucks has cooperated with three local companies in China.</i>
Suggesting	Offering suggestions/recommendations about writing contents, structure, format etc. E.g., <i>We can just discuss benefits for outsourcing, what the reason for it is. . something like that.</i>
Two main categories	
Initiating	Proposing new ideas or initiating group interaction. E.g., <i>Please respond and add something.</i>
Responding	Reacting to others' ideas. E.g., <i>The idea is good, but we need more challenges.</i>

Note: The examples were directly drawn from the wiki project, and language errors were not removed. Each instance of the above language functions can fall into the category of either initiating or responding.

Analysis of language functions of this current study adapted Li and Kim's taxonomy, maintaining their original categories of language function with additional ones of CT-related language functions. The CT-related language functions are based on the evidence in the observation data of this study and highlighted with the colour blue in Appendix C. The added CT-related language functions include interpreting information; exemplifying; supplementing; criticising; arguing and justifying; confirming and acknowledging; and concluding. Each of these CT-related language functions is defined below and illustrated with examples directly drawn from the observation data of this current intervention.

Interpreting information

Definition: Explaining and elaborating on self's or others' ideas with more details.

Example: I think this means... and I ...

Exemplifying

Definition: Providing examples to support the ideas.

Example: For example, sometimes they will cheat us.

Supplementing

Definition: Adding information to respond to and supplement other's uncomplete ideas.

Example: Student A: Yeah, and... Student B: to shoot the animal

Criticising

Definition: Tend to express disapproval and further inquiry by asking questions.

Example: Why should we be careful?

Arguing and justifying

Definition: Expressing disagreement or agreement with others' ideas or defending one's own ideas with reasons.

Example: No, we suppose she has... because...

Confirming and acknowledging

Definition: Making confirmation or acknowledgment of others' ideas, comments, and capabilities.

Example: Good job. / Yeah, that is it.

Concluding

Definition: Making conclusion or rephrasing earlier ideas.

Example: What you mean is he..., so...

The added CT-related language functions were based on student performance, and they were defined according to the working definition of CT in this study. These additional CT-related functions reflect the participants CT performance during the CW process in this study. The original distinction between initiating and responding language functions remained, and this permitted student performance on mutual engagements within the CW process to be detected.

In order to explore the students CT performance more directly and clearly, their produced language function will be grouped as non-CT related language function and CT-related language function in Chapter 4. Apart from the CT-related language functions listed above, other language functions are categorised as non-CT related, such as clarifying and suggesting (see examples and definitions below). The different language functions were recorded, coded and compared. After the whole conversation was transcribed, the TREs were identified and then different language functions were recognised. Therefore, participants' CT could be analysed by comparing the different language functions produced at different phases of this study (Lesson Two and Lesson Eight).

Clarifying

Definition: Stating, clarifying, identifying, describing (but not explaining) or defining one's new idea, or the idea discussed earlier, posting, writing content or sharing information.

Example: I support the idea. / I choose the doctor and the policeman.

Suggesting

Definition: Offering suggestions about writing structure and format etc.

Example: I think we can divide it into several parts to support it.

To conclude, the qualitative data collected from the observed classes was the main focus in this study. This data provided detailed findings to support or explain the quantitative results from the pre- and post- tests, which were previously analysed and the qualitative findings from the observed classes provided further confirmation or elaboration. These two kinds of data together addressed the first sub-question (Are there any changes in students' CT during the eight-week collaborative writing interaction?) from different perspectives. The table below summarises the analytical tools used to answer the question:

Table 3.5: Summary of Analytical Tools for first sub-question

Data Source	Analytical Tool	Note
Pre VS Post (Quantitative)	Watson-Glaser CT Appraisal	5 aspects, 67 multiple-choice questions (Glaser, 1937; Watson and Glaser, 1964; 1994)
	Guide to Rating Critical and Integrative Thinking	7 aspects, 42 maximum score (Washington State University, 2009)
Process (Qualitative)	A Model of Dyadic Interaction	4 interaction patterns, the levels of equality and mutuality, CT dispositions (Storch, 2013)
	Language Functions	Cognitive functions, diversity of language function (Li and Zhu, 2013; Li and Kim's, 2016)

3.4.3 *Semi-structured interviews*

In order to investigate the second sub-question of this study, participants' responses from the semi-structured interviews were analysed. The qualitative content analysis, which can be seen as "the study of recorded human communications" (Babbie, 2001: p304) was applied to analyse the interview data. This coding operation contained "a set of procedures to make valid inferences from text" (Weber 2004: p117). Two procedures were used for the qualitative content analysis: inductive category development and deductive category application (Mayring, 2000). The main focus was on the deductive coding in this study because of the themes of CT and CW in the interview questions.

Data analysis began after listening to the audio recordings and transcribing the interview responses into texts. The transcribed interview data was read and re-read in order to gain a sense

of the whole dataset. Following this, the data related to participants' understandings of CT, participants' attitudes towards the CW experience, and participants' feelings about using CW to promote CT were all summarised and analysed. Participants were interviewed in Chinese, so the interview data was first transcribed and analysed in Chinese, then the summaries were translated into English. The translation was checked by Teacher B.

To conclude, the analysis of both quantitative data and qualitative data is discussed in this section. The reliability and validity issues are examined in the following section.

3.5 Reliability and Validity

According to Roberts, Priest and Traynor (2006), reliability is about how far a particular test or instrument, such as a questionnaire will obtain similar results in different situations if nothing else has changed, while validity describes whether the instruments measure what they intended to measure. Reliability and validity are a demonstration of rigour in research processes and the trustworthiness of research findings (Cohen et al., 2007; Yin, 2009). In general, in order to achieve quantitative reliability and validity researchers need to carefully select research samples, research instruments and statistical analyses for the data ((Dornyei, 2007; Bryman, 2012). Meanwhile, qualitative reliability and validity can be achieved through the depth and richness of the data as evidence (Lee et al., 2010).

The decision to implement the study at University J in China was instrumental in ensuring the validity of the study. This was because the research mainly focused on Chinese undergraduate EFL students, and University J is one of the key national public universities in China and is representative of other Chinese universities. Both English major or non-English major students had English courses in the university, and they were required to obtain a level of basic CT skills during their studies. The setting was thus ideal for this study, which concentrated on the effectiveness of CW and CT intervention to improve EFL students' CT.

Regarding the appropriateness of the instruments, the pre- and post- CT tests selected two different measurements: The amended W-GCTA test and the English argumentative essay test.

As discussed in the literature (Section 2.1.5), each type of CT test had its own limitations, so this study applied two types of tests to enhance the reliability and validity of the test results. The amended W-GCTA was a valid and reliable multiple-choice test for CT. The written essays were carefully marked according to a marking criterion. These two tests focused on different aspects of CT. The amended W-GCTA test mainly measured participants' application of CT in comprehension and solving problems, while the writing test focused on their CT in constructing a well-structured essay. A combination of the results of these two tests made the findings of this study more convincing and reliable.

The number of the participants in this study was 24, which was a small sample and could not represent an entire population. According to Leedy and Ormrod (2001), larger samples are needed for heterogeneous populations, but smaller samples are appropriate for homogeneous populations. Although the sample was small, this study was an in-depth research study that illustrated some common features of the larger population (Bryman, 2012).

As mentioned above, qualitative data from the observations and the interviews was crucial to the reliability and validity of the study. The use of multiple sources of data increased the validity of the study (Dornyei, 2007; Yin, 2009). A limitation of the research approach was that participants might be reluctant to be recorded, which could influence their performance in class. Nonetheless, this limitation was minimised as they gradually got used to recordings during the eight-week intervention (Guest et al., 2012). Participants were informed that the recordings would be used for research purposes only, and their personal information would not be disclosed. More importantly, participants were told that they could withdraw at any time if they felt uncomfortable during the study. For the interviews, 10 participants volunteered. Their performance during the CW tasks and CT tests varied, and so they offered a representative sample of the other participants in the study. Overall, the use of triangulated qualitative and quantitative data increased the validity and reliability of this study (Richards et al., 2012; Creswell, 2003).

3.6 Originality and Limitations of Methodology

This was the relatively new study of its type to be conducted in a Chinese university context. The aim of this study was to investigate whether and how EFL students applied CT during the practices of CW. The mixed-method approach included pre- and post- tests involving amended W-GCTA tests and essays, observations and semi-structured interviews designed to gather data about participants' application of CT and perceptions of the effectiveness of CW intervention in improving CT. It contributes to the advancement of knowledge in developing CT, promoting CW, and applying CW in China. Since this is one of the first studies designed specifically to explore the effectiveness of CW in Chinese universities to support the development of CT, the methodology might be usefully applied in other Chinese universities to investigate the role of CW in promoting EFL students' CT.

The study had some methodological limitations in that it recruited a relatively small number of participants, affecting the generalisability of the findings. The CW and CT sessions were conducted as an extra training course, so some of the participants became too busy to attend. As discussed above, however, this in-depth eight-week interventional study concentrated on qualitative data. Eight weeks was a relatively short duration for a CW and CT course as participants need to become familiar with the process and new writing methods. Participants did need a relatively long process to become familiar with the new writing method. It would have been preferable for the participants to have opportunities to practice the CW tasks over a longer period.

3.7 Ethical Concerns

In terms of ethical issues, it is the researcher's responsibility to approach participants to volunteer to participate in this research. Ethical approval to undertake this study was granted by the Dean of Postgraduate Studies, acting on behalf of the Faculty of Humanities and Social Sciences in University N in the United Kingdom. Consent was also sought from the targeted university and students in China. Information and consent letters were provided for participants at the beginning of the intervention. Both written and verbal explanations of the study were also provided. Ethical requirements regarding confidentiality, and anonymity were emphasized.

Participants were also informed that they had the right to withdraw from the research if they decided not to continue.

3.8 Summary

This study entailed an investigation into the application and development of CT among EFL students during an eight-week intervention in a Chinese university. It aimed to explore the effects of CW activities on Chinese EFL students' CT and perspectives on the study during the writing process. In order to answer the research questions, this study took the ontological and epistemological position of pragmatism and adopted a mixed-method approach to collect appropriate data. The study combined with pre- and post- tests and interviews, took place over 11 weeks from March to June 2016 at University J in China. Both English major students and non-English major students were recruited to receive eight weeks' intervention on what CT is and how to write essays collaboratively. Observations and recordings were used to capture moment-to-moment interactions. Pre- and post- tests were used to measure participants' CT development and semi-structured interviews were conducted to explore participants' perspectives on the study. It was found that the approach was robust and provided acceptable levels of validity and reliability. In the next chapter, the analyses of both qualitative and quantitative data are presented.

Chapter 4: Findings

Introduction

This chapter presents the findings of the study. Data collected from three different sources were analysed and findings are organised accordingly: 1) the results of pre- and post- tests before and after the eight-week intervention; 2) the observation during the process of CW; and 3) the students' responses obtained from the interviews. The research questions were used to guide the data analysis, seeking evidence of whether or not participants applied CT, and whether or not the application of CT was developed during and after the CW practice. Wherever possible, links in findings from different sources were examined to validate the findings of this study.

The quantitative data from pre- and post- assessments illustrates an overall change in participants' application of CT after the eight-week intervention of explicit CT instruction in CW practice. Participants' performance during the CW classes were then examined in order to determine whether participants' application of CT had been improved through capturing the TREs produced by participants during their conversation and interaction. The general findings and detailed evidence from these two aspects were combined to address the first Research Question (RQ1) of this study '*Are there any changes in students' CT during the eight-week collaborative writing interaction?*' Findings of the interviews following the post- assessments were used to address the second Research Question (RQ2) '*What are students' perceptions of any impact of CW on CT?*'

4.1 Results of Pre- and Post- Tests Scores

The pre- and post- test results of the individual writing test and amended W-GCTA by the 24 participants were compared. Table 4.1 shows a general trend of improvement in application of CT in individual writing and amended W-GCTA. All participants at least obtained higher scores in one of the post-tests than in the pre-tests, which suggests some improvement in CT. Two-thirds of the participants (66.7%) showed improvements in both post-tests, as highlighted in blue in Table 4.1. The average scores for both tests also improved in the post- tests compared to the pre-tests.

Table 4.1: Results of Pre- and Post- tests

	Individual writing test		Amended W-GCTA	
	Pre-Writing test Score (Max. 42)	Post-Writing test Score (Max. 42)	Pre-CT test Score (Max. 67)	Post-CT test Score (Max. 67)
Student A	10	16	43(64.2%)	46(68.7%)
Student B	19	23	47(70.1%)	51(76.1%)
Student C	18	23	40(59.7%)	42(62.7%)
Student D	22	23	40(59.7%)	43(64.2%)
Student E	20	19	40(59.7%)	45(67.2%)
Student F	14	19	40(59.7%)	44(65.7%)
Student G	16	20	41(61.2%)	46(68.7%)
Student H	26	28	45(67.2%)	43(64.2%)
Student I	17	23	42(62.7%)	40(59.7%)
Student J	12	20	41(61.2%)	43(64.2%)
Student K	12	15	36(53.7%)	38(56.7%)
Student S	17	29	43(64.2%)	47(70.1%)
Student Y	12	16	36(53.7%)	42(62.7%)
Student R	14	12	43(64.2%)	48(71.6%)
Student N	18	28	42(62.7%)	51(76.1%)
Student O	9	11	33(49.3%)	45(67.2%)
Student P	8	8	47(70.1%)	50(74.6%)
Student Q	12	13	37(55.2%)	44(65.7%)
Student M	15	22	45(67.2%)	43(64.2%)
Student Z	9	13	42(62.7%)	44(65.7%)
Student W	10	15	47(70.1%)	50(74.6%)
Student L	12	13	44(65.7%)	45(67.2%)
Student U	11	15	43(64.2%)	40(59.7%)
Student V	9	14	46(68.7%)	46(68.7%)
Avg number	14.2 (33.8%)	18.25 (43.5%)	41.79(62.4%)	44.83(66.9%)

These two pre-tests and post-tests results were analysed by using the SPSS programme (version 24) to find out whether or not a significant difference between their tests results was evident. The results of a Paired Sample T Test (see Figure 4.1 below) indicate important features of the pre- and post- tests. In terms of participants' writing results, in the post-writing test participants get higher ($M=18$, $SD=5$) scores than in the pre-writing test ($M=14$, $SD=4$), and this shows a statistically significant difference ($t=5.134$, $p=.000$). The Standard Deviations indicate the ranges are not high, suggesting that they are good indicators of a central tendency. These results suggest that participants' CT in writing is improved in the post-writing test after the intervention. For the CT tests, Figure 4.1 shows the CT performance of participants in the post-CT test is improved

(M=45, SD=3) compared with their performance in the pre-CT test (M=41, SD=3). The difference in the data set is statistically significant ($t=4.839$, $p=.000$), indicating that participants' CT have developed after involvement in the CW programme in this study.

Figure 4.1: Paired Samples T Test of Pre- and Post- tests results

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre- Writing test Score (42)	14.25	24	4.637	.946
	Post-Writing test Score (42)	18.25	24	5.735	1.171
Pair 2	Pre- CT test Score (67)	41.79	24	3.683	.752
	Post- CT test Score (67)	44.83	24	3.447	.704

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pre- Writing test Score (42) & Post-Writing test Score (42)	24	.818	.000
Pair 2	Pre- CT test Score (67) & Post- CT test Score (67)	24	.514	.010

Paired Samples Test									
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pre- Writing test Score – Post-Writing test Score	-3.952	3.528	.770	-5.558	-2.346	-5.134	20	.000
Pair 2	Pre- CT test Score – Post- CT test Score	-3.455	3.348	.714	-4.939	-1.970	-4.839	21	.000

In response to RQ1, the comparisons of the pre- and post- result of the two tests suggest that most participants had made positive changes in their CT after the eight-week intervention. A more specific comparison and detail of the test results are analysed respectively in the following sections.

4.1.1 Comparison of the scores of amended Watson-Glaser CT Appraisal

This section focuses on the results of CT tests with further details of participants' performance on the amended Watson-Glaser Critical Thinking Appraisal (W-GCTA). The amended W-GCTA examined participants' CT in terms of five reasoning skills as discussed in Section 3.3.3 of Chapter 3. The amended W-GCTA test adopted in this study contains 67 multiple-choice questions. The value of each question is one point and the maximum score of the CT test is 67. As presented in Section 3.4.1 and the Table 4.2 below, the students CT scores were interpreted into five levels: well below average (under 10%), below average (11%-30%), average (31%-70%), above average (71%-90%), and well above average (above 91%). In this study, as the total score is 67, students who scored less than 6.7 (10%) had very poor CT skills compared to their peers in the norm group (i.e. undergraduate students). Students also demonstrated below average CT ability if they achieved scores between 7.4 (11%) to 20.1 (30%), and students who obtained scores between 20.8 (31%) to 46.9 (70%) showed an average CT performance in the norm group. Students had above average performance if they achieved scores higher than 47.6 (71%).

Figure 4.2: Descriptive Statistics of Pre- and Post- tests results

Descriptive Statistics								
	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Error	Std. Deviation Statistic	Variance Statistic
Pre- Writing test Score (42)	24	18	8	26	14.25	.946	4.637	21.500
Post-Writing test Score (42)	24	21	8	29	18.25	1.171	5.735	32.891
Pre- CT test Score (67)	24	14	33	47	41.79	.752	3.683	13.563
Post- CT test Score (67)	24	13	38	51	44.83	.704	3.447	11.884
Valid N (listwise)	24							

As Table 4.2 illustrates, no participants obtained a score below 31% of the total score in both pre- and post- tests, signifying that no participant had a below average CT performance on the test. Comparisons of pre- and post- tests scores illustrate positive changes in terms of average scores and range of scores. According to the percentile of the average scores from pre- and post- tests, students presented an average CT performance on both pre- and post- test. However, the average score (i.e. the mean in the Paired Samples Test) of the 24 participants in the post amended W-GCTA test is 44.83 (66.9%), an improvement on the 41.79 test score (62.4%) in the pre-test (see in Table 4.1, Figure 4.1, Figure 4.2). This figure illustrates that the participants CT performance on post-test was better than or equal to 66.9% of the undergraduate students. Another positive change is noted in the range of scores between the pre- and post- test results.

For the pre-test, the lowest score is 33 (49.3%) and the highest score is 47 (70.1%), which means no participant achieved the level of above average in pre-test. In contrast, the lowest score for the post-test is 38 (56.7%) and the highest score is 51 (76.1%), which means the highest score achieved the level of above average. More importantly, there are five participants (i.e. Student B, R, N, P, W) obtained an above average score (i.e. higher than 71%) in the post-test. Accordingly, five participants improved their CT performance from average to above average level. As the range of the scores improved, this indicates the general trend of improvement of participants in the post- CT test.

Table 4.2: No. of participants for each Level of amended W-GCTA

Levels		Correct answers (n=67)	67 items	No. of participants	
				Pre-test	Post-test
1	Well below average	6.7 or lower	10% or lower	0	0
2	Below average	7.4 - 20.1	11%-30%	0	0
3	Average	20.8 - 46.9	31%-70%	24	19
4	Above average	47.6 - 60.3	71%-90%	0	5
5	Well above average	61 or higher	91% or higher	0	0

The Paired Sample test in SPSS indicates that the difference between the pre- and post- tests results was statistically significant (Sig <.000;.000), suggesting that the improvement in participants' scores is meaningful. The mean CT test gain of 3.4 (as shown in Figure 4.1 above) is therefore evidence that participants obtained higher scores for their CT tests after their involvement in the eight-week CW programme. This data suggests that the majority of participants (79.2%, 19 out of 24) performed better in their CT in the post-tests. Therefore, this finding suggests that the designed CW with integrated CT course can help participants in improving their application of CT.

4.1.2 Comparison of the results of individual argumentative writing

Similar to the findings from CT tests, the analysis of results from the writing tests also suggests a positive change in participants' application of CT in the language learning intervention. Participants completed two individual argumentative writing tasks with similar topics. The writing topic of the pre-test was: 'Some people critique the Chinese learning style as out of date and not as beneficial as the Western learning style. Do you agree or disagree? Why?' The writing

topic of the post-test was: ‘Which do you prefer as a university student, online teaching or traditional face-to-face teaching? Use specific reasons and examples to support your opinion’.

The maximum score of the writing test is 42, and ‘A Guide to Rating Critical and Integrative Thinking in Writing’ from Washington State University (2009), as discussed in Section 3.3.3 and 3.4.1, was used to mark participants’ essays. This marking guidance mainly assesses the critical thinking aspects of participants’ writing. A comparison of the two sets of scores illustrates positive changes in individual argumentative writing before and after the intervention.

Table 4.3 is one participant’s (Student Y) mark sheet which is presented as an example of improvement in argumentative writing. Student Y gained 17 points in the pre-writing test, while his score increased to 29 points in the post-test. A comparison of the total percentage this participant achieved in the two tests indicated that Student Y had made notable improvement after the CW practice, with 40% (17 out of 42) in the pre- test and 69% (29 out of 42) in the post- test. A close exam of the items in the marking sheet below, this participant improved largely in terms of topic identification (from a possible range of scores from 1 to 5), making assumptions (from a possible range of scores from 2 to 5), and diverse perspectives (from a possible range of scores from 3 to 5). In the pre-test, Student Y could not identify the writing topic clearly. He attempted to make assumptions but failed to link the assumption with the context, and his supporting evidence was insufficient. As a result he presented a vague argument.

Table 4.3: An example of improvement in argumentative writing between two tests (Student Y)

Criteria	Score (pre-)	Comments	Score (post-)	Comments
1. Issues Identification and Focus	1	(+): Shows agreement with the topic, however, (-): no attempt to summarise the issue is seen. Therefore, the issue identification is not quite clear.	5	(+): good awareness of providing background information related to the context in which the given issue arises; also, good awareness of and skills in interpreting the given topic; clear standpoint is provided (-): the way of providing the related background information is very general and mechanical, e.g., 'with the development of the society' which actually shows a lack of specific knowledge of the given topic.
2. Context and Assumptions	2	(+): Having awareness of the context to discuss the disadvantages of China's learning style in terms of the relationship between teaching and learning, such as in high school. An attempt to contextualise the assumption is seen. (-): insufficient link between assumptions and the context, i.e., it might not be fair by just generally saying that China's learning style is out of date.	5	(+): demonstrating her/his understanding of the two contrary contexts; the scope (i.e., in terms of acceptance of new ways of teaching, convenience and efficiency of teaching) and assumptions are well linked to the issues (i.e. all oriented to show that traditional teaching outweighs online learning.) (-): little awareness of reflecting the limitations and complexity of the preferred way of learning.
3. Sources and Evidence	2	(+): good to see the evidence-based assumptions, such as to state that China's learning style is not perfect due to the style of teaching, which treats learners as receivers of information only (-): The justification is not adequate, particularly when arguing that China's style is out of date, which is too absolute. Also, more examples were expected to be seen.	4	(+): various sources and evidence are used to support the proposed argument, such as explaining the different natures of the two styles of learning and using examples. Most assumptions are well justified by the extensive explanation. (-): yet a couple of assumptions or arguments are not convincingly justified, such as the causal relationship between difficulty in receiving a new thing and difficulty in accepting online learning.
4. Diverse Perspectives	3	(+): comparison between China's and the Western learning styles, which is more convincing; Also, good awareness of the sub-dimensions to underpin the argument, such as from both the teaching and learning. (-): insufficient integration of these perspectives, and no consideration of any alternative views, due to lack of recognition of the complexity of the issue.	5	(+): very good to make assumptions and then provide justification of the two ways of learning all the way through the essay. Three different sub-perspectives all work for his/her standpoint and are also well-integrated. (-): no awareness of arguing the positive aspect of the contrary standpoint.

5. Own Perspective	2	(+): Having identified their own position and interpretation based on some certain evidence. (-): lack of integration and summary of the different views or perspectives to give a clearer and deeper reflection of the argument.	4	(+): well showing his/her original points of view, and highly skill at using the sources to strengthen or reiterate his/her views. (-): lack of a clear summary of different perspectives to have a deeper reflection of the main argument or standpoint.
6. Conclusion	3	(+): The conclusion is consistent with the given position at the beginning (-): Still a hasty conclusion, without any consideration of the implications or potential solutions etc.	2	(+): good awareness to make a conclusion and keep a consistent position. Showing awareness of the fact that internet is widely used (-): yet, mentioning the use of internet seems to have nothing to do with the reiteration of his/her point of view. Also, still a hasty conclusion which only contains the standpoint reiteration.
7. Communication	4	(+): The messages or the ideas are clearly conveyed. The general needs can be met. (-): some errors cause communication breakdown.	4	(+): The messages or the ideas generally are clearly conveyed. The general needs can be met. (-): some errors cause communication breakdown.
Total Score	17	Additional comments:	29	Additional comments:

(0=absent, 1=minimal, 2= emerging, 3=developing, 4=competent, 5=effective, 6=mastering; A score of four represents competency for a student graduating from WSU)

However, after the eight-week intervention, Student Y showed good awareness of raising issues, identifying assumptions that linked well with the discussed issue, supporting his own ideas with evidence, and summarising diverse perspectives to make the argument clear (see the marking sheet above, i.e. gaining 4 or 5 points in these aspects) in the post test. A comparison of the pre- and post- test results suggested that there is evidence that the participant's ability to demonstrate CT has developed through the CW intervention. Most of the other participants in this study also showed progress in terms of the CT performance in the post- individual writing test. This further suggests the usefulness of the CW language learning intervention carried out in this study. The specific scores of all participants' writing tests are presented below as evidence.

As seen in Table 4.4, the majority of the participants (79.2%, 19 out of 24) achieved a higher score (bold for the higher scores in post-test) in the post- writing test compared with that in the pre-writing test. Out of the 19 participants, eight students (their post-test scores are highlighted in red in Table 4.3) achieve above 50% of the total score in post-test, while only two students (Student D and H) do so in the pre-test. This suggests that, participants had very low level of CT in writing originally, and most of them performed better in the post writing test. As illustrated in Table 4.4, 16 (66%) of 24 participants had a higher score in aspects of "Issue Identification and Focus" and "Context and Assumptions", 15 (62.5%) participants in the "Own Perspective" aspect, 13 (54.2%) participants in the "Sources and Evidence" aspect, 11 (45.8%) participants in the "Diverse Perspectives" aspect, only three (12.5%) participants in the "Conclusion" aspect, and five (20.8%) participants in the "Communication" aspect. Linking these findings with the working definition of CT applied in this study, more than half of the participants developed their CT in terms of interpreting information (Issue Identification and Focus and Context and Assumptions), reasoning (Sources and Evidence) and analysing (Own Perspective).

As analysed above, these detailed analysis and findings illustrated that half of the participants develop the CT skills of identifying information, analysing, making arguments, reasoning, and showing different perspectives (sample essay from post-test can be seen in Appendix M). In addition, participants' average performance on the first five CT aspects were improved (i.e. 1.92 to 3, 1.92 to 2.75, 1.92 to 2.54, 2.21 to 2.83, 1.63 to 2.29). However, the average "Conclusion" score in the post-test slightly declined (from 1.67 to 1.5). One possible reason could be the lack of practice. According to the observation of the CW process, participants tended to spend more

time on discussing and drafting the main body of a written text. As a result they had less time to work on the conclusion. Participants did not have enough time to re-draft or make a suitable summary, which meant they lacked practice in writing a good conclusion. This time limitation will also be discussed in Section 4.2.3 when analysing participants' CW products.

Table 4.4: The specific CT scores in writing of all participants

S T U D E N T	Issues Identifi- cation and Focus		Context and Assump- -tions		Sources and Evidenc e		Diverse Perspec- -tives		Own Perspec- -tive		Concl- -usion		Commu- - nication		Total Score (MAX = 42)	
	Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post
A	1	<u>4</u>	1	<u>2</u>	2	2	2	2	2	2	0	<u>1</u>	2	<u>3</u>	10 23.8%	16 38.1%
B	3	<u>5</u>	2	<u>3</u>	3	<u>4</u>	3	3	2	<u>3</u>	3	2	3	3	19 45.2%	23 54.8%
C	2	<u>4</u>	3	3	3	<u>4</u>	3	<u>4</u>	2	<u>3</u>	1	1	4	4	18 42.9%	23 54.8%
D	2	<u>4</u>	4	3	3	3	3	3	2	<u>3</u>	4	3	4	4	22 52.4%	23 54.8%
E	3	<u>3</u>	2	2	3	3	2	2	3	3	2	2	4	4	19 45.2%	19 45.2%
F	2	<u>4</u>	2	<u>3</u>	2	<u>3</u>	2	<u>3</u>	2	2	1	1	3	3	14 33.3%	19 45.2%
G	2	<u>3</u>	2	<u>3</u>	2	<u>3</u>	3	3	2	<u>3</u>	2	2	3	3	16 38.1%	20 47.6%
H	4	4	4	<u>5</u>	3	3	4	<u>5</u>	3	<u>3</u>	4	3	4	<u>5</u>	26 61.9%	28 66.7%
I	2	<u>3</u>	2	<u>3</u>	2	<u>4</u>	2	<u>4</u>	2	<u>3</u>	3	1	4	4	17 40.5%	23 54.8%
J	3	2	2	<u>4</u>	0	<u>3</u>	3	3	1	<u>3</u>	1	1	2	<u>4</u>	12 28.6%	20 47.6%
K	2	2	2	<u>3</u>	1	<u>2</u>	2	2	1	<u>2</u>	1	1	3	3	12 28.6%	15 35.7%
S	1	<u>5</u>	2	<u>5</u>	2	<u>4</u>	3	<u>5</u>	2	<u>4</u>	3	2	4	4	17 40.5%	29 69.1%
Y	2	<u>3</u>	2	2	2	<u>3</u>	2	2	1	<u>2</u>	1	<u>2</u>	2	2	12 28.6%	16 38.1%
R	2	2	2	2	2	1	2	2	1	1	2	1	3	3	14 33.3%	12 28.6%
N	2	<u>4</u>	1	<u>3</u>	2	<u>4</u>	2	<u>4</u>	2	<u>3</u>	5	5	4	<u>5</u>	18 42.9%	28 66.7%
O	2	2	1	<u>2</u>	1	<u>2</u>	1	1	1	1	1	1	2	2	9 21.4%	11 26.2%
P	1	1	1	1	2	1	1	<u>2</u>	1	1	0	0	2	2	8 19.1%	8 19.1%
Q	1	<u>2</u>	2	2	2	2	2	2	2	2	1	1	2	2	12 28.6%	13 30.9%
M	2	2	2	<u>4</u>	2	<u>3</u>	2	<u>4</u>	2	<u>3</u>	1	1	4	4	15 35.7%	22 52.4%
Z	2	<u>3</u>	1	<u>2</u>	1	<u>2</u>	1	<u>2</u>	1	1	1	1	2	2	9 21.4%	13 30.9%
W	1	<u>3</u>	2	<u>3</u>	2	2	2	2	1	<u>2</u>	0	<u>1</u>	2	2	10 23.8%	15 35.7%
L	2	2	1	<u>2</u>	2	1	2	2	1	<u>2</u>	1	1	3	3	12 28.6%	13 30.9%
U	1	<u>3</u>	2	2	1	1	2	<u>3</u>	1	<u>2</u>	1	1	3	3	11 26.2%	15 35.7%
V	1	<u>3</u>	1	<u>2</u>	1	1	2	<u>3</u>	1	1	1	1	2	<u>3</u>	9 21.4%	14 33.3%
Tot	46	72	46	66	46	61	53	68	39	55	40	36	71	77	341	438
Av	1.92	3	1.92	2.75	1.92	2.54	2.21	2.83	1.63	2.29	1.67	1.5	2.96	3.21	14.2 23.8%	18.25 38.1%

(Higher scores in post-test are bolded; Red for achieve 50% above in post-test)

Similar to the findings of the amended W-GCT tests, comparisons of participants' CT performance in argumentative writing pre- and post- eight-week intervention suggest a modest improvement. Although the highest score in the post-writing test is 29 (69% of the maximum score), the results indicated a tendency to demonstrate better CT in writing after participating in the programme. Therefore, after comparing participants' performance in both the CT test and the writing test in this study, the findings yield a positive result in participants' CT development. Participants' application of CT were promoted after they received CT input and were then involved in CW practice. Based on the evidence from the test results, it is suggested that CW practice and CT instruction are useful learning strategies for EFL students. These strategies might not only be applied to undergraduate students, but it could also be applied to students at high schools or post-graduate levels. Further evidence of how the intervention has promoted the application of CT in CW are provided by examining detailed findings from the observed CW process.

4.2 The CW Process

The audio recordings of participants' interactions were analysed focusing on how they interacted and facilitated each other during the CW process, and any changes in participants' behaviours and CT performance after the eight-week intervention.

The participants chose their CW partners themselves. The only requirement was that there should be no more than three people in a group so that each group member had sufficient opportunity to participate and contribute to the joint tasks (Storch, 2013). The majority of the participants worked with the same partner during the intervention, and a few participants changed their partners occasionally. The CW and CT intervention was an additional training course for the participants. It was not compulsory and therefore when some participants were absent, their partners needed to work with a different partner. In this study, pairs started to work together at different lessons. Some pairs started to work together from Lesson 2 while others started from Lesson 3, and some finished their collaboration in Lesson 8 while others did so in Lesson 7. Therefore, some pairs worked together in a total 8 lessons while some worked together in 6 or 7 lessons. Comparison is made of participants' interaction patterns at the beginning of the eight-week intervention and at the end of the intervention. However, all the pairs participating in this study worked together in at least 6 lessons, and all attended the pre- and post- tests. Therefore,

this study will not compare across different pairs, but only compare each pair's own performance at the beginning and at the end of the eight-week intervention.

Several changes in CW practices are observed that indicated participants' application of CT. The findings are organised by patterns of interactions, followed by specific features of language function. As discussed in the literature review chapter, the investigation of participants' interaction patterns could help the researcher to discover their level of mutuality and equality in task engagement (Storch, 2013). This, to some extent, helped to indicate whether participants showed reflective and open-minded attitudes (i.e. CT attitudes). The analysis of language function could highlight CT-related language function, based on the definition of CT in the study, to reflect participants' CT during their interactions. Thus, participants' application and development of CT during the CW process could be illustrated.

The following sections present participants' application of CT through the lens of their interaction patterns and language functions. In each section, overall findings by the pairs and groups are presented to explore a general finding of all participants' performance. Three pairs (i.e. Pair One, Pair Two, and Pair Three) are then further analysed to illustrate specific features and changes in the CW process over the eight-week intervention. These three pairs were selected first because they worked with the same partners during the whole eight-week intervention. Also all of them showed improvements in CT when the two pre- and post- tests were compared. It was considered meaningful to further explore how and why they had improved in post-tests through an analysis of their performance during the CW process. Thirdly, the three pairs were chosen because they presented different interaction patterns and features. Accordingly, how participants who produced different interaction patterns perform during the CW process can be discovered. Finally, the three pairs are selected because they attended all the sessions of the eight-week intervention and the interview after the intervention. Their high levels of engagement in the research could provide comprehensive and reliable findings.

4.2.1 Interaction patterns

In general, the findings from student interaction patterns suggest that participants showed reflective and open-minded attitudes (i.e. CT attitudes) during the CW process. All participants

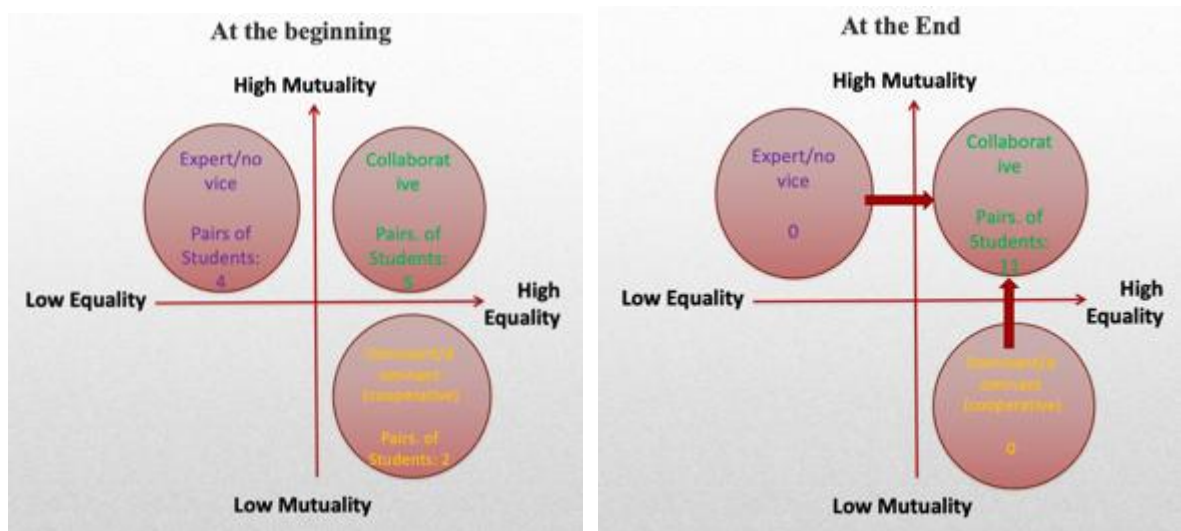
worked collaboratively by the end of the eight-week CW intervention. Storch's (2013) model of dyadic interaction was used to analyse the participants' interaction patterns during the CW process. The model recognised four interaction patterns in terms of participants' performance on the mutuality and equality of contributions to the task during the interaction (see Section 2.3.3). The four patterns are collaborative pattern, expert/novice pattern, dominant/dominant pattern, and dominant/passive pattern. Three patterns were found in this study apart from the dominant/passive interaction pattern. Table 4.5 summarises interaction patterns formed by all participants at the beginning and at the end of the eight-week intervention.

Table 4.5: Summary of all participants' interaction patterns at the beginning and end of the eight-week programme

No.	Pairs/Groups	Beginning (Lesson 2 or 3)	End (Lesson 7 or 8)
1	Student A and B (8 lessons)	Dominant/dominant pattern	Collaborative pattern
2	Student S and Y (8 lessons)	Expert/novice pattern	Collaborative pattern
3	Student C, D and E (8 lessons)	Collaborative pattern	Collaborative pattern
4	Student F and G (7 lessons)	Expert/novice pattern	Collaborative pattern
5	Student H and I (7 lessons)	Collaborative pattern	Collaborative pattern
6	Student K and J (7 lessons)	Dominant/dominant pattern	Collaborative pattern
7	Student P, O and Q (8 lessons)	Expert/novice pattern	Collaborative pattern
8	Student Z and M (7 lessons)	Collaborative pattern	Collaborative pattern
9	Student U and V (7 lessons)	Collaborative pattern	Collaborative pattern
10	Student N and R (6 lessons)	Expert/novice pattern	Collaborative pattern
11	Student W and L (6 lessons)	Collaborative pattern	Collaborative pattern

At the beginning of the intervention, participants demonstrated different interaction patterns as indicated in Table 4.5 above. Table 4.5 reveals that participants worked in the three different interactions at the beginning of the intervention as illustrated by the different colours, but all pairs worked in collaborative mode at the end of the intervention. Figure 4.3 below shows a clear distribution of interaction pattern produced by all participants:

Figure 4.3: The distribution of all participants' interaction patterns at the beginning and at the end of the eight-week programme



According to Table 4.5 and Figure 4.3, at the beginning of the intervention, two (18.2%) pairs of participants formed a dominant/dominant pattern, four pairs (36.4%) formed an expert/novice pattern, and five pairs (45.4%) formed a collaborative interaction pattern. Less than half of the pairs formed a collaborative interaction pattern at the beginning. However, all pairs had developed a collaborative interaction pattern by the end of the intervention. This was a very positive finding, which suggested that the eight-week CW and CT intervention was useful to promote effective interactions.

The three sample pairs' performance in three lessons are illustrated below in order to further explore the specific features of different interaction patterns formed by participants. The analysis is then used to examine how they developed their CT and interaction patterns during the CW process as all of them showed improvements in CT in post-tests. The three pairs performed different interaction patterns at the beginning of the eight-week intervention, thereby providing illustrations of different features of the three interaction patterns. The typical and important features of their interaction patterns not only showed their task engagement, but also exemplified their CT attitudes during the CW process.

Pair One

The first sample is from the participants in Pair One (Student A and Student B). Student A improved from 10 to 16 in the individual writing test and improved from 43 to 46 in the CT test, while Student B improved from 19 to 23 and 47 to 51 respectively. When comparing the tests scores between Student A and Student B, it seemed that Student B demonstrated better CT skills. During the CW process, however, both participants contributed during the writing process to the joint writing tasks. Both tried to show their own arguments and opinions, but the engagement between them was not very good at first. The TREs 1a below shows how these two participants interacted with each other in their CW task at Lesson Two, the topic of which was whether people should give beggars money:

Episode 1a: from Lesson Two (Helping beggars)

5. A: 随便说 [*Just say something.*] I support the idea because some poor people are real...是真的穷啊, 一些情况 [*They are really poor, in some cases.*]
6. B: I think, I think we can divide it into...
7. A: Ah?
8. B: several parts to support it, we can, from the, start from the beggars. The beggars, how self and... What is it?
9. A: 嗯, 主要是这两个方面。 [*Yes, it's mainly these two parts.*]

Student A and B were co-constructing a short essay (120-200 words). They could use both L1 and FL, so words or sentences in *[...]* are translations. According to the class observation, the interaction pattern and features showed in Episode 1a was representative of the whole conversation produced by Pair One in this task. Student A and Student B were talking about whether they should help beggars when they saw them on the street. This conversation occurred at the very beginning of the writing task, so these two participants were discussing how to start their writing task. As the episode shows, Student A began by proposing to think about situations in which people were really in poverty (turn 1), whereas Student B mentioned another way to look at this topic, from two perspectives (turn 2). Although both participants tried to contribute to the task (e.g. turns 1, 2, and 4), they focused more on expressing their own opinion rather than listening to and/or analysing each other's opinions (e.g. turns 3, 4, 5).

At the end of Episode 1, Student A (turn 5) failed to support Student B's idea (turn 4) to complete the task, which was evidence that they lacked collective scaffolding (Storch, 2013) in

the pair work. They were not responsive to each other and failed to provide assistance when the other required it. They also showed a high level of disagreement during the whole writing process, and often failed to resolve issues smoothly by using reasoning and argumentative skills. Therefore, Student A and Student B had high ‘equality’ but low ‘mutuality’. Although both members of the pair contributed to the task, they did not engage with each other’s contribution. Both tried to take over the conversation during their discussions. Consequently, according to Episode 1a, these two participants formed a typical *dominant/dominant interaction pattern* in Lesson Two.

However, their performance changed in Lesson Six. Episode 2a below presents the interaction between Student A and Student B after some practice in CW in this eight-week intervention. They were discussing ‘Should high school students be involved in a romantic relationship?’ The whole episode is a translated version as they used their first language in discussion.

Episode 2a: from Lesson Six (Romantic relationships in high school)

1. **B:** [Firstly, let’s analyse the reasons.]
2. **A:** [For the first reason, we can discuss how it will affect students’ studies.]
3. **B:** [The influence of study has many aspects that can be discussed.]
4. **A:** [Many aspects?]
5. **B:** [The influence of study can be discussed from the perspectives of “time” and “efficiency”.]
6. **A:** [Or from the “result”, “poor academic performance”, this is the most serious and important consequence.]
7. **B:** [It also belongs to the influence of study. So, we can discuss from many aspects, first is “time”, second is “study efficiency”, and the third is...]
8. **A:** [And all of these lead to one result, which is “poor academic performance”.]

The words or sentences in the “...” refer to something the participants wrote down or wanted to write as they were speaking. Student B started the conversation, suggesting they analysed the possible reasons to support their argument, and also tried to elicit some opinions from Student A (see in turn 1). Student A agreed and responded immediately by proposing the first possible reason, and then they focused on the topic and discussed turn by turn (e.g. turns 2 and 3). More importantly, they provided mutual assistance (e.g. turns 5 and 6) and analysed (e.g. turn 7) each other’s ideas instead of just expressing their own ideas. The conversation between Student A and Student B was very cohesive and responsive, they engaged in each other’s ideas and contributions. As evidenced in Episode 2a, they worked in a *collaborative interaction pattern* during the writing process. A similar performance was discovered in the last CW task (Lesson Eight). Episode 3a below captures some interaction features between Student A and Student B in

Lesson Eight, when they were discussing which two people could survive more successfully on a desert island:

Episode 3a: from Lesson Eight (Survival on desert island)

1. **A:** First, let's talk about which person you choose will be the... the... will be survive? Which two persons?
2. **B:** I choose the doctor and the policeman.
3. **A:** Policeman?
4. **B:** Yeah.
5. **A:** So, at the beginning, can you tell me what is the reason?
6. **B:** Because, we think the doctor is good at curing when...
7. **A:** Curing?
8. **B:** When somebody gets hurt, we can use...use ability to...to help him or her.
9. **A:** But in desert, curing...he has no medicine or something to help...
10. **B:** No, we suppose she have...has, we suppose she has, because you don't know whether she has or not.

Pair One used more English in their discussion in Lesson Eight, though made grammatical errors (e.g. in turn 1). The errors were not corrected by the researcher as they sometimes would self-correct or correct for each other. This conversation occurred at the very beginning of the writing task, Student A started the discussion and asked Student B's opinion about the two people she chose (turn 1). Student B answered Student A's question directly and immediately (turn 2). They repeated and elaborated on each other's opinions (e.g. turns 3, 5, 7, 8) to build on the cohesion of the conversation. Their pair talk was highly cohesive. During the whole process, they contributed equally in terms of generating ideas, analysing and evaluating their ideas, and deciding on how to best express the ideas by using their thinking skills more critically. Although they still had disagreements with each other, they tried to resolve those disagreements with convincing reasons and evidence, demonstrating that their thinking developed during the discussion process. As a result, both 'equality' and 'mutuality' were relatively high, compared with their performance in Lesson Two. They not only contributed to the task but also reflected and engaged with each other's contributions well. Overall, neither member asserted individual expertise, but both of them acted as experts drawing on their own knowledge and thinking resources to scaffold each other during the writing process. As the episode demonstrates, therefore, they formed and maintained a *collaborative interaction pattern* in Lesson Eight. Another interesting finding is that they used more target language (English) during the conversation than before, so the whole episode above is produced by them in English.

In summary, Student A and Student B developed their interaction patterns from dominant/dominant patterns in Lesson Two to a collaborative interaction pattern by the end of the study. They became more open-minded and critically reflective in their interactions with each other during the CW process. The change in interaction patterns could be viewed as evidence of their CT development that helped them to collaborate more effectively to complete the writing tasks. As a result, their scores in post-tests were improved.

A. Pair Two

The second sample is from the participants in Pair Two (Student S and Student Y). The two test scores of Student S moved upward from 17 to 29 (writing test) and 43 to 47 (CT test), while student Y's scores improved from 12 to 16 and 36 to 42 respectively. For this pair, Student S seemed to demonstrate more effective CT skills. They tried to jointly participate in and contribute to the tasks. However, they performed very differently from Pair One in the same writing tasks (Lesson Two, Lesson Six and Lesson Eight), and their roles during the discussion were different from Pair One, especially in Lesson Two. This might be because Student Y had lower language proficiency than Student S, so she could not express her opinion confidently. Instead of expressing her own ideas, she preferred to ask for help from Student S. The Thinking-related Episode 4a below shows how these two participants interacted with each other in Lesson Two (discussing whether people should give beggars money):

Episode 4a: from Lesson Two (Helping beggars)

1. Y: "In recent years, a strange..." 应该不是 [Should not be] "strange" ... hum...
2. S: 可以是, 因为之前很多人都帮了, 现在都不帮了, 可以是个很奇怪的现象. [It can be, because lots of people helped in the past, but they don't help now. It can be a strange phenomenon.]
3. Y: 可以写这个吗? [Can we write this?] "People are..." 这怎么读? [How to pronounce it?] "cau..tious"?
4. S: Cautious, cautious...
5. Y: "cautious...are very cautious, helping..."
6. S: "beggars"
7. Y: "hum... the beggars, especially..." 什么什么什么 [And what?]

In Episode 4a, again, the contents in the "... " signify something they wrote down or wanted to write while speaking, while text in *[...]* is translation. According to the episode above, Student Y firstly stated her own ideas about how to start the essay and seemed to struggle with whether to

use the term ‘strange’ to describe the phenomenon (turn 1). Student S confirmed and helped Student Y to complete the idea (turn 2). During the whole writing process, although Student Y was the one who often initiated the conversation (e.g. turns 1, 3), she needed a great deal of help from the other participant during the writing process (e.g. turns 3, 5, 7). In fact, both of them contributed to the writing content, but Student S acted more as an expert in terms of language and linguistic aspects, and he also often provided corrective feedback and confirmation to his partner (e.g. turns 2, 4, 6). They engaged with each other’s contributions well. Therefore, unlike Pair One, without the asserted role of expert, Pair Two displayed an *expert/novice pattern*.

In Lesson Six, however, both participants tried to contribute more. The interaction pattern produced by Student S and Student Y was slightly different from their previous performance in Lesson Two. The following episode is produced by them in Lesson Six (should high school students be involved in a romantic relationship):

Episode 5a: from Lesson Six (Romantic relationships in high school)

1. Y: [“At our point of view...”, and then what?]
2. S: [Your opinion about this. What is your opinion?]
3. Y: [Hum... “I do not agree with it.”]
4. S: [“Disagree?” We have the same opinion this time. All right, and then... then we can use “but” ...]
5. Y: [Why should we use the adversative here? I do not understand. I do not want to use it.]
6. S: [Because “lots of them are involved in romantic relationships, but we don’t support that”]
7. Y: [“But we do not support, we do not support...”, we can say “our points of view is...”. I think we can show our opinion directly. Do not use the adversative.]
8. S: Okay, Okay. “As a point of view...” [I will start to write.]

In Episode 5a, Student Y started drafting the essay, and tried to invite some ideas from her partner. Student S asked a question in reply to elicit more from Student Y. Obviously, during the conversation, Student A attempted to express her own opinion, even disagreement (e.g. turn 5). Unlike in Lesson Two, Student Y was not only responsive to Student S but also analysed her partner’s opinion (e.g. turn 7) and showed disagreement, though she still needed assistance from Student S (e.g. turn 1) in terms of both language and thinking aspects. Another important change during the whole CW process in this lesson was that Pair Two focused more on thinking aspects (such as generating ideas, analysing ideas, and constructing the text), rather than linguistic or language aspects (e.g. word spelling and meaning, grammar accuracy, and translation), than in Lesson Two. This was a good sign, indicating that they used and developed their CT during the interaction and collaborative process to improve the quality of their writing.

Finally, although Student Y was still a little weaker than Student S in the language aspect, she also expressed her own opinion in both her first and target language to make the contribution more balanced. Episode 6a from Lesson Eight, about survival on a desert island, shows their performance:

Episode 6a: from Lesson Eight (Survival on desert island)

1. S: 到时候我们要不要那个, 就是反方向说一下? [Do we need to argue from the opposite side?]
2. Y: 反方向说谁呀? …说他吗? [Opposite side? about whom? …Him?]
3. S: “The football (player)…” ha-ha, “(He) just know how to play the (football)…” can do not…”
4. Y: 他只…他…就说… “就因为他平时训练的运动量比较大, 然后他可能需要很多能量去补充, 但是他并没有…” [He…he only, we can say… “He may need lots of energy, because he has a large amount of training exercise in daily life. But he cannot…”]
5. S: 吃的多. [He eats a lot.]
6. Y: 对, 他吃的多, 但是荒岛上并没有那么多食物, 所以他容易饿死. [Yes, he eats a lot, but there isn't enough food on the desert island. So, he may starve to death easily.]
7. S: 诶, 对的. [Yes, that's right.]

According to this episode, Student S started the conversation by suggesting arguing from the opposite side (turn 1). Student Y asked questions to show her confusion and uncertainty about the suggestion (turn 2). They then discussed this in turns. During the discussion, this pair's collaborative efforts improved, shown in Student S's increased contribution to initiating the conversation (e.g. turn 1) and Student Y's more effective engagement (e.g. turns 2, 4, 6) in both of their text constructions. The content in (...) refers to the implicit meaning speakers wanted to express but failed. The interaction pattern switched to be more like a *collaborative pattern*. Both participants took responsibility for the writing with a high degree of 'equality' and 'mutuality'. Student Y, although weaker in the language aspect, responded and proposed many ideas to construct the joint essay (e.g. turns 4, 6) with CT. More importantly, they paid more attention to generating and analysing ideas rather than checking language accuracy, which means they used more CT skills to consider the writing content. In conclusion, Pair Two moved from an expert/novice interaction pattern at the beginning of the intervention (in Lesson Two), and gradually developed to a collaborative interaction pattern towards the end of the intervention (in Lesson Six and Eight).

Pair Three

The selected third sample Pair (Student C and Student D) illustrated different patterns. Student C improved from 18 to 23 in the individual writing test and improved from 40 to 42 in the CT test, while Student D improved from 22 to 23 and 40 to 43 respectively. The improvements of Pair Three in the tests were not as obvious as the other two pairs. One possible reason might be that, unlike Pair One and Pair Two, they formed a collaborative interaction pattern at the beginning of the eight-week intervention. Therefore, their improvement might not be as obvious as the other pairs. Besides, these two participants sometimes worked in a small group of three, but the third person was not always present. Thus, their performance during CW tasks might be interesting to explore in terms of whether they performed differently to the other two pairs. This section mainly analyses the performance of Student C and Student D in different stages of this eight-week intervention. As with Pair One and Pair Two, three episodes (Episode 7a, 8a and 9a) from Lesson Two, Lesson Six, and Lesson Eight will be illustrated respectively in the following section:

Episode 7a: from Lesson Two (Helping beggars)

1. D: [I suppose, “we should not give beggars money, not give...”]
2. E: [“No, not give.”]
3. D: [Right]
4. C: [“not give...”]
5. E: [“not give money...”]
6. D: [“give food”]
7. E: [But we can provide other help.]
8. D: [Yes, just like food...]
9. E: [If he is a real (beggar), if he is a liar, if he is a liar...]
10. D: [If he only wants money, then he is a liar]
11. E: [Yes, why real beggar needs money only.]
12. C: [Wait a second, here I have an example. If one child’s parents are badly ill and living in a hospital, they need money, what will you do?]
13. E: [We can help the child by telling him/her to report this situation to the public media]
14. D: [Right.]

In Episodes 7a, Student C and Student D worked with another student to complete the CW task in Lesson Two together. They communicated in their first language, so the whole episode is in [...] and translated by the researcher. According to the episode, Student D started the conversation by giving her own position (we should not give beggars money) in turn 1. The other two participants agreed with this opinion immediately (i.e. turns 2, 4), and then they discussed alternative ways for helping beggars (e.g. turns 6, 7, 13). There were more short phrases and overlaps occurring during the conversation than the other two pairs, this was because there were

three participants. However, they contributed and participated jointly during the collaborative process. They considered each other's viewpoints (e.g. turns 1-6), helped each other to complete ideas (e.g. turns 7-11), and analysed the proposed opinions (e.g. turns 13 and 14) together. According to the episode above, Student C seemed not to express herself too much, but she responded and analysed her group member's ideas actively (e.g. turn 12). All of them contributed to the task, and they also had a high level of engagement. Unlike Pair One and Pair Two, therefore, Student C and Student D formed a *collaborative interaction pattern* during the second writing task. Their performance in Lesson Six is demonstrated below:

Episode 8a: from Lesson Six (Romantic relationship in high school)

1. D: [You are not staying on topic. You are talking about..., you are criticising the education (system).]
2. C: [No, because you...]
3. D: [You are often digressing.]
4. C: [This is because the main reason you do not want to be involved in a romantic relationship (in high school) is... is study is very important.]
5. D: [I didn't say that.]
6. C: [And I think, they can, hum... also focus on their study when they are involved in a romantic relationship, as long as they achieve the school's..., they can complete what they should do. You don't need to work so hard that you always stay in the classroom. Why shouldn't (high school students fall in love with somebody)?]
7. D: [You talked a lot, but you only mentioned one reason. To conclude, you only had one reason (of why they can't fall in love in high school).]
8. C: [What reason?]
9. D: [The concern of study or education.]
10. C: [Let's first write down "you agree with this... study..." and what next?]
11. D: [But this is yours (opinion).]
12. C: [So, what is your reason for disagreeing with this phenomenon? Study? Be honest, please.]
13. D: [Study... love, and this romantic relationship is not mature.]
14. C: [Not mature? Everybody has puppy love.]
15. D: [All right. Let's follow your idea. I agree.]

This is a relatively long episode produced by Student C and Student D in Lesson Six. They worked as a pair this time. At first, Student D questioned Student C's previous ideas and claimed Student C was digressing (in turns 1 and 3). Student C explained and tried to persuade Student D (in turns 4 and 6). During their conversation, Student C was more talkative, while Student D was more critical, often concluding (e.g. turn 7) and questioning (e.g. turn 1) the other participant's opinions. This did not mean that Student C dominated the conversation, she also tried to invite opinions from her partner (see in turns 10 and 12), and Student D responded as well (e.g. turn 13). Although there were some disagreements and arguments between participants in Pair Three, neither of them dominated the whole conversation, and both tried to solve their disagreements or

convinced each other with good reasoning skills. They still produced a *collaborative interaction pattern* that had a high level of both equality and mutuality of their contributions to a CW task. During the collaborative process, Pair Three communicated very coherently and actively, and they engaged well with each other's contributions.

Until the last week of the eight-week CW and CT intervention, Student C and Student D continued to demonstrate a similar *collaborative interaction pattern* during the writing process. Episode 9a illustrates their interaction, including joint participation and contribution in Lesson Eight:

Episode 9a: from Lesson Eight (Survival on desert island)

1. D: As the first, we should choose doctor.
2. G: Yeah.
3. D: And, then...
4. G: [Why do you exclude this one (farmer)?]
5. D: [To explain, farmer...]
6. G: [He (farmer) knows how to grow... food...]
7. C: If he arrives, desert, desert island... one month is impossible to grow food.
8. D: [What?]
9. C: [If you really arrive on a desert island, is it possible to grow food in one month? You try it.]
10. G: Ha-ha, grow food, [whether or not you can live for one month (is a problem).]
11. C: [So how can you get food?]
12. D: find... (some food on the island)
13. C: [It is said that is a desert island,] desert...
14. D: [All right.]

In Lesson Eight, Student C and Student D worked with another participant again, who was different from the participant in Lesson Two. They discussed which two people could survive more successfully on a desert island. According to the episode above, Student D started the discussion by expressing her own opinion, which is that the doctor can survive more successfully (turn 1). Then they discussed their reasons for excluding the other individuals. During the discussion, they frequently used CT skills such as criticising, arguing and explaining (e.g. turns 4, 6-9, and 11-13). They also tried to use more target language during the conversation, although they still often needed to explain their thoughts in their first language. This was a typical example of a *collaborative interaction pattern* formed by participants during the CW process. No one controlled the whole process, no distinct role of expert or novice emerged, and the role of expert was fluid so that they could assist each other to complete the task. The levels of equality and mutuality for their contributions were very high throughout the interaction. Student C and

Student D formed a collaborative interaction pattern from the very beginning until the last stage of this intervention.

To summarise, the selected three samples (Pair One, Pair Two, and Pair Three) showed different interaction patterns (dominant/dominant pattern, expert/novice pattern, and collaborative pattern respectively) at the beginning of the intervention. Pair One and Pair Two gradually developed into a collaborative interaction pattern in the last lesson; while Pair Three, who produced the collaborative interaction pattern at the beginning, continued in the same interaction pattern until the end. The findings demonstrated that participants could develop a collaborative interaction pattern with some CT inputs and more practice in a relatively longitudinal study. The development of their interaction patterns might relate to changes in their CT attitudes and how they used their CT during the interaction. The analysis of language functions produced during the verbal interactions showed some features of participants' CT development more specifically in the next section.

4.2.2 Language functions and performance of CT in interaction

The findings related to interaction patterns were positive though they were insufficient to explain the performance or development of participants' CT. Storch's (2013) interaction model was originally used to analyse participants' language learning during the collaboration. Therefore, in order to explore participants' application of CT more comprehensively, the language functions produced during student interactions were analysed. As in Section 4.1.1, this section will present the overall findings of language functions first in order to explore participants' CT development in general terms of language function. Then, the same three sample pairs discussed in Section 4.2.1 are further analysed to investigate the specific features of their language function under the same TREs during their interactions. This process helped the researcher to understand how participants used their CT skills during the CW process and to find evidence to support improvement in students' CT skills.

The language functions produced in TREs were grouped into two categories: CT-related language function and non-CT related language function, in order to explore whether and how participants developed their CT during the eight-week interaction. Some of the language

functions (e.g. agreeing) could be categorised into Non-CT related, as they did not reflect participants' CT, while others (e.g. arguing) could signify that participants were thinking critically. This was related to the CT definition applied by the study (see Section 2.1.1). Accordingly, specific language functions were divided into two categories: CT-related (Interpreting Information, Exemplifying, Criticising, Arguing and Justifying, Acknowledging and Confirming, and Concluding) and Non-CT related (the other language functions). A brief summary of language function produced by all participants is illustrated below and pairs who formed different interaction patterns are marked with different colours.

According to the data captured in Table 4.6, over half of participants (63.6%, 7 pairs out of 11) produced more CT-related language function at the end of the intervention compared with their performance at the beginning. This suggested that, with more practice, they used more CT during the interaction at the end of the intervention. At the last session of the eight-week intervention, participants produced 160 more CT-related language functions in total during the class in comparing with that at the beginning. This suggested that, with CT instruction and more CW practice, they used more CT during their interactions at the end of the intervention.

Table 4.6: The summary of all participants' language functions produced at the beginning and at the end of the eight-week programme

Pair	At the Beginning		At the End	
	CT-related language function	Non-CT related language function	CT-related language function	Non-CT related language function
Pair 1 (A and B)	38	76	62	69
Pair 2 (S and Y)	38	153	26	131
Group 3 (C, D and E)	48	131	50	111
Pair 4 (F and G)	44	124	24	67
Pair 5 (H and I)	42	162	55	149
Pair 6 (K and J)	22	104	18	72
Group 7 (P, O and Q)	59	157	91	131
Pair 8 (Z and M)	33	55	95	141
Pair 9 (U and V)	21	128	43	76
Pair 10 (N and R)	45	104	102	120
Pair 11 (L and W)	18	115	6	59

(Pairs highlighted with colour of orange represent the **Dominant/dominant pattern**; with colour of purple represent the **Expert/novice pattern**; with colour of green represent the **Collaborative pattern**)

More specific language functions were analysed with the three sample pairs (i.e. Pair One, Pair Two, and Pair Three) to investigate more detailed features of participants' application of CT. Selection of the same sample pairs helped the researcher to understand their application and development of CT more completely. Moreover, the three pairs showed different features in producing CT-related language functions (Pair One produces more, Pair Two produces less, and Pair Three stays relatively the same).

The three pairs' language functions in Lesson Two and Lesson Eight were identified by analysing the same episodes. They were analysed and compared in order to explore what kinds of language functions participants used and whether there was evidence of enhanced CT during the writing process. In addition, language functions produced by participants were also divided into initiating functions and responding functions in terms of their interaction feature (adopted and further developed from Li and Kim, 2016). The study focused more on the responding language function, because it represented how participants engaged or interacted with their partner. This could be further explored to analyse participants' CT attitudes and skills during the CW process. For instance, if participants showed more initiating functions than responding functions, this indicated a low level of engagement, and suggested that they were not willing to collaborate with others. More specific sub-language functions (e.g. clarifying, interpreting information, arguing, and exemplifying) were also defined and examples provided (see Appendix C). Some of the sub-functions (e.g. clarifying, suggesting, and agreeing) were categorized into Non-CT related, as they did not reflect participants' CT, while others (e.g. interpreting information, criticising, and arguing) could signify that participants were thinking critically. Specific examples of language functions will be presented and analysed by the three sample pairs in following.

A. Pair One

Similar to the interaction pattern section, starting with Pair One, the same episodes from Lesson Two and Lesson Eight are illustrated with specific language functions added below:

Episode 1b: from Lesson Two (Helping beggars)

1. A: 随便说[Just say something.] (**Eliciting-I**) I support the idea, (**Clarifying-I**) because some poor people are real,是真的穷啊, 一些情况[They are really poor, in some cases.] (**Interpreting information-I**)
2. B: I think, I think we can divide it into... (**Suggesting-I**)
3. A: Ah? (**Asking question-R**)
4. B: ...several parts to support it, we can, from the, start from the beggars. The beggars, how self and... (**Suggesting-I**) What is it? (**Asking question-I**)
5. A: 嗯, 主要是这两个方面。[Yes, it's mainly these two parts.] (**Agreeing-R**)

According to the same episode from Lesson Two produced by Pair One, some language functions were added corresponding to the taxonomy of language function (Li and Kim, 2016; Stanley, 1992; Zhu 2001). The marks ‘**I**’ and ‘**R**’ refer to ‘Initiating’ (initiating a new topic or idea) and ‘Responding’ (responding to partners’ idea). For Pair One in Episode 1, Student A initiated the conversation by stating his own ideas in turn 1. Student B did not respond but made suggestions about the writing structure in turn 2. Student A seemed to agree with Student B in turn 5, but Student B did not actually finish her suggestion in turn 4. At this stage, the conversation between Student A and Student B was incoherent, and they focused on expressing their own ideas or giving suggestions. Student A elaborated on his own statement, but Student B shifted the discussion topic. Both participants tried to initiate their ideas to take over the conversation, but they failed. In contrast, the same Episode 3b below illustrates the different language functions in Lesson Eight:

Episode 3b: from Lesson Eight (Survival on desert island)

1. A: First, let's talk about which person you choose will be the... the... will be survive? Which two persons? (**Eliciting-I**)
2. B: I choose the doctor and the policeman. (**Clarifying-R**)
3. A: Policeman? (**Asking question-R**)
4. B: Yeah. (**Confirming-R**)
5. A: So, at the beginning, can you tell me what is the reason? (**Eliciting-I**)
6. B: Because, we think the doctor is good at curing when... (**Interpreting Information-R**)
7. A: Curing? (**Asking question-R**)
8. B: When somebody gets hurt, we can use...use ability to...to help him or her. (**Interpreting Information -R**)
9. A: But in desert, curing...he has no medicine or something to help... (**Arguing-R**)
10. B: No, we suppose she have...has, we suppose she has, because you don't know whether she has or not. (**Justifying-R**)

At the beginning, Student A initiated the conversation again, but this time he invited Student B to state some ideas, instead of showing his own opinions. Following this, Student B, in turn 2, responded and shared more information using interpreting information skills (e.g. turns 6 and 8).

More diverse language functions were evidenced in the discussion during this task, such as eliciting (e.g. turn 5), interpreting, arguing (e.g. turn 9) and justifying (e.g. turn 10). This reflected the diversity of their CT skills. Participants in Pair One became more responsive to and supportive of each other, while their thinking developed. Comparing the language functions performed in these two lessons, Student B produced fewer initiating acts but more responding acts in Lesson Eight. Additionally, both of the participants performed more ‘Arguing’ and ‘Justifying’ language functions in Lesson Eight. This, to some extent, reflected their CT development.

According to the overall data captured in Table 4.6 above, Pair One produced more CT-related language functions in Lesson Eight (38 to 62). Table 4.7 below displays a summary of specific comparisons of language functions by individual participants in Pair One performed in two CW lessons. The total number of initiating and responding acts for both Student A and Student B in Lesson Eight was higher than in Lesson Two, with an increase for both Student A (64 to 73) and Student B (50 to 58). Not only did they contribute more to the writing process, but comparison of their behaviours in initiating and responding also showed that initiating acts dropped 58% (48 to 20), while the number of responding acts nearly doubled (66 to 111) in Lesson Eight. This means that they listened and responded to each other more, rather than only concentrating on expressing their own ideas during the conversation in Lesson Eight. To be specific, Pair One produced more ‘clarifying’ (14 to 4) and ‘suggesting’ (20 to 6) functions in the initiating category in Lesson Two than in Lesson Eight, and there was no concluding function. Both of the participants attempted to dominate the conversation, so there was a very small number of supplementary and scaffolding language functions such as ‘supplementing’ (4) and ‘interpreting information’ (3) in Lesson Two. Although the number of ‘disagreeing’ (5) functions was not large, Pair One often ignored each other’s suggestions.

Meanwhile in Lesson Eight, both Student A and Student B tried to initiate and respond in the tasks by using diverse language functions. Compare with the two tasks, however, their engagement in task negotiation had changed. There were more responding acts (111) than initiating acts (20) in Lesson Eight, while the numbers were very close in Lesson Two (66, 48 respectively). The number of “interpreting information” functions (3 to 10) in the responding category increased. This suggested that they listened and responded to each other rather than

only expressing their own ideas during the conversation. They paid more attention to the co-construction of writing by using more and different language functions and CT skills. Accordingly, Pair One produced more language functions of ‘interpreting information’ and ‘arguing and justifying’, which were accordant with their performance in the post writing test (i.e. they achieved higher scores in ‘issue identification’ and ‘context and assumption’ aspects). Besides, Student B seemed to change her behaviour in Lesson Eight compared to Lesson Two. The reason Student B gave for her change, according to her interview response, was “I learned a lot from my partner, he has a very active mind”. Student B became more open-minded and was willing to listen and to learn from her partner. More detailed responses from Student B are presented and analysed in Section 4.3.

Table 4.7: Summary of Language functions involving two lessons by Pair One

Language function		Lesson Two			Lesson Eight		
		Student A	Student B	Sub-total	Student A	Student B	Sub-total
Initiating (I) (Proposing new ideas or initiating peer interaction)	Clarifying	8	6	14	2	2	4
	Suggesting	12	8	20	5	1	6
	Eliciting	1	1	2	2	1	3
	Interpreting information	5	2	7	1	0	1
	Asking question	1	3	4	6	0	6
	Examplifying	0	1	1	0	0	0
Subtotal		27	21	48	16	4	20
Responding (R) (Reacting to others' ideas)	Clarifying	1	3	4	5	10	15
	Suggesting	7	1	8	5	4	9
	Eliciting	0	1	1	1	0	1
	Interpreting information	3	0	3	3	7	10
	Supplementing	0	4	4	2	2	4
	Asking Question	4	3	7	6	2	8
	Criticising	2	2	4	2	2	4
	Examplifying	3	1	4	2	0	2
	Agreeing	3	4	7	4	6	10
	Disagreeing	2	3	5	2	1	3
	Arguing and Justifying	10	5	15	16	13	29
	Confirming and Acknowledging	2	2	4	6	6	12
	Concluding	0	0	0	3	1	4
Subtotal		37	29	66	57	54	111
Total		64	50	114	73	58	131

B. Pair Two

The second sample, Pair Two (Student S and Student Y) demonstrated different interaction and CT features. As discussed in Section 4.2.1, Pair Two formed an *expert/novice* interaction pattern in Lesson Two. The following example focused on the language functions in the same episode:

Episode 4b: from Lesson Two (Helping beggars)

1. Y: "In recent years, a strange..." 应该不是 [Should not be] "strange" ... hum... (Clarifying-I)
2. S: 可以是, (Acknowledging-R) 因为之前很多人都帮了, 现在都不帮了, 可以是个很奇怪的现象. [It can be, because lots of people helped in the past, but they don't help now. It can be a strange phenomenon.] (Interpreting Information -R)
3. Y: 可以写这个吗?[Can we write this?] "People are..." 这怎么读? [How to pronounce it?] "cau...tious"? (Asking question-I)
4. S: Cautious, cautious... (Clarifying-R)
5. Y: "cautious...are very cautious, helping..." (Clarifying-R)
6. S: "beggars" (Supplementing-R)
7. Y: "hum... the beggars, especially..." 什么什么什么 [And what?] (Asking question-R)

In this episode, Student Y initiated the conversation by directly stating her own opinion, and Student S responded to her and provided detailed reasons in turn 2. Then Student Y requested language help in turn 3 and received responses in turns 4 and 6. Student Y also tried to invite more ideas and information from her partner at the end of the conversation. Their conversation was relatively more coherent than Pair One, and they showed a more diverse use of language functions. During the whole interaction, Student Y initiated the conversation more than Student S in Lesson Two. Student S, although he was not as active as Student Y, provided effective responses to his partner.

The diversity and total amount of language function produced by Pair Two did not change greatly in Lesson Eight compares with their performance in Lesson Two (e.g. Episode 4b), as Episode 6b shows below:

Episode 6b: from Lesson Eight (Survival on desert island)

1. S: 到时候我们要不要那个, 就是反方向说一下? [Do we need to argue from the opposite side?] (Suggesting-I)
2. Y: 反方向说谁呀? ...说他吗? [Opposite side? About whom? ...Him?] (Asking question-R)
3. S: "The football..." ha-ha, "just know how to play the... can do not..." (Clarifying-R)
4. Y: 他只...他...就说... "就因为他平时训练的运动量比较大, 然后他可能需要很多能量去补充, 但是他并没有..." [He...he only, we can say... "He may need lots of energy, because he has a large amount of training exercise in daily life. But he cannot..."] (Interpreting Information -R)
5. S: 吃的多. [He eats a lot.] (Supplementing-R)
6. Y: 对, 他吃的多, 但是荒岛上并没有那么多食物, 所以他容易饿死. [Yes, he eats a lot, (Agreeing-R) but there isn't enough food on the desert island. So, he may starve to death easily.] (Interpreting Information -R)
7. S: 诶, 对的. [Yes, that's right.] (Agreeing-R)

Student S started the conversation with a suggestion this time. Student Y responded and proposed one possible choice in turn 2. They then discussed ‘why the football player is not a good choice’ in this task by adding and elaborating on useful information together. Finally, they reached an agreement efficiently. One interesting finding from Pair Two in Lesson Eight was that they displayed no ‘disagreeing’ functions during their conversation. When they showed disagreement, they ‘suggested’ alternative choices or ‘argued’ with reasons for their disagreement. This means their CT skills were promoted during the process. What’s more, the numbers of responding acts between Student S and Student Y were relatively equal in Lesson Eight in comparison with those in Lesson Two.

According to the overall Table 4.6, Pair Two produced less CT-related language functions in Lesson Eight (38 to 26). However, there were changes between different categories of language function. Table 4.8 shows the summary and comparison of language functions that Pair Two performs. The total number of produced language functions for both Student S and Student Y in Lesson Eight was slightly lower than that of Lesson Two, with a decrease of about 21% for Student S (90 to 71) and 15% for Student Y (101 to 86). They used more responding functions (72%) than initiating functions in Lesson Eight (113 out of 157), while the percentage of responding acts was 70% in Lesson Two (135 out of 191). Although these two figures were close, the diversity of language functions for both Student S and Student Y changed slightly. They also showed a lot of ‘clarifying’ (18) and ‘suggesting’ (14) functions in the initiating category in Lesson Two, but unlike Pair One, they produced more ‘clarifying’ (28), ‘suggesting’ (20) and ‘supplementing’ (14) functions in the responding category. This means Student S and Student Y supported and collaborated with each other more than Pair One at the very beginning. However, there were few elaborations, arguments, and conclusions in Lesson Two.

Interestingly, Student Y produced many ‘asking question’ functions in both the initiating (9) and responding categories (12). This means that she often asked for help from her partner during the writing process. In the two lessons, Student Y was the person who often initiated the conversation, so she had more initiating language functions than Student S. This demonstrated that Pair Two formed an *expert/novice* pattern in Lesson Two, and Student Y played the role of novice during the interaction. Student Y was also the person who asked more questions and who needed assistance from Student S, yet her CT skills were also developed as she showed

‘interpreting information’ (2 to 4) and ‘supplementing’ (5 to 9) functions. In Lesson Eight, there were still many suggestions, statements and questions produced by Pair Two, but they applied more ‘supplementing’ functions (14 to 21) to elaborate on each other’s ideas. Student Y had a slightly weaker performance than Student S during the two writing tasks, this was probably because of her lower language proficiency, based on her responses from interview. She struggled and concentrated more on grammatical problems when they were drafting the essay, so this might have influenced her performance on the CT aspect.

Table 4.8: Summary of Language functions involving two lessons by Pair Two

Language function		Lesson Two			Lesson Eight		
		Student S	Student Y	Sub-total	Student S	Student Y	Sub-total
Initiating (I) (Proposing new ideas or initiating peer interaction)	Clarifying	5	13	18	3	9	12
	Suggesting	8	6	14	5	7	12
	Eliciting	3	6	9	4	2	6
	Interpreting information	2	9	11	3	5	8
	Asking question	0	2	2	2	4	6
	Examplifying	0	2	2	0	0	0
	Subtotal	18	38	56	17	27	44
Responding (R) (Reacting to others’ ideas)	Clarifying	17	11	28	15	11	26
	Suggesting	15	5	20	12	1	13
	Eliciting	5	3	8	0	2	2
	Interpreting information	9	5	14	12	9	21
	Supplementing	3	12	15	3	13	16
	Asking Question	8	5	13	4	10	14
	Criticising	0	3	3	0	1	1
	Examplifying	1	3	4	0	2	2
	Agreeing	2	1	3	0	3	3
	Disagreeing	1	1	2	0	0	0
	Arguing and Justifying	6	8	14	4	4	8
	Confirming and Acknowledging	5	4	9	3	1	4
	Concluding	0	2	2	1	2	3
	Subtotal	72	63	135	54	59	113
Total		90	101	191	71	86	157

C. Pair Three

The final sample of Pair Three (Student C and Student D) also showed interesting interaction features. As discussed in Section 4.2.1, they performed a *collaborative interaction* pattern at the very beginning and stayed in this ideal interaction pattern until the end of the study. The episode below shows how they used their language to interact with their partners in Lesson Two:

Episode 7b: from Lesson Two (Helping beggars)

1. **D:** [I suppose, “we should not give beggars money, not give...”] (**Suggesting-I**)
2. **E:** [“No, not give.”] (**Clarifying-R**)
3. **D:** [Right] (**Confirming-R**)

4. **C:** ["not give..."] (**Clarifying-R**)
5. **E:** ["not give money..."] (**Supplementing-R**)
6. **D:** ["give food"] (**Supplementing-R**)
7. **E:** [But we can provide other help.] (**Arguing-R**)
8. **D:** [Yes, just like food...] (**Agreeing-R**)
9. **E:** [If he is a real (beggar), if he is a liar, if he is a liar...] (**Clarifying-R**)
10. **D:** [If he only wants money, then he is a liar] (**Supplementing-R**)
11. **E:** [Yes, a real beggar needs money only.] (**Agreeing-R**)
12. **C:** [Wait a second, here I have an example. If one child's parents are badly ill and living in a hospital, they need money, what will you do?] (**Exemplifying-R**)
13. **E:** [We can help the child by telling him/her to report this situation to the public media] (**Suggesting-R**)
14. **D:** [Right.] (**Agreeing-R**)

Student D started the conversation by suggesting her own opinion, and then Student C and the third participant clarified their own opinions. They used various kinds of language functions to support their partners in developing their arguments and thoughts, such as 'clarifying' in turns 4 and 9, 'supplementing' in turns 5 and 6, and 'exemplifying' in turn 12. They responded to each other coherently to show their agreements (e.g. turns 8 and 11) or confirmation (e.g. turn 3). The most frequently used language functions by Pair Three in this lesson were 'clarifying', 'suggesting', 'supplementing', 'asking questions', 'agreeing', and 'arguing and justifying'. This diversity of language functions which appeared during the conversation reflected a diversity of CT skills. During the whole interaction in Lesson Two, Student C produced many more utterances than the other two participants, but this did not mean that Student C dominated the conversation or played an expert role during the CW process. Student D and another participant also contributed to the task and had very good engagement. A similar performance by Pair Three could be found in Lesson Eight, as Episode nine illustrates below:

Episode 9b: from Lesson Eight (Survival in desert island)

1. **D:** At the first, we should choose doctor. (**Clarifying-I**)
2. **G:** Yeah. (**Agreeing-R**)
3. **D:** And, then... (**Clarifying-R**)
4. **G:** [Why do you exclude this one (farmer)?] (**Eliciting-R**)
5. **D:** [To explain, farmer...] (**Clarifying-R**)
6. **G:** [He (farmer) knows how to grow... food...] (**Justifying-R**)
7. **C:** In he arrives, desert, desert island..., one month is impossible to grow food. (**Arguing-R**)
8. **D:** [What?] (**Asking question-R**)
9. **C:** [If you really arrive a desert island, is that possible to grow good within one month? You try it.] (**Arguing-R**)
10. **G:** Ha-ha, grow food, [whether or not can live for one month (is a problem).] (**Interpreting Information -R**)
11. **C:** [So how can you get food?] (**Criticising-R**)
12. **D:** find... (some food on the island) (**Justifying-R**)
13. **C:** [It is said that is a desert island,] desert... (**Arguing-R**)
14. **D:** [All right.] (**Agreeing-R**)

In this episode, Pair Three worked in a small group, but with a different participant. Overall, the diversity of language function produced by Pair Three changed slightly. Student D initiated the conversation by clarifying her own opinion, but the third participant attempted to elicit further reasons from Student D by asking a question in turn 4. The language function that appeared in turn 4 in the above episode was defined as an ‘eliciting’ function rather than ‘criticising’ or ‘asking question.’ This was because the purpose of this question was to elicit more information from Student D, and it did not indicate disapproval of the participant. After that, participants argued with each other critically and logically. Many ‘arguing and justifying’ functions occurred (e.g. turns 6, 7, 9, 12, and 13). Consequently, Pair Three used and developed their CT skills to complete writing tasks collaboratively in Lesson Eight.

Table 4.9: Summary of Language functions involving two lessons by Pair Three

Language function		Lesson Two			Lesson Eight		
		Student C	Student D	Sub-total	Student C	Student D	Sub-total
Initiating (I) (Proposing new ideas or initiating peer interaction)	Clarifying	14	4	18	1	6	7
	Suggesting	2	4	6	4	2	6
	Eliciting	3	0	3	1	1	2
	Interpreting information	1	0	1	1	4	5
	Asking question	0	0	0	0	0	0
	Examplifying	1	0	1	0	0	0
	Subtotal	21	8	29	7	13	20
Responding (R) (Reacting to others' ideas)	Clarifying	13	3	16	11	20	31
	Suggesting	19	3	22	4	7	11
	Eliciting	4	0	4	2	1	3
	Interpreting information	5	7	12	6	6	12
	Supplementing	10	13	23	6	8	14
	Asking Question	3	1	4	1	1	2
	Criticising	12	10	22	13	5	18
	Examplifying	4	3	7	9	2	11
	Agreeing	6	0	6	0	4	4
	Disagreeing	4	0	4	0	0	0
	Arguing and Justifying	10	8	18	15	14	29
	Confirming and	5	4	9	2	2	4
	Acknowledging						
	Concluding	2	1	3	1	1	2
	Subtotal	97	53	150	70	71	141
Total		118	61	179	77	84	161

The CT-related language functions produced by Pair Three were similar in the two lessons (48 to 50). Table 4.9 summarised and compared both general and specific features of language functions produced by Pair Three in the two lessons. In general, the total number of language

functions for Student C (118 to 77) decreased by 40% in Lesson Eight, while for Student D (61 to 84) they increased by about 37%. This indicated that Student C produced much more than Student D in Lesson Two, but the situation changed slightly in Lesson Eight. In this lesson, Student D (84) used more language functions than Student C (77) in total. In addition, the number of ‘arguing and justifying’ functions in Lesson Eight increased (18 to 29) while the number of ‘agreeing’ functions decreased (23 to 14). These data suggested that participants were not only showing agreement for each other’s points of view, but they were supplementing, justifying, or even criticising the proposed ideas. Another important finding to be emphasised here was that, although the interaction pattern between Student C and Student D did not change, they developed and used diverse CT skills at the end of the eight-week intervention.

The specific features of interactions between the three samples of participants are illustrated and analysed above. In general, one interesting finding was that participants who formed different interaction patterns showed different features of language functions. For example, participants in the *dominant/dominant* pattern might produce similar statistics in both initiating functions and responding functions. This seldom happened in other interaction patterns. Pair One and Pair Two illustrated certain features and connections between the interaction patterns and produced language function. The potential links between them could be further explored with a larger sample of EFL students in a future study. Secondly, participants used different kinds of CT skills during the collaborative process, according to the diversity of language functions, and their CT were promoted after being practiced in several classes. This was evident in that most of them used more ‘arguing and justifying’, ‘criticising’, ‘supplementing’, and ‘interpreting information’ functions as a result. Therefore, their application of CT was improved in post-tests.

4.2.3 Comparison of CW works

This section presents the three sample pairs’ CW marking sheets as examples of their writing results. Their CW works can be seen in Appendix N. The reason for presenting the marking sheets of the three sample pairs is because their CW process has been analysed in detail in the last two sections. This would enable the researcher to explore in detail whether the observed data from CW process was consistent with or supplements their CW results. The outcomes of CW produced by participants were not the main focus in this study, but they could reveal some interesting findings to enhance the validity and reliability of the findings from the CW process.

Previous studies related to CW compared the CW products with individual writing (see sections 2.2 and 2.3), and they found that people involved in CW could produce shorter, but more accurate and better-quality texts. In this study, it is decided instead that it would be more useful to compare participants' CW products produced at the beginning and at the end of the eight-week intervention. The study focused on participants' application of CT during the process of writing and in the written texts, which meant the small grammar mistakes or misspellings did not influence the participants' writing marks. 'A Guide to Rating Critical and Integrative Thinking in Writing' (Washington State University, 2009) was used as marking criteria for both pre- and post-writing tests in this study (see in Section 3.3.3 and 3.4.1). According to the guide, the maximum score is 42, for which each aspect contains six points (0 represents the skill is absent and 6 represents mastering of the skill).

The marking sheets and results of the two CW pieces produced by the three samples (Pair One, Pair Two, and Pair Three) is demonstrated in this section. After analysing their performance during the CW process, it is helpful to understand and discuss their CW works produced in Lesson Two and Lesson Eight.

For Pair One, the result in Lesson Two was not very good, and they showed poor CT performance, as Table 4.10 presents below:

Table 4.10: Scores of CW product produced by Pair One in Lesson Two

Criteria	Score	Comments
Issues Identification and Focus	2	(+): a clear standpoint was presented (-): However, the lead-in, background and introduction was a bit redundant. For instance, the questioning in the introduction is not necessarily needed
Context and Assumptions	2	(+): some basic assumptions can be seen (-): the assumptions should be more integrated and more specified. For instance, to make society more harmonious may be too general
Sources and Evidence	1	(+): (-): little evidence can be seen
Diverse Perspectives	2	(+): awareness of more than one perspective can be seen, some comparison can also be seen; (-): however, more explanations were expected
Own Perspective	1	(+): maintains a consistent position, (-): lack of solid justification. More explanations would be helpful

Conclusion	1	(+): shows awareness of providing a conclusion and a summary of the position can be seen (-): the conclusion should not be concerned with new reasons, but some recommendations were expected;
Communication	3	(+): Flow of ideas is clear, the basic structure is clear (-): more coherence was expected
Total Score	12	Additional comments: None

The writing topic for Lesson Two was ‘Do you think we should give beggars money when we see them on the street? Give reasons and examples to support your answer.’ Pair One was poor at providing supporting evidence, justifying their own argument, and making proper conclusions. According to the comment sheet above (Table 4.10), their background introduction was redundant, and they almost failed to provide solid justification and supporting evidence (1 point). Only the communication aspect of the writing got a fine mark (3 points). Their performance and score of CW products produced in Lesson Eight (‘Which two people do you think can survive on the desert island most successfully? Why?’) improved slightly (from 12 to 13):

Table 4.11: Scores of CW product produced by Pair One in Lesson Eight

Criteria	Score	Comments
Issues Identification and Focus	2	(+): clearly identified the football player and farmer as the persons who may live longer. (-): the identification should have been concise; in addition, all the persons’ identities should have been made visible to the readers
Context and Assumptions	2	(+): some basic assumptions in terms of their merits were clearly made (-): however, how these merits are related to living longer should have been more clearly clarified
Sources and Evidence	2	(+) some supportive explanations can be seen (-): more explanations were expected so that the idea flow would be more natural and coherent
Diverse Perspectives	2	(+): more than one perspective can be seen (-): some comparisons were expected, that is, without comparison, it may not be convincing to argue the two may live longer than the others
Own Perspective	1	(+): keeping a consistent position (-): more integrated thinking was expected
Conclusion	1	(+): good to show the attempt to make a conclusion (-): however, a bit confusing
Communication	3	(+): main ideas are clear (-): pay attention to the structure, particularly for the introduction and conclusion
Total Score	13	Additional comments: None

Apart from the ‘source and evidence’ aspect improving slightly, for which ‘some supportive explanations can be seen’, for a score of 2 (the emerging stage), the other six aspects of writing stayed at the same level as was produced in Lesson Two. In fact, the performance of CW products completed by Pair One during the eight-week intervention, to some extent, were steady and similar, getting similar scores. This compared result was different from that find during the CW process. The possible reasons for this discordance will be analysed after the demonstration of the other two samples in this section.

Pair Two had a similar performance and scores to Pair One in Lesson Two. The total score of their CW text was only 10 (out of 42), which showed poor writing and CT skills in CW:

Table 4.12: Scores of CW product produced by Pair Two in Lesson Two

Criteria	Score	Comments
Issues Identification and Focus	1	(+): a clear standpoint was presented (-): However, the lead-in, background introduction was a bit redundant and the idea is a bit incoherent. That is, even though quoting the old saying is good, virtue is not directly related to giving money to beggars, unless the argument that helping beggars is a kind of virtue is made
Context and Assumptions	2	(+): showing basic assumptions (-): one or two other assumptions were expected
Sources and Evidence	1	(+): (-): lack of detailed explanation and solid evidence
Diverse Perspectives	2	(+): awareness of more than one perspective can be seen (-): however, some comparison can also be seen
Own Perspective	1	(+): Keeping a consistent position, (-): occasionally lack of solid justification. E.g., helping others does not necessarily mean being helped, and virtue is not equal to obligation, so it is not convincing to argue because of the virtue issue, people should help others
Conclusion	0	(+): (-): lack of a conclusion
Communication	3	(+): Flow of ideas is clear, the basic structure is clear (-):
Total Score	10	Additional comments: None

The conclusion of their writing was missing, and the other aspects of writing such as ‘issue identification’, ‘evidence’, and ‘own perspective’ were at a minimal level. In other words, they attempted to show these skills, but they only showed basic awareness or had limited success

within those aspects of writing. Similar to Pair One, they got 3 points in the communication aspect in that their ‘flow of ideas and basic structure were clear’. Compare with Pair One, Pair Two’s produced text showed a greater improvement in Lesson Eight (10 to 16).

As illustrated in Table 4.13, Pair Two made improvements in ‘making basic assumptions’, ‘showing great efforts to support the arguments’, and ‘comparing with the other perspectives’ in writing. All these aspects of writing were enhanced to the ‘developing’ level (3 points) in Lesson Eight, and they also attempted to make a conclusion. Pair Two showed some enhanced CT skills in writing.

Table 4.13: Scores of CW product produced by Pair Two in Lesson Eight

Criteria	Score	Comments
Issues Identification and Focus	1	(+): It is good to show the awareness of presenting the identities and a clear position. (-): However, the author should have introduced these points with his/her words. Also, the questioning is redundant, and the main perspectives were expected to be outlined
Context and Assumptions	3	(+): clear basic assumptions, considering the chosen ones’ advantages, (-): however, what might be the most important qualities for people to survive on the island should be more clearly argued
Sources and Evidence	3	(+) showing great efforts to support the arguments, particularly with some explanations on the causal relationship (-): but some are not convincing, for example, if running fast is the advantage of a football player, what about for a policeman? Why did the author choose football player rather than policeman?
Diverse Perspectives	3	(+): very good to compare with other people, (-): the comparison should be more comprehensive. It might be argued that the weak points may result in the unchosen ones’ failure to live longer
Own Perspective	2	(+): good to form their own argument (-): more integration was expected, and the deep reasons for surviving on the island should have been considered
Conclusion	1	(+): good to show an attempt to make a conclusion, (-): however, the conclusion is too simple
Communication	3	(+): overall structure is good, (-): the ideas should be more coherent and more integrated
Total Score	16	Additional comments: None

For the last sample, Pair Three (Student C and Student D) had similarities in both performance and development of CW products with Pair Two in the two lessons. Pair Three also achieved a total score of 10 in Lesson Two:

Table 4.14: Scores of CW product produced by Pair Three in Lesson Two

Criteria	Score	Comments
Issues Identification and Focus	1	(+): showing an attempt to present a clear standpoint (-): However, the causal relationship to arrive at the position is a bit unclear. In this sense, a bit more explanation was expected. Also, it is a bit off-topic, in that why not giving beggars money was not well elaborated, instead, the focus was on how to provide specific help.
Context and Assumptions	1	(+): showing the basic awareness of own assumptions with respect to providing the real beggars help with food and getting help from the government. (-): however, some assumptions were not clearly made. E.g., to raise money from the government; also, some assumptions were repeatedly made. Moreover, more contexts were expected.
Sources and Evidence	1	(+): some evidence can be seen, e.g., the women who helped the others got a return later. (-): However, not all the arguments are supported by sources or evidence. Secondly, the relationship between evidence and analysis should have been more carefully considered.
Diverse Perspectives	1	(+): awareness of more than one perspective can be seen; (-): however, these aspects should be more integrated, rather than just listing the different aspects, and more perspectives were expected.
Own Perspective	2	(+): Keeping a consistent position, (-): lack of solid justification. More explanations would be helpful.
Conclusion	1	(+): showing awareness of providing a conclusion. (-): but the conclusion is too short and simple, with little meaning to the essay.
Communication	3	(+): Flow of ideas is clear (-): some oral English and abbreviations appeared.
Total Score	10	Additional comments: None

The pair co-constructed the CW essay with a very low level in the seven dimensions of writing, except for the communication aspect. They also got three points in the communication category, as with the other two pairs. In fact, most Chinese EFL students usually display a better performance in this aspect of writing compared with other dimensions (Storch, 2012). The low score of CW produced in Lesson Two might indicate that the participants had similar levels in EFL writing and CT at the beginning of the eight-week intervention. Subsequently, they also showed an improvement in Lesson Eight (10 to 15), as Table 4.15 summarises below:

Table 4.15: Scores of CW product produced by Pair Three in Lesson Eight

Criteria	Score	Comments
Issues Identification and Focus	2	(+): good to introduce all the persons' identities; and clarify the position. (-): However, the perspectives for the position should have been briefly sketched
Context and Assumptions	2	(+): some basic assumptions can be seen, in terms of professional skills and first-aid knowledge (-): however, the assumptions should have been more specific, such as professional skills and training
Sources and Evidence	2	(+) some attempts to support the argument can be seen (-): however, more solid justification was expected
Diverse Perspectives	2	(+): good to see comparison with the other persons, (-): should more comprehensively consider why the others cannot survive longer than their chosen ones
Own Perspective	2	(+): consistent position (-):
Conclusion	2	(+): good to summarise the aspects previously discussed. (-): some awareness of the other skills or features should have been shown
Communication	3	(+): the structure is well organised, and the idea flow is good (-):
Total Score	15	Additional comments: None

The performance and scores of the CW product completed by Pair Three illustrated that they achieved 2 points out of 6 for the majority of the aspects in writing. Pair Three improved by one small step in each of the six dimensions of CT in writing after the eight-week intervention.

After comparing the data on the CW outputs produced in Lesson Two and Lesson Eight, it was evident that all three pairs showed improvement in CT in the writing outputs. However, it should be noted that the developments of CT skills in Pair One discovered from CW products were not as significant as the findings from their CW process. Although the scores of Pair One on CW products did not improve significantly, the observation data did indicate that they gradually displayed more CT during the CW process to discuss, negotiate and interact with their partner during the process in order to complete the joint writing tasks.

With regard to language issues, participants paid attention to issues such as grammatical errors, spelling mistakes, or vocabulary choices. When participants discussed the writing tasks, they tended to use L1 in order to express themselves more clearly. Thus, when they transferred their

oral discussion into L2 written text, they needed sufficient time to edit or organise both language and content (Derewianka, 2014). The insufficient time affected their CT performance in writing products, and this could be the reason why most of the participants had improved scores in the ‘communication’ aspect in this study, which will be further discussed later in Section 5.1.1.

Limited time could be another possible reason for the discordant results between CW process and CW products. As discussed above, participants needed sufficient time to undertake CW practices and participants in this study were given 60-80 minutes to complete the task. However, most of them spent the time discussing and interacting during the CW process and had little time left for writing following the discussion. As such, there was no time for most of them to review or edit their whole drafts after they finished drafting the texts. As a result, many participants submitted their first draft at the end of the classes and this, to a large extent, influenced the quality of their co-constructed texts.

Evidence from pre- and post- tests was that the average score of the ‘conclusion’ aspect declined slightly, and the three pairs all showed a very low level in this aspect in both CW works and individual writing tests. Although Pair One discussed productively and critically during the process, their CW products might not reflect their real CT developments during the CW process. Furthermore, the insufficient practice of writing critical conclusions in CW tasks also influenced their CT performance on this aspect in post-tests. As a result, they achieved lower scores in the individual writing test. This suggested that sufficient practice of writing during the CW process was important for participants’ individual CT development.

The nature of the task type could be another factor influencing the discordant results between CW process and products. The choice of writing task was made because of the limited time in class. In order to allow participants to complete the task in the 60-80 min sessions that were available, the researcher designed the relatively simple and short CW tasks for participants. This could be seen as one limitation of the study. The task of short argumentative essay writing was relatively simple compared to the complexity of the rubric used to mark the CW products. For example, it did not appear to be easy for participants to address the CW task in Lesson 2, “whether people should give beggars money or not” as an academic writing product

demonstrating good arguments, reasoning, and different perspectives. The marking of the short argumentative essays with the complex marking rubric led to relatively low CW scores. Future studies could consider the teaching environment more carefully, in order to design a more appropriate CW task or marking rubric.

4.3 Interview with Participants

After the investigations from both pre- and post- tests and CW process observations, participants' responses in interviews provided more in-depth findings and explanations to address the second sub-research question of this study '*What are students' perceptions of any impact of CW on CT?*' The findings from interviews supplemented and further explained the observation findings from the CW process. More importantly, in order to answer the main research question '*Can CW facilitate Chinese EFL students' CT in class?*', the interviews enable the researcher to explore the participants' points of view on this aspect.

After the eight-week intervention, 10 of the 24 participants voluntarily attended a semi-structured interview, including participants in Pair One, Pair Two, and Pair Three. Thus, this section mainly drew upon the responses of the three pairs in the interviews. The interviews provided a chance for the participants to share their feelings and experiences of a CW. More importantly, they were able to explain some of the behaviours observed during the CW process. The interviewed questions contain two parts, as discussed in Section 3.3.5. The first part aimed to understand participants' existing knowledge and experiences of CT, and the second part related to CW aspects and the impact on CT and writing. Therefore, this section summarises participants' responses in terms of three aspects: 1) participants understandings and attitudes towards CT; 2) participants attitudes towards CW; 3) participants attitudes towards using CT during the CW process. The interview questions can be seen in Appendix D. The interviews were conducted in Chinese, which was the shared language of the participants and the researcher. Participants were invited to respond in their first language in order to express their opinions clearly and sufficiently. This was also beneficial for the researcher to understand their perspectives more accurately and comprehensively. The participants' responses from the interviews are discussed and analysed in this section.

4.3.1 Participants' attitudes and understandings about CT

Firstly, it is necessary to know how these participants previously understood or felt about CT. This might have influenced how they used or developed their CT in the eight-week CW and CT intervention. Findings from the interviews suggested that participants might have previously heard CT terms but lacked adequate understanding of it. The following questions are used to elicit EFL participants' prior understandings about CT.

1) Did you know what critical thinking was about and how to use it before this study?

Student A and Student B in Pair One both admitted that they had not previously learned what CT was or how to use CT before attending the intervention. Student A said, 'I have heard the term CT occasionally before, but I have not learned it specifically'; while Student B stated, "I only knew a little about the term 'CT', and I didn't previously learn and use it systematically". Similar findings were discovered from the other four participants. For example, Student S also mentioned, "I heard this term in high school when I was on my politics courses. The English teachers didn't mention that". Student Y said that she had never learned about CT before, although she had heard of it. Therefore, none of these participants had learned about CT before, although most of them had heard of the term.

2) What was your definition of critical thinking previously?

For this question, the six participants had slightly differing understandings about CT before they got involved in the eight-week intervention. They respond:

Student A: *I thought it was a different learning method.*

Student B: *I felt it meant thinking from many aspects.*

Student S: *I thought CT was to solve a problem from different perspectives.*

Student Y: *I regarded CT as seeing things or solving problems without 'absoluteness'. There was not just one right answer.*

Student C: *It means observing from different angles, such as objective or subjective perceptions.*

Student D: *I thought it meant to think from different perspectives or different angles.*

All of the other participants perceived of CT as a way of regarding issues or problems from different perspectives or angles. Student Y implied open mindedness in seeing CT as regarding problems as having ‘not just one right answer’.

3) Did you consider yourself a good critical thinker previously?

This was a self-evaluation question, aiming to explore participants’ own understandings of being a critical thinker. Apart from Student C, the other five participants did not consider themselves to be good critical thinkers previously. Student B said, for example, “I thought I wasn’t good at CT, because I didn’t know it well before”, and Student Y claimed she could think critically, but she needed further development. She explained that “I used to think from two sides, both advantages and disadvantages, but I was not good at analysing”. Student C thought differently from the other participants, believing she had at least become a good critical thinker since she grew up. She believed she was starting to think from different perspectives more and more. In general, their understandings of CT might influence their self-evaluations on whether they were a good critical thinker. Therefore, to help participants had a better understanding of CT was necessary for them to evaluate themselves. To summarise, the majority of the participants regarded themselves as poor critical thinkers in their previous studies and lives, with Student B arguing that this was because he didn’t quite understand the term before. Therefore, an understanding of CT appeared to be important in order for EFL students to be open to becoming good critical thinkers.

4) In general, do you think learning critical thinking skills are beneficial in your studies and life?

This question aimed to discover participants’ attitudes toward CT in their daily studies and lives. The underlying assumption was that participants’ attitudes towards CT would influence their performance during the CW process and tasks, and it might also influence their feelings after they have involved in the CW tasks. Therefore, it was important to have a general idea about participants’ attitudes towards CT before the investigation of their attitudes towards CW in next section. Participants comment:

Student A: *CT can show our thinking abilities, and it will bring significant benefits for English writing and learning. These skills can train us, especially our minds, to improve our development.*

Student B: *CT was beneficial for English writing, because writing itself needs a clear logic.*

Student S: *CT can be used in both studies and daily life, such as in debates, but students do not have the chance to use it.*

Student Y: *CT can be useful for English learning and other learning, although not always, and especially when people face problems, they will use CT to solve them.*

Student C: *CT is helpful for improving writing. At least, you can have more perspectives, and you can write more. It also can help language learning, for example, it can help you understand reading texts. But it is not helpful for the speaking aspect of language learning.*

Student D: *The promotion of CT is helpful for English writing. People can write more sufficiently and accurately with CT. It is also beneficial for English reading, to analyse the articles. In general, promoting CT is definitely valuable, especially for study.*

All of the participants had a positive attitude towards CT and the use of it in both English studies and their daily life. Most of the participants understood the necessity of promoting CT abilities. This could be one of the possible reasons why they agreed to participate actively during the CW and CT interventional course, so that no *dominant/passive interaction pattern* was found during the CW process.

To summarise, although some participants had heard of the term CT, none of them had learned a great deal about the concept previously. Most participants regarded CT as thinking from different perspectives and thought that they did not use CT very well during their previous studies. All of the participants agreed that CT was very beneficial for English learning and even other learning in their daily life. In this sense, it seemed appropriate to encourage CT among EFL students in the wider environment.

4.3.2 Participants' attitudes towards CW

After exploring participants' attitudes toward CT and their use of CT, participants' perceptions of CW were explored and analysed using a set of questions, in order to understand how they really felt during the CW process. CW was regarded as a relatively new learning strategy for the Chinese EFL participants in this study, because lecturing was still the more prevalent and commonly used teaching method in China. Therefore, unsurprisingly, none of the participants in this study had experienced or understood CW before attending this eight-week intervention. Therefore, below are some questions that required participants to share their feelings and

perspectives after they experienced the eight-week intervention. As this section focuses on participants' attitudes toward CW and their interaction process, participants' responses for each question are illustrated in the format of the three pairs.

1) During the writing process, how did you work (interact) with your partner?

The question asked participants to describe how they interacted during the CW process, so it was interesting to consider participants' direct responses in the pairs formed for the writing process:

***Student A:** During the writing process, we discussed gathering more information and ideas at first, and then compared our ideas. Sometimes the person who had better ideas was responsible for writing. Although the main point of view and the whole structure were discussed by both of us, the person who wrote was responsible for more specific details such as the choice of vocabulary and the sentence pattern.*

***Student B:** During our writing process, we gathered our ideas at first, and then I listed an outline. My partner did not like to list an outline, so sometimes I could not understand my partner's whole thoughts clearly, this also resulted in arguments.*

Pair One gathered ideas together at the beginning of the CW process, and according to Student B they had arguments during their discussion. This was consistent with the findings from the observation of the interaction between Pair One. Further reasons are demonstrated later in this section. Pair Two adopted similar procedures to Pair One:

***Student S:** When we wrote, we firstly unified our standpoint. Then we discussed the essay's structure. The process became more efficient with more practice.*

***Student Y:** During the writing process, we firstly discussed the structure of the essay, and then listed an outline. We often had disagreements when we were listing the outline. We discussed when we wanted to use complicated sentences. Sometimes we re-read it at the end, but sometimes we did not have enough time.*

This pair also gathered ideas first and listed an outline before drafting the essay. Student Y mentioned that there were some disagreements between them, which was similar to Student B's report on Pair One.

Below illustrates how Pair Three interacted with each other:

***Student C:** During our CW process, we discussed the topic first, and then always found we had different points of view. I would try my best to persuade my partners if we had disagreements. Sometimes, they were convinced but sometimes they just compromised.*

***Student D:** During our CW process, we rapidly discussed the topic and background information, then we started to draft our essay. During the drafting process, sometimes we would keep discussing the supportive reasons. We didn't have much time to further edit our draft after the first writing. We normally submitted our draft directly.*

In general, the three pairs had similar writing procedures during the CW tasks. Student Y and Student D indicated the problem of time limitations, which confirmed the findings from the class observation. This might be one of the reasons for the unsatisfactory CW products.

2) How do you evaluate the collaborative writing activity according to your experience?

This question aimed to find out how participants felt about the CW tasks, based on their own experience. Participants explained and analysed their perceptions with examples:

***Student A:** I feel my partner and I did not coordinate very well during the writing, and it seems we were still at the first stage (the beginning) of collaboration. We have different writing styles and writing patterns. For example, we had a disagreement with the use of 'As a result' in a sentence. We could not understand or persuade each other. There were many arguments or disagreements during our writing process, which was not relaxed. I felt more pressure when we were writing collaboratively because of our different writing patterns. We needed more time to do the collaboration better.*

***Student B:** My partner and I had many different opinions during our discussion. This is maybe because of the gender difference. But I also learned a lot from my partner, he has very active thinking.*

Student A and Student B's responses indicated that they had similar feelings about the practice of CW, but they explained that their differences might be attributed to as gender, writing styles, and writing patterns. This might explain why they formed the *dominant/dominant* interaction pattern at the beginning of the study. Student A believed that the collaboration between his partner and himself was just getting started and that the many disagreements during the writing process could have been resolved with more time to collaborate. Student S and Student Y in Pair Two also had different genders and writing styles, but their responses were slightly different:

***Student S:** My partner and I often had disagreements with each other, but I would agree with her if I thought her ideas were not bad. So, I think sometimes we also wrote smoothly. I believe writing*

collaboratively could reduce pressure on me in writing. Two people writing together made it much easier and more relaxed. We could help each other in the language aspect.

Student Y: *My partner has a better English level than me, such as grammar and vocabulary. He was really helpful for me in the language aspect. However, our writing styles and writing patterns were quite different, which often brought about disagreements. But I do not think this is a disadvantage for us. We could learn a new writing pattern from each other. This opens our mind to new ideas and new expressions. With more practice, our efficiency in writing and collaboration improved.*

Student S and Student Y faced similar problems to Pair One, in that they also had some disagreements during the CW process, but they had a more positive attitude towards the disagreements. Therefore, their interaction pattern was different from Pair One in Lesson Two. They argued that the disagreement could be a beneficial element that provided learning opportunities for each other. More importantly, both Student S and Student Y felt their collaboration became more efficient with more practice. This also supported the findings from the observed class that Pair Two gradually formed a *collaborative interaction* pattern at the end of the study. Student C and Student D shared the same gender, but according to their responses in the interview, they still had disagreement or arguments during the CW process:

Student C: *We had different writing styles, so we also had disagreements about how to construct the text. I liked to use attributive clauses, while my partner preferred simple sentences. We combined them together in the end. One advantage of CW is you can find each other's good points, and then help each other with these good points. For example, I have limited vocabulary in English, so my partners could provide assistance. One disadvantage of CW is it sometimes will minimize your personal writing style, because you compromise during the collaborative process.*

Student D: *I sometimes felt pressure during the CW process when my partner and I had different opinions. The disagreements caused arguments, which brought some pressure for me. I believe CW was good for writing improvement. What's more, my partners and I had a much closer relationship with each other after the interaction during the CW process.*

Student C discussed both advantages and disadvantages of CW according to her experience. Student D also agreed that sometimes CW caused pressure because of arguments, but she believed CW to be a helpful strategy for English writing and learning, and that it was generally beneficial for promoting relationships among EFL students.

3) Which writing style do you prefer in class? Individual writing or collaborative writing?

After describing and evaluating the CW experience, participants were asked about which writing styles they preferred and why. This aimed to provide some ideas for EFL teachers or researchers in classroom design for their future studies. Student A admitted that CW was more complicated than other writing patterns, and it brought more pressures, especially when disagreements occurred during the writing process. Therefore, Student A preferred individual writing at normal times as it was more relaxed, but he would “choose CW for academic development purposes”. Student B also claimed, “in class I prefer individual writing because it is more relaxed, and the disagreements during CW are very difficult to solve”. Student Y preferred individual writing, but she also admitted that CW provided an opportunity for them to be much more open-minded in thinking and writing.

Unlike the other participants, Student S preferred writing collaboratively rather than writing individually in writing class. Student C would choose writing individually in class because of the disagreements with others, which was the same reason as the other participants in this study. However, she also pointed out that “students can discuss collaboratively during the pre-writing section, and then write the whole text individually after the discussion”. This suggestion sounded like other collaborative learning activities such as group discussion and peer review. Student D was the only one who suggested that different writing tasks applied to different writing patterns. She suggested, “I will choose CW if I am asked to write a persuasive or argumentative essay, but if I have to write narrative text, I prefer individual writing”. Student D demonstrated CT by beginning to differentiate between task type. She recognised the benefit of collaborative work when the task was a persuasive or argumentative essay, compared to a narrative text.

In summary, most participants’ responses supported the findings from the observed interaction during the CW process. Although some participants preferred individual writing or partial CW (e.g. only collaborating in pre-writing) in class, the majority of them agreed that CW strategy and the intervention were useful to promote the language learning. The main reason for them to choose individual writing was the occurrence of disagreements and arguments during the CW process. However, one participant also argued that disagreements could be a good learning opportunity. The importance of ‘disagreement’, or having differences of opinion, as necessary to understand another’s point of view, to learn how to build a reasoned, evidence-based case to support one’s own point of view. This is further revealed in participants’ comments about their

attitudes toward CT skills discussed below. From this it can recognise that, for academic purposes, CW is a very good and helpful learning strategy.

4.3.3 Participants' attitudes towards using CT skills during the CW process

The last but the most important issue is the participants' attitudes toward using CW to promote CT. The main purpose of this study is to explore whether CW can promote EFL students' application of CT. Therefore, it is necessary to assess what participants themselves thought about it, and whether their feelings corresponded with the findings in pre- and post- tests and the CW process. There are three main questions in this section.

1) During the collaborative writing process, did you use any critical thinking skills?

Student A and Student B both admitted they had used different CT skills during the CW process, especially when they had disagreements with each other:

***Student A:** During the writing process, we discussed gathering more information and ideas at first, and then compared our ideas. We would analyse the topic at first, and then combine it with our own experience. I think we used a lot of analytical skills. When we had disagreements, we would meet halfway with the person who sounded more reasonable and logical after we compared and analysed.*

***Student B:** I think we used our CT during the CW process. When I argued with my partner, I was thinking and analysing to organise my thoughts.*

They recognised that they were involved in diverse CT skills during the writing process in order to complete the tasks. They compromised after comparing and analysing each other's ideas because they realised the tasks were joint writing tasks. This partly explains how this pair shifted from the *dominant/dominant* pattern to a *collaborative* pattern. Pair Two had similar findings:

***Student S:** I believe we used lots of CT skills during our CW process, for example, I would ask my partner to explain her ideas further, and we used real examples to support our opinions. We tried to make our arguments more convincing.*

***Student Y:** I think my partner and I often used CT during our CW process, because we often had different points of view. The more disagreements, the more thinking developments.*

Student S and Student Y also reflected that they often used CT during the CW process, especially when they had disagreements or arguments with each other. In order to solve these

disagreements, they applied and developed different kinds of CT skills, such as comparing and evaluating skills, to reach the agreement at the end of the collaborative task. Therefore, Student Y argued that ‘disagreement’ occurring in the CW process is a good phenomenon that promoted CT among students. Student C and Student D also came up with similar opinions toward the use of CT in the CW process:

***Student C:** I think we used CT ability during the writing process. Everybody had different opinions because we had different points of view. This caused arguments, and our CT abilities could be seen during the arguments. I was not easily persuaded by others. I often insisted on my own opinions when I had disagreements with others, but I tried to use my logical thinking and CT to convince my partners. Sometimes other people were convinced by me.*

***Student D:** During the CW process, I think we used our CT skills. For example, we thought from the contrary way when we provided supportive examples. We tried to make our reasons more critical and convincing.*

They admitted that they used CT skills during the CW process, and these skills were helpful for them to complete the writing task. Therefore, all of the participants admitted they made use of different CT skills during the CW process.

2) Do you think collaborative writing is a useful strategy to improve students’ critical thinking skills?

Both participants in Pair One claimed that they had a better understanding of CT after the designed eight-week intervention:

***Student A:** I understand the concept of CT more systematically after this class. I think both CW and CT are interesting concepts. Compared with normal classes, the CW class provides a better environment to show our CT skills.*

***Student B:** I think it is a good way to promote CT. It also helps with our English writing abilities.*

Student A suggested the long-term practice of CW could promote EFL students’ CT skills, and the efficiency of this promotion depended on the level of collaboration. Pair Two had similar feelings to Pair One:

***Student S:** My understanding of CT is more specific now, which contains different thinking skills. I think the CW class is more interesting than the Chinese traditional teaching class. And two people*

thinking together is better than one thinking alone. CW is a useful method for thinking development. You would be more aware of some issues during the writing process.

Student Y: *My understanding of CT is still not so absolute, but I have learned some more specific thinking skills after the training course. I agreed that CW is an effective strategy to promote CT. It really promoted my thinking, especially when we had disagreements.*

Pair Two also learned more about CT. As the ‘disagreements’ occur in the CW process could facilitate CT, they believed that the application of CW strategy could promote EFL students’ CT development. However, Pair Three had slightly different opinions:

Student C: *I suppose CW could promote learners’ CT abilities, but the promotion was not very efficient. This was because Chinese EFL learners got used to their old learning and thinking styles. It was not easy to change them.*

Student D: *In my opinion, CW is beneficial for both language learning and CT. Learners can improve in thinking development and language learning aspects during the CW process.*

Although Student D agreed that CW is a helpful strategy to promote CT development and language learning, her partner Student C claimed that CW could not promote their CT skills efficiently and significantly because of the traditional learning and thinking styles in China. According to Student C, although CW was a good learning strategy, it could not change Chinese EFL students’ thinking patterns easily. This is an interesting opinion that will be discussed later in the discussion section of this study.

3) Do you think your critical thinking ability improved after the eight-week collaborative writing tasks?

This was comparable to the previous question but focused more on participants’ improvements in CT after the intervention. Student A did not just understand the concept of CT more clearly, but also stated “I will not think directly or straight forward any more like before”. Student B believed her CT skills were developed so that she could produce better-quality essays after practicing CW. Pair Two also claimed their CT skills were improved after the CW practices. In fact, this was supported by the comparison of pre- and post- test results. That is to say, Pair One got higher scores after the eight-week intervention. Student B even got the highest mark (51) on post-CT test among the 24 participants.

For Pair Two, Student S stated “I think my level of CT has also improved, as I realised my previous writing style was not critical enough, such as lacking supportive evidence”, while Student Y admitted “I had no idea about how to distinguish the difference between *something that could be right* and *something that could be wrong* before, now I can tell the difference with my CT”. They also showed improvements in the post-tests. Similarly, Student D in Pair Three believed her CT skills had improved after attending the CW programme, and she said, “I become more critical and logical when I am writing and thinking currently”. Unlike with other participants, Student C, who thought of herself as a good critical thinker, as discussed in above Section 4.3.1, claimed her thinking ability had not changed much after experiencing the eight-week intervention. However, according to her two post-test results, Student C’s CT skills had indeed improved compared with her pre-tests results.

In general, most of the participants had a positive attitude towards the promotion and application of CT in the CW strategy, especially in a relatively long-term study. The more CW is practiced, the more CT will develop. The CW environment provides more opportunities for EFL students to exchange ideas, solve disagreements, and develop CT skills such as analysing, reasoning and interpreting information. Meanwhile, developing CT skills can improve writing performance that, in turn, guide EFL students to produce better-quality writing. As a result, both CT and language learning can be promoted through CW strategy.

4.4 Summary

This chapter has illustrated both quantitative and qualitative findings of the study from three facets: the pre- and post- tests results, the observed data from CW process, and participants’ responses in interview after the intervention. The overall findings from the two pre- and post-tests indicated that participants’ CT levels were improved moderately after the eight-week intervention (i.e. multiple opportunities to practice CW and explicit CT instruction). This finding explored a development of participants’ application of CT, which could be used as supportive evidence for what was explored from the CW process.

During the CW process, participants’ interaction patterns are analysed at first. Three different interaction patterns produced by participants are discovered, and more importantly, the same

participants' interaction patterns could change into a collaborative pattern with more practice at a later stage. The findings from language functions produced during the conversation showed participants' interaction features and CT developments in more detail. Various kinds of CT-related language functions were produced, which revealed that different CT skills were promoted, such as the skills of 'interpreting Information' and 'arguing and justifying'. Therefore, from overall change to more specific evidence, these findings together answered the first sub-question of this study.

The CW works produced by sample participants during the eight-week intervention are also analysed. Some of the participants' improvements in their CW outputs were observed but not as obvious as observed from CW process. Finally, this chapter has illustrated participants' perceptions of applying CW in the EFL classroom and its impact on developing CT. According to participants' responses in interviews, they partly explained some of their behaviours during the observed interaction. Most of the interview responses are able to supplement and correspond to findings from pre- and post- tests and the CW process observations.

In conclusion, most of the findings from pre- and post-tests, observations of the CW process, CW products, and participants' responses in interviews showed positive results after implementing the eight-week intervention. These findings together can support the idea that CW integrated with CT instruction is a beneficial and useful strategy for CT development in EFL students in China. According to the observed findings, the application of CT in terms of arguing and justifying skills. In addition, according to participants' response, it will be better if the CW intervention can be further designed with a longer period.

Chapter 5: Discussion

Introduction

This study explored the application of CT by 24 EFL students during an eight-week face-to-face CW intervention based on sociocultural theory. Following the presentation of findings in Chapter 4, this chapter will firstly discuss the findings in relation to the two research questions (*RQ1: Are there any changes in students' CT during the eight-week collaborative writing interaction? RQ2: What are students' perceptions of any impact of CW on CT?*), and cross reference these findings to the relevant literature. Then, the key findings of analytical framework, students' mixed attitudes toward CW, and the CW integrated CT instruction intervention adopted for this study will be discussed. Finally, some suggestions for ways of promoting CT through CW for EFL teachers and researchers are offered.

5.1 Discussion of the Findings in Relation to Research Questions

The main finding of this study is the clear illustration that a combination of explicit CT instruction and multiple opportunities for CW practice improve the frequency and quality of the student's application of CT throughout after the eight-week intervention. Participants were aware of the application and promotion of their CT (i.e. metacognition), and believe that this intervention is a useful method for their CT development and language learning in classes (see details from interview responses in Chapter 4). This finding supports this study's argument that CT can be taught, promoted and assessed in Asian countries, and challenges those scholars who do not hold optimistic views on this (e.g. McPeck, 1990; Ramanathan and Atkinson, 1999; Simpson and Courtney, 2002). The finding of this study concurs with those who have more recently argued that CT skills are teachable and assessable, and can be promoted through CW activities (Kim, 2003; Li and Wegerif, 2014).

CT in this study has been defined as the application of an attitudinal perspective and a cognitive skills perspective in which students demonstrate reflective and open-minded attitudes, enabling them to solve problems and make decisions. This includes the skills of understanding or interpreting information, reasoning, inferring and deducing, analysing, critiquing and evaluating.

The thinking, problem solving, and decision-making processes were analysed through observation and assessment during the collaborative writing process. The designed eight-week intervention (see Section 3.3.2) and CT tests (see Section 2.1.5 and Section 3.3.3) targeted the teaching and examining of specific CT skills. The CT-related language functions that were produced include the CT elements that were taught, and the collaborative interaction pattern showed that participants demonstrated reflective and open-minded attitudes during the CW process. These findings demonstrate participants' application of improved CT, suggesting that CT can be taught, assessed, and demonstrably improved in participants who were involved in an eight-week intervention study. A framework to analyse and assess CT during the CW process was developed.

In this section, the research findings from pre- and post-tests, classroom observations, and interviews are drawn upon to address the research questions, and then to explore their significance for the EFL field.

5.1.1 RQ1 'Are there any changes in students' CT during the eight-week collaborative writing interaction?'

The findings of this study demonstrated that the combination of explicit CT instruction and multiple opportunities for CW practice improved f EFL students' application of CT in class. The findings from observation in CW classes (Section 4.2) and pre- and post- tests of CT and individual writing (Section 4.1) indicated that participants applied CT during the CW process, and CW encouraged the applications of CT. The findings and evidence are discussed specifically below to support the argument.

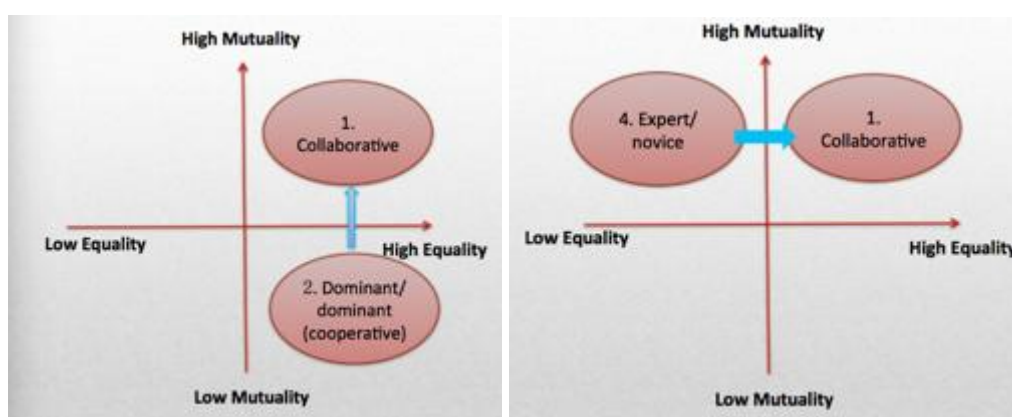
1) Evidence from interaction patterns produced during the eight-week CW process

Examinations of interactions by using the Model of Dyadic Interaction during the CW process reveal that students engage in different interaction patterns, and these patterns are changed over the eight-week intervention (see Section 4.2.1). According to sociocultural theory, the analysis of interaction patterns is helpful in exploring how students work with their partner to complete the task (Storch, 2013). The different interaction patterns found in this study support Storch (2002),

in that students involved in CW produced unique interaction patterns during the various stages of the writing process.

Regarding the possibility of the formation of an interaction pattern between a fixed pair, the findings of this study challenge Storch's (2013) claim that the interaction relationship would not change no matter what kind of tasks were set or how many times the related tasks were conducted. In this study, although participants who formed *collaborative interaction* patterns showed a tendency to persist with this during the whole eight-week intervention, as evidenced by the participants in Pair Three and some participants presented in Section 4.2.1. Other participants' interaction patterns changed. The analysis in Section 4.2.1 suggested that participants who did not form *collaborative interaction* patterns at the beginning of the intervention were able to develop into this pattern with more practice and CT instruction, as evidenced by Figure 4.3 in Section 4.2.1 and as illustrated by the participants in Pairs One and Two in Figure 5.1 below. The findings from this study are in line with Li and Kim's (2016) study, which found that students formed different interaction patterns with the same partners in CW tasks. However, Li and Kim did not investigate the possible reasons for this change or how the change occurred. According to this study, the findings suggested that participants changed their interaction pattern to form collaborative interaction patterns with teaching intervention, and participants who formed collaborative interaction patterns persisted with this.

Fig. 5.1: Changes of Dyadic Interaction of Pair One and Pair Two



As mentioned above, the change in interaction patterns and the persistence of collaborative interaction patterns might relate to the multiple opportunities for CW practice and explicit CT instruction during the eight-week intervention. Previous studies, such as Storch (2013) and Li

and Zhu (2013), focused more on interaction patterns formed during a single CW task and the products of CW. Unlike these studies, this prolonged study was the first to explore changes in participants' interaction patterns. As suggested by Vygotsky (1978) and Swain (2010) from a sociocultural perspective, the student interaction and both teacher and peer mediation are important for individual's language learning and thinking development in EFL class. According to the analysis in Section 4.2.1, six pairs of participants in this study demonstrated *collaborative interaction* patterns after having more opportunities to become familiar with the writing pattern and their writing partners. Meanwhile, the CT instruction and practice helped participants to develop their CT attitudes, which promoted their engagement during the writing process. While the interaction patterns of six pairs changed gradually over the period of the intervention, the other pair persisted in a *collaborative interaction* pattern. Therefore, it is suggested that explicit CT instruction is helpful for CW practice and *collaborative interaction* patterns. Multiple opportunities for CW practice can also promote participants' CT development when they form *collaborative interaction* patterns during the process.

To conclude, the findings from the interaction patterns in this study suggested that students who were involved in CW formed different interaction patterns to those found in Storch's model (2002). However, the study argued that interaction patterns changed to *collaborative interaction* patterns gradually, due to the combination of multiple opportunities for CW practice and explicit CT instruction. This study also suggested that the CW practice and CT instruction were helpful for participating students who formed a *collaborative interaction pattern* at the beginning of the intervention in maintaining the interaction relationships throughout the whole eight-week intervention. This perhaps supported Storch's claim that students who produced *collaborative interaction patterns* tended to persist over time, while others gradually developed *collaborative interaction patterns* with ongoing practice of CW and application of CT.

With regard to the working definition of CT for this study, the evidence above suggested that participants formed the collaborative interaction pattern which showed reflective and open-minded attitudes when they interacted with their partners. The application of participants' CT was demonstrated during the CW process.

2) Evidence from language functions produced during the eight-week CW process

Changes in participants' application of CT were evidenced in their produced language functions during student interaction in CW. Their produced language functions were categorized based on the adopted Taxonomy of Language Function in this study. As previously discussed, (see Section 4.2.2), language functions were observed during social interactions (Mackey, 2012). From a sociocultural perspective (see Section 2.3.1), language itself can be regarded as a mediation tool to support students' learning and thinking development (Swain, 2010). This study noted various language functions produced by participants during student interactions. In general, the CT-related language functions indicate the application of CT, meanwhile the more responding language functions were produced, a collaborative interaction performed in class with better engagement.

Overall, it was found that 63.6% (7 pairs out of 11) of participants applied more CT-related language function at the end of the eight-week intervention. As presented in Section 4.2.2, the language functions produced by participants during the CW process changed according to the adapted taxonomy of language function (Li and Kim, 2016). Many Non-CT-related language function (e.g. 'suggesting' and 'clarifying') emerged at the beginning of the eight-week intervention. The analysis of language function was helpful for understanding detailed interaction features among participants during the CW process. The original taxonomy proposed the idea of responding and initiating language functions that reflected how students interact with each other. However, the adaptation of this taxonomy for this study paid more attention to responding language function and helped to shed light on participants' application of CT by adding some CT-related language functions (e.g. 'criticising' and 'interpreting information') based on observing participants' conversations in class. It then further categorised the language function into non-CT-related and CT-related. The adapted taxonomy was used to explore both participants' interaction relationships and application of CT during the CW process in a face-to-face learning environment. The findings further suggested that participants applied different CT-related language functions, which reflected the application of different CT skills, during the CW process, and their CT were promoted during the process. With regard to the working definition of CT for this study, the CT-related language functions produced reflected participants' application of CT skills in terms of interpreting information, arguing with reasons, analysing, critiquing and evaluating.

3) Potential link between interaction patterns and language functions

This study further explored the potential links between participants' performance in interaction patterns and in the language functions that were produced and combined them to reflect their CT development. This is one of the key findings of the current study that combines the findings from interaction patterns and language functions to develop an analytical framework for CT (see further discussion in Section 5.2.1). As discussed in the literature in sociocultural theory, language functions served both social and cognitive functions (Swain, 2006). Students' application of CT and interaction features, to some extent, were reflected by coding and analysing their produced language during the conversation in class. Hence, the analysis of language functions offered more detailed changes in interaction features that reflect participants' CT application during the CW process.

EFL students produced a number of specific language functions during peer interactions in class (Stanley, 1992; Zhu, 2001; Li and Zhu, 2013; Li and Kim, 2016). Students used these language functions to negotiate their thoughts and ideas in order to enhance the effectiveness of interactions (Mendonca and Johnson, 1994). In line with those studies, this study has found that the higher the mutuality level in participants' interactions, the more responding language functions occurred. Pair One, for example produced more CT-related language functions at the end, (see Table 4.7 and Episodes 1b and 3b in Section 4.2.2) showing the most obvious change as both Student A and Student B produced more responses in Lesson Eight. Meanwhile, their interaction pattern shifting from a *dominant/dominant interaction pattern* in Lesson Two to a *collaborative pattern* in Lesson Eight (see in Section 4.2.1). They used much more responding language functions in Lesson Eight (see the Table 4.7 in Section 4.2.2), at the same time, their mutuality level was enhanced according to their interaction relationship, so their interaction pattern changed. The findings also illustrated that Pair One produced more responding acts to analyse each other's viewpoints by using CT. Accordingly, their performance in produced language functions could be linked with the findings of their interaction patterns to show an application of CT. Similar findings from Pair Two were explored in terms of change of language functions and interaction patterns.

This study also argued that participants who produced and stayed in a *collaborative interaction pattern* displayed diverse language functions and CT during the CW process. Pair Three, for instance, continued to form a *collaborative interaction pattern* during the eight-week intervention (see Table 4.9 and Episodes 7b and 9b in Section 4.2.2). Although Pair Three produced a similar quantity of CT-related language functions at the end, they produced more ‘Arguing and Justifying’ and ‘Criticising’ functions, which correspond to the ‘analysing’ and ‘evaluating’ dimensions of Bloom’s revised taxonomy of thinking skills (Krathwohl, 2002) in Lesson Eight. Therefore, they formed a collaborative pattern from the beginning until the end of the study. This further supported that the application of CT during CW was important and necessary to form and maintain a *collaborative interaction pattern* throughout the tasks, and the application of CT was reflected in the analysis of language functions.

4) Evidence of improvement of CT in CW products in class

Changes in participants’ application of CT were evidenced in the CW products they completed in class. The CW products (i.e. writing texts) were marked according to the ‘Critical and Integrative Thinking Rubric’ (Washington State University, 2009). As reported in the findings Section 4.2.3, the CW products completed by the three sample pairs in this study illustrated that CT had improved in writing. However, some of the improvements were not as significant as those observed during the CW process.

As mentioned in Section 4.2.3, one of the possible reasons for this could be related to the features of the CW task itself. CW was originally widely used in L1 learning. In Daiute and Dalton’s (1993) and Dale’s (1994) studies, which focused on CW in the L1 context, students in CW produced better quality, but shorter texts when compared with individual writing. Similar findings were found after CW was introduced in second/foreign language (SL/FL) learning. The findings of this study concurred with the results from Abadikhah (2012), Fortune (2005), and Kim (2008) who applied CW in the SL/FL context. These studies found that students themselves paid more attention to grammar and performed better compared with students who wrote individually. The participants in this study also paid attention to the essay structure, different ways to express their ideas, and vocabulary or sentence choices. The rubric for writing in this study (see Appendix B) contains seven different categories. Only one category, ‘communication,’ focuses on language, structure and other writing elements. According to the

rubric, most of the participants in this study performed well in the ‘communication’ aspect. They tried to express their ideas clearly and create a clear essay structure, so all three sampled participants scored 3 for ‘communication’, which was higher than many other categories. (see Section 4.2.3). This was one supportive evidence that participants attended to the ‘communication’ aspect when they were drafting essays collaboratively. This could have influenced their CT performance in writing. Perhaps this can partly explain the participants’ performance in CW products in this study.

Unfortunately, the nature of CW tasks in this study and the relatively complex critical and integrative thinking rubric were not complimentary and did not function effectively as a dual process. Participants displayed improvements in CT aspects (e.g., comparison between Table 4.12 and Table 4.13 in Section 4.2.3) after the eight-week intervention, while the finding from the rubric did not fully demonstrate the participants CT ability in this study. The rubric assessed how different ideas are generated and organised to create solid arguments and is, therefore, more suitable for use in assessing undergraduate student papers and thesis, which contain more complicated writing approaches than the CW tasks.

This study might have achieved improved data reliability from the CW products if the rubric had been modified to correspond with the nature of the CW tasks. For example, Alexander et al (2010) used modified version of the Critical and Integrative Thinking rubric to examine students CT performance in online discussions. They maintained the seven dimensions from the original rubric but added three additional criteria considered as important elements for online discussion, and successfully discovered student CT improvements by using the rubric. Therefore, the original rubric can be used widely and modified flexibly in different contexts. For the current study, the rubric can be simplified for short essays, and expanded to include more CT and collaborative elements in a CW context.

Apart from modifying the Critical and Integrative Thinking rubric, an alternative method of avoiding the discordant results between CW processes and CW products is to design a more appropriate rubric based on CT definitions identified in this study. As discussed in Section 2.1.1, this study mainly focused on students’ CT skills of understanding or interpreting information,

reasoning, inferring and deducing, analysing, critiquing and evaluating. Thus, a rubric can be designed based on the six identified skills, illustrated as six aspects in writing. These aspects could utilise the range of scores from the Critical and integrative thinking rubric (scores from 0 to 6; 0= absent, 6=mastering) to formulate a measurement configuration. Furthermore, other CW related criteria can be added to the rubric, such as to respect or respond to other viewpoints. A more appropriate marking criterion can therefore be developed that generates reliability and fits to individual research design and classroom setting. Future studies which focus on CT in writing should pay close attention on this aspect of assessment.

Another possible reason why some CW outputs in this study were disappointing may be the lack of time or time management in class (also discussed in Section 4.2.3). Participants had 60-80 minutes for each CW task, and they were required to collaboratively produce a relatively short but complete argumentative or persuasive text within that time. As Niu (2009), Wigglesworth and Storch (2009), and Tan et al. (2010) suggest, students involved in CW need much more time to complete joint tasks than they would to complete individual writing, as they need to negotiate and interact with partners. As observed in class, participants in this study spent at least half of the time in verbal interaction and negotiation, and most of them submitted the draft without editing or further revising, according to their responses from interviews. However, this study also found that some participants believed that lengthening the time for a CW task is unnecessary, as a more restrictive time frame enabled them to collaborate more efficiently in order to produce a better-quality text.

Accordingly, EFL teachers should carefully design CW tasks, choosing appropriate marking criterion, considering the nature of the task, participants' language proficiency and classroom settings (Storch, 2013) to ensure that students are encouraged and guided during the collaborative process, and interact with each other effectively. To be more specific, teachers should select the task type based on the skills to be taught and the planned class time. Meanwhile, teachers might also set time limitations for each CW stage, such as 20 minutes for pre-writing, 30 minutes for writing, and 20-30 minutes for revising or editing. In order to avoid discordance between the CW process and products (see Section 4.2.3), future studies could consider the complexity of the CW task, the CT skills being taught, and the marking rubric for the writing. For example, a more concise marking rubric would be suitable for short

argumentative writing, or the use of the particular complex marking guidance with more academic writing tasks (500-1000 words composition).

In this study, despite the findings from CW products were slightly discordant with the observed results from CW process, participants did improve their CT during and after the eight-week intervention. With regard to the working definition of CT for this study, the improved CW writing scores suggested that participants' CT in terms of interpreting information, reasoning, and analysing were developed. This suggests that the designed CW integrated CT instructional intervention was helpful for EFL students in CT application and development.

5) Evidence from test results of CT after the intervention

The amended W-GCTA test results of this study suggested that the quality of participants' CT application was improved after the eight-week intervention. With regard to the working definition of CT for this study, the CT skills tested by amended W-GCTA were taught during the eight-week intervention. The participants' CT performance on pre- CT test (i.e., amended W-GCTA) showed an average CT performance among undergraduate students. However, the results from pre- writing test and classroom observation at the early stage of this study were not very good. In general, participants did not show good CT application at the beginning of the eight-week intervention, and this is in line with the findings from You's (2004) and Gao's (2012) studies, which found that Chinese EFL undergraduate students had a low application of CT. This finding supported Davidson and Dunham's (1997) argument that CT is assessable and Mason's (2008) claim that CT can be improved through teaching relevant thinking skills, as evidenced by the higher scores from the post-intervention tests. The results from CT test instruments illustrated that 79.2% of participants (19 out of 24) achieved higher marks in the CT test (amended W-GCTA). The Low scores in the pre-tests, and higher scores in the post-tests, supported the argument that explicit CT instruction and multiple opportunities of practice and application impacted on participants' application of CT following the intervention.

The improved average post-test scores, after the eight-week intervention, indicated that participants applied their CT better. As presented in Section 4.1.1, five students improved their CT from the average (31%-70%) to the above average level (71%-90%). The differences

between pre- and post- tests results (Section 4.1) was statistically significant ($\text{Sig} < .000$), which supported the idea that the CW with integrated CT instruction was helpful for participants to improve the quality of CT application. The finding of this study was consistent with that of other empirical studies (Rao, 2007; Lizarraga et al., 2010; Lin, 2014). These studies applied CT tests before and after teaching intervention, suggesting that teaching interventions play a significant role in thinking development. Unlike previous intervention studies, this study has addressed a research gap by providing a systematic design for a relatively long-term intervention to explore EFL students' application of CT during the CW process, using an analytical framework which is discussed in detail in the following sections.

The findings from pre- and post- CT tests of the amended W-GCTA suggested that participants' CT scores were improved after the eight-week intervention. Interestingly, the participants CT performance in the pre- CT test showed an average level (see in Section 4.1.1), which exceeded their performance in the pre-writing test. This may be the result of amendments to the W-GCTA. As explained in Section 3.3.3, the amended W-GCTA is a Chinese version which minimises the negative influences of language factors. More importantly, the unfamiliar topics in the test were removed due to time constraints, providing students with sufficient time and knowledge to support their thinking. This suggested that topic familiarity in the test questions could be a determining factor in student CT test performance. Thus, future researchers who are interested in Chinese undergraduate student CT performance with W-GCTA might consider comparing performance with different kind of themes and subjects in the test questions. This can further illustrate if topic familiarity is a possible factor in influencing student CT performance.

This study further explored the possible reasons for the poor application in CT at the early stage of the eight-week intervention based on participants' responses in interviews (detailed discussion in Section 5.1.2). It indicated the need to promote CT among Chinese EFL undergraduate students and the need for EFL teachers to explore or design an appropriate approach to facilitate students' CT in class. The CW integrated CT instruction intervention applied in this study is a very distinctive learning method compared to normal methods in English classes in China. According to the sociocultural theory, the CW approach encourages peer interaction and collaboration and provides a non-threatening environment for EFL students (Storch, 2013).

6) Evidence of CT improvements in writing

Evidence of CT improvements in both CW products and individual writing tests were demonstrated by the improved writing scores, which both marked by the Washington State University Critical and Integrative Thinking Rubric. As discussed above, although the rubric could not fully present students' CT performance on CW products in class (see Section 5.1.1 above), the CW products (see Section 4.2.3) and the individual writing test results (see Section 4.1.2) suggested that the development of CT was evident in the argumentative writing. To some extent, this indicated that developing CT helped EFL students to produce better-quality (higher marks) in the thinking aspects of essays. With regard to the working definition of CT for this study, the assessed CT skills in writing, such as identifying issues and contexts and assumptions, were consistent with the CT skills taught in class and assessed in CT test (amended W-GCTA). Thus, the improvement of writing scores from both CW products and individual writing tests represent participant' developments on CT in writing. As discussed in the literature, CT is an essential skill for EFL undergraduate students to become more efficient and effective students (Stapleton, 2001; Hu, 2017). Moreover, its importance has been emphasised by scholars in many countries, particularly in Asia (Li, 2011; Zeki, 2015; Yang, 2017). Hence, the results of the writing products in this study were regarded as supportive evidence of the importance of promoting CT among Chinese EFL students in higher education. EFL Students' CT performance improved in writing and this could reflect improvements in thinking through reciprocal influence (Paul and Elder, 2007). Besides, according to the interview responses (see Section 4.3.1 and 4.3.3), EFL students who participated in this study believed that CT could benefit their writing, language learning and future study. In this study, therefore, it is suggested that the CT improvement in writing may benefit EFL students in language learning and writing in the future.

Although the complex Critical and Integrative Thinking rubric did not work effectively with CW tasks in class, the rubric functioned better in the pre- and post- writing tests within this study. As illustrated in Section 4.1.2, the results from the pre- and post- writing tests suggested a positive change in participants CT and writing. Participants showed improvements in seven aspects according to the rubric criteria, and the majority of the participants (79.2%, 19 out of 24) achieved a higher score in the post- writing test. This finding corroborated other findings from classroom observation in this study, so it suggests that the Critical and Integrative Thinking rubric can be used to assess individual argumentative essay. Many undergraduate students are

assessed by this rubric in the WSU timed writing assessment, in which they are required to produce a long argumentative essay and a shorter reflective essay (Condon and Kelly-Riley, 2004). Both long and shorter essay are assessed by using the Critical and Integrative Thinking rubric. Hence, the rubric is more appropriate for the pre- and post- writing tests than the CW tasks employed in this study, as the tests required participants to write a longer essay. However, the complex Critical and Integrative Thinking rubric is still not the most appropriate tool for the pre- and post- writing assessment in this study, as the rubric was originally designed to assess undergraduate level lengthy essays. The more appropriate rubric designed for use in the current study should be utilised for both CW tasks in class and pre- and post- writing tests. In this way, more comprehensive and associated data about student CT performance in writing can be gathered, expanding knowledge of the impact of particular approaches.

Moreover, this study concurred with existing literature that suggested that CT can be facilitated through collaborative learning activities and writing strategies (Lin, 2014; Odom et al., 2009; Todd and Hudson, 2007). The findings suggested that the collaborative learning approach combined with writing provided a conducive learning environment for the application of CT.

To conclude, the evidence from student interactions, CW products and tests results discussed above answered the first research question in this study. The combination of explicit CT instruction and multiple opportunities for CW practice during the eight-week intervention improved EFL participants' CT application.

5.1.2 RQ2 'What are students' perceptions of any impact of CW on CT?'

The findings from the interviews presented in Section 4.3 showed mixed attitudes from participants towards the use of CW in this study. However, the majority of participating students agreed that CW is an approach that can be used to promote EFL students' CT in higher education, in keeping with Heyman (2008) and Haihosseini et al. (2016) who claimed that collaborative activities are beneficial for CT development. More detailed responses from participants in this study are analysed below. It is necessary to take participants' perceptions into consideration in order to understand their performance and learning outcomes (Storch and Wigglesworth, 2010).

From the responses in Section 4.3.1, it appeared that some participating Chinese EFL university students perceived that they were not good at CT. This finding concurred with previous researchers (e.g. Yang, 2017; Gao, 2012; You, 2004). They also found that possible reasons are misunderstandings related to CT and traditional teacher-dominant learning in class. Findings from Gao (2012) and You (2004), for instance, suggested that students had lacked opportunities to learn and practice their CT skills in class. Whereas Yang's (2017) students had misunderstandings related to CT, participants in this study have been provided with explicit CT instruction and sufficient opportunities to practice CT in class. Therefore, some participants have perceived that they were not good at CT in this study will be further explored in this section later.

As discussed in the literature review chapter (Section 2.2.4), few studies have evaluated EFL/ESL students' attitudes towards CW and other collaborative activities. The findings from those earlier studies were mixed. Some research suggested that EFL university students do not favour group and pair work (Brown, 2009; McDonough, 2004; and Riley, 2009). Other studies noted EFL students had positive attitudes towards communicative activities (Green, 1993; Littlewood, 2010; and Trinder, 2013). One possible reason for the mixed results could be the students' low self-confidence in their FL/L2 proficiency (Storch, 2005). This study, therefore, allowed participants to use their L1 during the CW process in order to reduce the pressure of using a FL.

An exploration of possible reasons for participants' mixed attitudes after the eight-week intervention in this study concluded that all participants agreed that CW is a useful and effective method for language learning and CT development. However, nearly half of them preferred to write individually in class. The mixed attitude was consistent with findings from previous CW studies (Storch, 2005; Riley, 2009; Elola and Oskoz, 2010; Shehadeh, 2011; Trinder, 2013). In line with those study, one reason for the mixed results in this study has been revealed. Apart from participants' low self-confidence in FL, the way researchers asked the questions in surveys was also impactful (Littlewood, 2010). For example, participants were asked about what kind of activities they 'enjoy', or they think are 'effective' for learning. Students may have different understandings of the terms of 'enjoyment' and 'effectiveness' (Garret and Shortall, 2002). Some

showed positive attitudes to activities they enjoy, while others cared more about their effectiveness. Participants in this study showed different attitudes towards the ‘effectiveness’ and ‘enjoyment’ of using CW, hence the mixed results. Therefore, the ‘effectiveness’ of the CT instruction integrated with the CW practice is evident in this study according to participants’ responses. The mixed attitudes from participants was one of the key findings of this study, which will be further discussed with the possible reasons in following section (see Section 5.2.2).

5.2 Discussion of Key Findings of this Study

This section discusses three keys findings of the study: the analytical framework adopted in this study could help to investigate participants’ CT during the interaction tasks; the mixed attitudes from participants toward the CW practice; and that the application of CW integrated CT instructional intervention in the study helped participants to achieve better performance in using CT. It also offers suggestions on how to practice a CW strategy to promote EFL undergraduate students’ CT in class.

5.2.1 *An analytical framework of CT during the CW process*

This study is differentiated from previous relevant studies by having developed an analytical framework for thinking skills (AFTS). The AFTS is unique as it combined the dyadic interaction patterns (see in Section 2.3.3) from Storch (2013) and the language function taxonomy (as introduced in Section 2.3.2) adapted from Li and Kim (2016). It was used to identify EFL participants’ application of CT and CT development in face-to-face CW tasks. To use AFTS, the findings from the adapted taxonomy of language functions provided the researcher with quantitative evidence of the CT application. This was in line with other previous studies that analysed students’ thinking development by using quantitative methods such as content analysis and sequential analysis (e.g. King and Kitchener, 1994; Jeong, 2003; Newman et al., 2004; Kayes, 2006; Thormann et al., 2013). The AFTS, however, also provided qualitative findings toward participants’ application of CT by analysing their dyadic interaction patterns. Accordingly, as suggested by Jones (2008b; 2013), both quantitative (i.e. numbers of produced language functions) and qualitative evidence (i.e. TREs and interaction patterns) of CT development during the activity process were found in this study. Using the AFTS allowed a more comprehensive understanding of the application and development of CT.

In terms of the qualitative evidence, this study found the development of CT by analysing their dyadic interaction pattern. The TREs (i.e. thinking-related episodes) were analysed in order to explore the participants' CT application during their interactions. The TREs, produced by the participants, were captured during CW sessions (see Section 4.2). TREs, further developed from Storch's (2013) concept of LREs, contributes to the investigation of EFL student thinking and interaction features during collaborative activities. In accordance with Storch's (2013) and Li and Zhu's (2017) studies, general interaction features were reported in Section 4.2.1 to show how participants interacted with their partners, highlighting that mutual engagement was crucial for successful collaboration. This study also discovered participants' CT attitudes by analysing their interaction patterns. Their interaction relationships during the CW process were summarised and analysed in terms of the CT aspect, and potential connections were noted between interaction patterns and CT attitudes.

Regarding to the quantitative evidence, the adapted taxonomy of language functions was used to explore the application of CT in this study. After discovering the general interaction relationship between participants, the adapted taxonomy further provided detailed interaction features of participants' application of CT. As illustrated in Section 4.2.2, this study used the same TREs to analyse participants' interaction patterns and language functions. This provided a more comprehensive understanding of the participants' application of CT during their interactions. The quantitative evidence collected by the adapted taxonomy supported Li and Kim's (2016) findings that participants provided various kinds of language functions during peer interactions. This study further discovered CT-related language functions that reflected the participants' application of CT. This finding advocated the claims from sociocultural theory, in which the changes and developments in participants' CT were reflected and analysed through the language they produced (Swain, 2010). Meanwhile, this study reported that there were potential links between participants' interaction patterns and produced language functions (as discussed in Section 5.1.1). The AFTS combined these two instruments together for a more thorough analysis and contributed to the analysis of participants' CT during the process of CW tasks.

It is important that the AFTS adopted in this study could help the researcher to trace the changes of participants' CT application during the activity process. As with many existing methods (e.g.

surveys, CT or writing tests, and check lists) in the EFL domain to assess or explore students' CT (Brown et al., 2001; Todd and Hudson, 2007; Lizarraga et al., 2010), the application of AFTS confirmed the development of participants' CT in EFL class. However, this study further applied AFTS to investigate the changes of participants' CT application and developments during the CW process. It is necessary to understand how EFL students apply their CT during the activity process, so that teachers can design more appropriate lessons. The analytical framework developed in this study helps researchers and teachers to observe how EFL students' CT is facilitated, applied, and developed during the collaborative process. Future studies might investigate student performance during the collaborative process by applying this framework.

As a first attempt to combine interaction patterns with language functions, the analytical framework was not without problems. The TREs can be further defined or categorised. Some language functions overlapped and were, thus, more difficult to identify, such as 'clarifying' and 'suggesting' functions. This analytical framework could be further developed into a more detailed hierarchy or taxonomy with more language function categories.

5.2.2 The mixed attitudes from participants toward CW

An important finding from participant interview responses was that all contributors were aware of their application of CT during the CW tasks, and several realised that improvements in CT could benefit their individual language learning in the future. The majority of participants also agreed that the eight-week interventional study promoted their thinking and language learning. This finding suggested that it is necessary to promote EFL students' CT and metacognitive awareness within classes, and that CT development can also promote student metacognition and individual learning capacity. This is in line with Cheng's (2019) study which illustrated that the use of cognitive and metacognitive strategies can help students become more independent language learners. More detailed findings from participants responses are discussed below.

As discussed in Section 5.1.2, participants in this study showed mixed attitudes toward the CW practice after the eight-week intervention. As to the reasons, apart from previously reported participants' low self-confidence in FL proficiency (Storch, 2005) or their dislike of group work (Riley, 2009), this study also revealed other possibilities. As reviewed in previous findings (e.g.

Trinder, 2013), participants in this study also had different understandings and attitudes toward the ‘effectiveness’ and ‘enjoyment’ of CW. The majority of participants acknowledged the ‘effectiveness’ of practicing CW in EFL classes, while only some agreed they enjoyed the CW practice. This was evidence of the effectiveness of using CW to promote CT in EFL class in this study, despite lower levels of experiential enjoyment of CW. This different attitude indicated that both ‘effectiveness’ and ‘enjoyment’ can be used as indicators to reveal participants’ perceptions from different aspects of effectiveness or enjoyment. It could also be regarded as an implication for other researchers regarding the design of surveys or interview questions. For example, if researchers focus more on ‘effectiveness’ indicators rather than the ‘enjoyment’ of a strategy, they should select appropriate terms such as ‘effective’ or ‘useful’ strategy rather than vague term such as ‘good’ or ‘enjoyable’ strategy when they are asking for participants’ reflections.

The second possibility of participants’ mixed attitudes toward CW was related to their disagreements and arguments with each other during peer interaction. A close look at responses in the interviews indicated that participants showed reservations because of the disagreements and arguments that occurred during the CW process. They reported that these disagreements and arguments brought pressures and that they had to work hard to persuade each other. One student (Student C), for example, claimed that “I personally prefer the way of personal writing, because I am a strange person (i.e. unique person with different ideas) and my viewpoint is always in conflict with other people’s”. She thought CW requires more time to discuss ideas and organise language. She was unaware of any improvement, claiming that her CT had not improved after the eight-week intervention, which did not accord with her performance in class or her CT test results. She suggested that “CW is not a very effective way to improve the ability of CT, but there is still some effect. Because I think this is resulted from the long-term learning method of our Chinese students. They are just not easy to get changed”.

The long-term learning method Student C mentioned might relate to another possibility of participants’ mixed attitudes toward CW. This study found that participants’ mixed attitudes largely related to participants’ prior writing experience and their beliefs about language learning. This supported Pajares’ (1992) claim that underlying beliefs can determine people’s attitudes towards a particular practice or activity, finding that some Chinese EFL participants might not be used to having debates or arguments with their peers during the learning process, because their

previous learning style is teacher-dominant and harmony-oriented (Guo and O'Sullivan, 2012). Therefore, some participants in this study were unwilling to participate in CW because their prior writing experience did not encourage engagement in debates or arguments, and they preferred learning by writing individually. In addition, similar with McDonough's (2004) finding, although the evidence indicated positive results, some participants believed that pair and group work was not conducive to learning. Participants were worried that they may learn incorrect knowledge from their peers, although the actual analysis illustrated the contrary. This was comparable to the finding from Student C mentioned above. However, other participants in this study exhibited more positive attitudes and perceptions of the collaborative activities. For example, Student D believed that they should use different writing methods for different kinds of writing. She perceived CW activities as "helpful for both CT and English writing, covering both thinking and language study". This also related to her learning belief that there are multiple ways to learn, and that they can learn, not only from teachers, but also from peers. This suggested that EFL students' learning beliefs can be related to their opinions about the nature of language learning, influencing their attitudes and preferences (Kalaja and Barcelos, 2003). Accordingly, a mixed result of participants' attitudes toward CW was explored because of participants' mixed language learning beliefs.

This study believed that the participants learning beliefs might be changed. According to participant responses from interviews, this study advocated previous suggestions that a number of factors can influence participants' opinions, such as the nature of classroom activities, the level of enjoyment, teachers' communicated views, and perceptions of progress (Peng, 2011). As suggested by sociocultural perspective, this study suggested that teachers can be influential in participant belief formation (Storch, 2013). Teacher could reduce participants' reservations about CW in longitudinal studies by guiding them carefully and intentionally. In this study, participants who had more favourable attitudes towards CW accepted that disagreements and arguments occurred during the collaborative process and regarded those disagreements and arguments as advantages, providing them with increased opportunities for language learning and CT development. For example, both Student A and Student B agreed that CW is helpful for CT and writing, yet also mentioned "the pressure of disagreements" during CW. Student B preferred individual writing in class because it was more relaxed, but Student A preferred CW in order to improve himself. Accordingly, most participants recognised CW as an effective way to promote CT and even writing, whilst their beliefs about "disagreements and arguments" lowered the

“enjoyment” level of the activities. Therefore, encouragement from the teacher to apply CT and to recognise the benefits of argumentation in collaborative activities might promote more positive participant attitudes. Future EFL teachers might pay more attention to this aspect if they wish to successfully apply CW or other collaborative activities in EFL class.

To conclude, according to the findings from the interview responses in Section 4.3, participants recognised their own CT and its influence on their performance during the CW process. Mixed attitudes towards CW might relate to students’ views on learning and prior learning experiences. Individual writing was more familiar to Chinese EFL students, but participants showed metacognitive awareness when they reflected their CW experience according to their responses. Although some were unaware of the ways in which arguments and debates with peers can benefit their language learning, many were aware of the benefits of CW and CT for their independent learning capacity in the future.

5.2.3 *The Combination of CW integrated CT instruction in an intervention*

This study found that the combination of multiple opportunities of CW practice and explicit CT instruction is a useful and effective approach for EFL students to promote its application. It is suggested that involving EFL undergraduate students in CW tasks supported them not only in language learning but also in CT application, especially in a prolonged (eight-week) study. In this study, participants formed *collaborative interaction patterns* with the practice of CW integrated CT instruction, leading to improvements of CT in writing after the eight-week intervention, thereby suggesting that CW required an application of CT. The following sections discuss the application of CW integrated CT instructional intervention in this study to offer pedagogical suggestions for EFL teachers and researchers who wish to apply this approach in Chinese universities and colleges.

Suggestion 1: Involving students in a non-threatening collaborative learning environment.

This study suggested that a CW strategy can enhance the learning environment for EFL students. Although it is very different to the commonly used learning methods in China, Chinese EFL students can apply it efficiently and successfully with teacher guidance. It is necessary to

introduce or develop more effective learning methods for Chinese EFL students. As the traditional teacher-dominant learning method in China was criticised as inefficient for language learning and CT development (Chen, 2017), this study suggested the application of a CW strategy. Likewise, in line with Vygotsky's (1978) sociocultural theory and the notion of ZPD, this study suggested that a collaborative learning approach can encourage peer interaction and provide more opportunities for participants to enhance language learning. Participants in this study reported that the collaborative activities promoted their thinking and learning (see Section 4.3). It was found that the CW strategy created a non-threatening environment for EFL students and encouraged them to express their ideas and interact with peers more actively during the task process (Storch, 2013).

Meanwhile, the non-threatening collaborative learning environment is helpful for students to develop their independent learning capacity and provides opportunities for CT and metacognition development. The application of CT could be promoted when classroom activities trigger metacognition by incorporating certain elements of teamwork, such as problem solving (Ryder, 1994). CW tasks in this study provided the collaborative learning environment required for active participation in peer interaction and CT engagement (Odom et.al.,2009). Here, CW tasks provided discussion opportunities during peer interaction to create knowledge rather than passively absorbing facts. The group discussions encouraged CT and metacognition, enabling participants to develop individual cognitive and metacognitive skills, and also to learn in collaborative and participative ways.

Suggestion 2: Considering the task types of CW

All of the CW tasks designed in this study involved short argumentative or persuasive writing in order to facilitate participants' thinking. This study revealed that participants were familiar with this type of writing (Yang, 2017), and they completed all CW tasks in class. As discussed in the literature, this study suggested it is necessary to consider the task type in class as EFL students may show different interaction and thinking features in different types of CW tasks (Storch, 2004; Zhu and Mitchell 2012).

The argumentative or persuasive writing tasks were meaning-focused. This study agreed with Storch (2013) that these tasks encouraged EFL students to express and share more ideas rather than focusing on language accuracy. In order to complete the writing task together, all of the participants, as evidenced in Section 4.2, presented their individual arguments. They negotiated about the writing context, persuading each other with good reasons, analysing and evaluating both their partner's and their own arguments. This required and facilitated their use of CT during the writing process to navigate disagreements or arguments during the discussion. In order to solve the arguments, they used various CT skills and produced different language functions (e.g. arguing and justifying) to complete a better-quality CW joint-product. Unlike other group work, as discussed earlier in the literature review on peer review and peer evaluation (e.g. Odom et al., 2009), participants involved in CW were less reluctant to provide negative feedback or to disagree if they wanted to successfully produce a quality writing product. Therefore, this study suggests that a relatively long-term intervention with multiple opportunities to practice CW and explicit CT instruction is a useful method for EFL undergraduate students' CT application and development, and that argumentative writing tasks can encourage students to think critically.

Suggestion 3: The value of disagreement and argument during CW

The findings from observed CW processes and their writing outputs supported the value of disagreement and argument during the CW and found that argument is not merely for agreeing or disagreeing with others. This study advocated that argument provides a dialogic context for participants to hear other voices, to take their views on board, and to reflect on one's own thinking and understanding (Bell, 1997). It provides opportunities to practice and develop their CT and metacognitive skills. It may also lead to co-construction or re-construction. Continuous acquiescence is not productive thinking as it avoids relaying negative or contrary views or opinions. Some participants had misinterpretations of the argument in this study.

According to the three sample pairs presented in Chapter 4 (see in Section 4.2.2), a limited number of 'disagreeing' functions were used by participants in the observation of produced language functions. Participants used more 'arguing and justifying' functions during their discussion when they formed a collaborative interaction pattern. This finding supported the previous suggestions of the importance of arguments in writing and thinking (Fisher, 2011). It also demonstrated that participants applied and developed their CT when they engaged in

arguments during the CW process, especially when they formed a *collaborative interaction pattern* in argumentative writing tasks. Moreover, the findings from most participants suggested that more CT-related language functions were produced at the end of the intervention. Participants applied more CT when they were discussing their points of view and presenting their arguments, in order to complete the CW tasks. Meanwhile, the results from individual argumentative writing tests demonstrated that most participants had improvements in the post-test, especially in “Sources and Evidence”, “Diverse Perspectives” and “Own Perspective” aspects. This illustrates that the participants’ application of CT to express and support their own arguments was promoted in writing. Therefore, the important value of argumentation during the CW and CT tests was presented.

Suggestion 4: Integrating CT in EFL education.

In this study, Chinese EFL participants demonstrated relatively low levels of CT in their writing performance and in CT tests before the eight-week intervention. This was due to some EFL participants in China being unfamiliar with the notion of CT introduced from Western culture (Li, 2015). Therefore, this study suggested that it is beneficial to integrate CT with other courses to promote EFL students’ thinking skills (e.g. Gibson, 2012). This study integrated CT with EFL writing classes to promote EFL participants’ CT. It was found that CT is an essential skill for EFL participants to successfully complete activities in class (Hu, 2017; Marin and Halpern, 2011). As deliberated in previous literature, the importance of developing university EFL students CT is emphasised by both the language education policy and language learning curriculum in China (Chen, 2017). CT can be integrated across the curriculum as Chinese EFL teachers are required to develop both language learning and learning strategies (CMoE, 2010). Developing CT and metacognitive awareness would not only help EFL students to solve problems more efficiently but also encourage them to become better independent language learners.

The study applied argumentative or persuasive CW tasks as a means for participants to develop CT, as writing represented the human cognitive process (Paul and Elder, 2007). The more CW tasks they practiced the more opportunities of applying and developing CT were produced. Therefore, CT could be integrated with CW classes for EFL students to promote the CT application, especially their CT performance in writing. According to the findings from this

study, participants' CT skills and CT performance in writing were developed and it can therefore be argued that CT can be added as an extra learning objective to the college EFL curriculum, combined with language learning class, such as writing class.

Suggestion 5: Explicitly teaching or instructing CT.

The findings from this study supported the explicit instruction of CT combined with CW practice. CT, as suggested by other researchers (e.g. Jones, 2008; Lin, 2014) is an abstract concept that requires clear definitions and instruction. This study took the position that CT can be defined, taught, and assessed (Davidson and Dunham, 1997; Mehta and Al-Mahrooqi, 2015). As discussed in literature, this study found that explicit instruction is necessary to enhance CT, participants' awareness that they are thinking critically, and the appreciation of how important CT is in study and life (Davidson, 1998; Mason, 2008). Most EFL participants in this study applied their CT and formed *collaborative interaction pattern* after the eight-week CW practice with explicit CT instructions. According to the responses in interviews and the observations of the class, as participants realised the importance of CT, they actively engaged in the CW process. Participants in this study also reflected that the CT instruction and teaching section was very interesting and useful in a CW class.

These findings have implications for teacher-oriented teaching approaches, which are the most used for EFL students in China (Hu, 2017). Traditional EFL teachers in China need support to re-conceptualise their roles to promote learning and student/student interaction in class.

Suggestion 6: Allowing the use of L1 during CW

This study supported the use of participants' first language (L1: Chinese in this study) during CW tasks. Previous research has been divided in regard to whether EFL students should be allowed to use their mother tongue in FL classes. This study supported those who claim the use of L1 as an important task management and language learning tool (Swain and Lapkin, 2000; Schhadeh, 2011; Storch and Aldosari, 2010). This study was also in line with sociocultural theoretical perspectives (Vygotsky, 1978) which posit that language itself, whether it is L1 or target language, can be a mediation tool in language learning and thinking development (see Section 2.3). Based on the findings in this study, it is argued that the use of L1 provided a

window for the researcher to gain insight into participants' minds. Participants in this study often interacted with each other using Chinese and produced a large number of TREs in their arguments. For example, Appendix O offers a coded transcript of student interactions and illustrates that the majority of conversation between participants utilised L1. Most CT-related language functions were produced by L1 during interactions. These TREs enabled the researcher to observe and analyse developments in the students thinking during the CW process, and provided another method with which to make EFL participants' thinking visible (Lin et al, 2016). Therefore, the use of L1 in EFL classes is encouraged as it promotes the application and development of CT to enhance CW tasks.

Suggestion 7: importance of mixed methods to answer the research questions.

A mixed-method is suggested for this study. In order to answer the research questions, this study applied different instruments to collect data: pre- and post- tests, audio recorded in-class observation, and interviews after the intervention. These tools were used to analyse participants' CT from both quantitative and qualitative perspectives. Due to the restricted number of participants, the findings from pre- and post- tests provided an overview of the trends of participants' CT development after the eight-week intervention. The test results corresponded with the findings from class observations and participants' interview responses. The use of mixed methods was beneficial for investigating complicated issues (Creswell, 2009) providing more comprehensive and richer evidence to answer the research questions. It was clearly very useful for the study to apply mixed methods in collecting relevant data to explore whether participants' CT can be promoted during a long-term intervention.

Suggestion 8: A longitudinal intervention of CW and CT is necessary.

A longitudinal intervention, as suggested by Storch (2013) is also recommended by this study. This study tracked changes in participants' application of CT during an eight-week intervention designed to promote EFL students' CT. In order to observe the application of CT, based on the observations of classes and participants' responses in interviews, a minimum period of six weeks was suggested. However, this eight-week intervention was still relatively short for Chinese EFL students to become familiar with the practice of CW and CT in class. More significant improvements in CT might be found if participants were given more practice and a longer period

of learning opportunities. Therefore, EFL teachers or researchers who are interested in collaborative learning strategies or CT development are encouraged to conduct a longitudinal programme, involving one semester or two semesters, to provide EFL students with sufficient time and learning opportunities.

Suggestion 9: Fit CW and CT into wider EFL curriculum in Chinese universities.

The application of CW and CT could correspond with and enhance the EFL curriculum in Chinese universities and colleges. Firstly, both CW and CT can be delivered within the time allocation for EFL classes. According to the College English Curriculum Requirements, the time requirement for undergraduate college English writing is that students ‘be able to write within 30 mins a short composition of no less than 120 words on a general topic or an outline’ (CMoE, 2007: 7). Thus, teachers who would like to use CW in writing class can carefully design the CW tasks that fit the time requirements above. Meanwhile, CT can also fit into the allocated time, as CT does not require additional in-class activity from teachers. Teachers can design or modified their original activities to embrace CT elements, so that students may have opportunities to practice CT during the activity process. For example, if the original activity is individual brainstorming for a writing plan, then the teacher can ask students to brainstorm in pairs or groups and discuss several critical questions simultaneously. Therefore, both collaborative activity and CT can be managed within the allocated lesson time.

Secondly, the application of CW and CT can be absorbed into the wider EFL curriculum in China. According to the College English Curriculum Requirements (CMoE, 2007) and the Guidelines on College English Teaching (CMoE, 2016), the objective of college English is to develop the EFL student’s ability to use English in a well-rounded way and to develop independent learning capacity. In addition, the importance of students being able to communicate effectively in their future studies and careers is also highlighted. To achieve these goals, different teaching methods are required in the EFL learning contexts in Chinese universities and colleges, especially in methods that promote student communication and learning strategies within class. Therefore, CW, as a collaborative activity, can meet the requirement of the curriculum which encourages students to practice their communication skills with peers in EFL classes. What is more, CT can also correspond to the curriculum requirements, and promote capacity enhancement courses to increase student understanding of different cultures, values, and ways of

thinking (CMoE, 2007; 2016). Chinese EFL teachers can involve CT skills or activities (e.g. critical reading and critical questioning) in class as learning strategies for students to improve their language learning efficiency. In this study, both CW and CT were teaching objectives, and so the study incorporated the design of an integrated thinking and writing course. Future teachers and course developers can adapt such an approach to their own students' requirements, and to assess the correct balance of language or thinking emphasis, as requirements demand.

The suggestions discussed above lead to the specific procedures for EFL teachers who have an interest in applying CW and CT in class:

1. Understand what CW and CT are and learn how to practice them in class. Teachers' understandings of the terms will largely influence students' understandings.
2. Decide which is the main focus in class, CW, CT, or both and then carefully design the course based on the curriculum. According to the curriculum (CMoE, 2016), college English in China can either focus on specific language skills or involve different learning strategies and foreign cultural knowledge. These foci can be taught as an independent course or integrated within general English language teaching courses.
3. Ensure clarity in the design of CT instructions or activities. CT has many definitions, skills and related activities, and teachers need to design the CT instruction or activities with clear definitions and teaching aims. Otherwise, students may be confused during the various CT activities.
4. Choose and design a CW task type carefully. According to the curriculum (CMoE, 2007), the writing task in Chinese EFL classes should not be so complicated that students are unable to complete it within 30 minutes. Thus, the design of CW tasks should allow students to complete the writing within 30 minutes. Meanwhile, CW has two main tasks: meaning-focused and language-focused, and the different task types lead to different learning outcomes (Storch, 2013). Therefore, an appropriate task type based on the teaching purpose should be considered.
5. Students should work in pairs or in small groups. Working in pairs can provide students with more opportunities for task contribution, while in small groups students have more assistance from their partners.

6. Provide students with adequate time for practicing. Students may need more time to familiarise themselves with the concept of CT and CT skills. They also need time to learn how to interact with peers more effectively during the CW process, otherwise, they cannot practice it efficiently in class. A relatively longitudinal study (e.g. one or two semesters) may be more beneficial, especially for those who had misunderstandings about CT and do not have experience in collaborative activities.
7. Monitor the CT activities and the collaborative process to ensure students focus on the task and provide assistance when they require it. If students are involved in a CW task for the first time, they may need guidance or assistance.
8. Allow students to use their first language during the collaborative process. The application of L1 can be a mediating tool that promotes CT development and collaboration efficiency, and additionally it can reduce students' anxiety if they have relatively low language proficiency.

In order to achieve the above procedures within the allocated timeframe, teachers can arrange activities prior to the class. For example, teaching subjects, aims, types of activities etc can be considered as part of the teaching plan design. Students could also receive guided CT instructions before classes if they are unaware of, or have limited knowledge of CT or CW.

Finally, this study also suggests that selecting an appropriate rubric to measure student progress in writing is necessary. According to the discussion in Section 5.1.1, the Washington State Critical and Integrative Thinking Rubric is not appropriate for the current study to explore student CT performance in writing as the rubric was design for assessing long and complex papers or thesis among undergraduate students (Condon and Kelly-Riley, 2004). Although the rubric can be modified to use in different contexts, this study failed to further modify it into a more suitable version. As discussed in Section 5.1.1 (p. 162), future studies which seek to assess CT through writing activity should select a more appropriate rubric according to the type of writing tasks and teaching aims.

5.3 Summary

This chapter discussed findings from both quantitative pre- and post-tests and qualitative class observation and interviews. The findings have been discussed in relation to the research questions, and the three key findings are further discussed to suggest the potential of CW integrated CT instructional intervention for promoting CT.

The study suggested that EFL participants' CT was applied and promoted during the CW process, by integrating CT in collaborative interactions. The adapted analytical framework of CT was helpful to the researcher to explore the application of participants' CT during the CW process. The majority of participants in this study agreed that CW integrated CT instruction promoted CT development and language learning effectively, and they showed metacognitive awareness during the interview process. As many researchers argued, CT is enhanced when it is integrated in different courses (Wright and Taverner, 2008; Lin and Mackay, 2004; Mason, 2008). The study supported the view that a writing task is a useful manifestation for CT development in the FL context, and CW is an applicable method to practice in Chinese EFL classes. With the development of CT and metacognitive awareness, the independent learning capacity for EFL students is promoted.

In the next chapter, the aims and the main findings of this study are briefly reviewed, and the significance and contribution of the study are emphasised. The limitations of the study are considered, and finally suggestions for future research are summarised.

Chapter 6: Conclusion

This study aimed to explore the process of CW and its effects on EFL students' application of CT. It addressed the research questions (RQ1 *Are there any changes in students' CT during the eight-week collaborative writing interaction?*; RQ2 *What are students' perceptions of any impact of CW on CT?*) to demonstrate that Chinese EFL students' CT can improve by using a CW intervention integrated with CT instruction. Given the growing requirement for students to demonstrate CT in higher education (see discussion in Section 1.1.1) and the relatively weak CT performance of Chinese EFL students reported by some researchers (e.g. Pu and Evans, 2018; Yang, 2017), this study proposed its own working definition of CT and applied this to a CW integrated CT instruction intervention. CT in this study is defined as the application of an attitudinal perspective and a cognitive skills perspective in which students demonstrate reflective and open-minded attitudes, enabling them to solve problems and make decisions. This involves the skills of understanding or interpreting information, reasoning, inferring and deducing, analysing, critiquing and evaluating. The thinking, problem solving, and decision-making processes were analysed through observation and assessment during the collaborative writing process.

Participating students had mixed attitudes toward their CW experience. Despite their perceptions of CW experience, participants have demonstrated modest improvement in both pre- and post-tests and collaborative interaction in class. This study supports the claim that Asian students can think critically, and that their CT can be improved in FL/SL contexts. In this chapter, the researcher briefly reflects on these key findings and discusses their contribution. The limitations of the study and recommendations for future research are also discussed.

6.1 Reflections on my Key Findings

As discussed in Chapter 5, there were three key findings from this study that relate to the application of CW integrated with CT instruction intervention, the adopted analytical framework of CT, and participants' mixed attitudes toward the intervention. The reflections on these three key findings are presented briefly as below.

The application of CW integrated with CT instruction intervention was beneficial for participants, improving the frequency and quality of application of CT. The data collected from observations of the CW process and the pre- and post- tests results (see Section 4.1 and 4.2) suggested that participants applied more CT and their CT test scores improved. This finding supports the claim that explicit CT instruction or input can promote Asian EFL students' CT development (Mason, 2008), and it suggests the importance of the teacher's role as a mediator. According to sociocultural theory, the teacher's instruction is regarded as a mediation tool to scaffold student interactions in class (Water and Bateman, 2013). Meanwhile, CW provides a non-threatening mediated learning environment that encourages student-student interaction in class (Storch, 2013). The underlying assumption of this non-threatening environment is that it enables students to work in the zone of proximal development (ZPD) proposed by Vygotsky (1978). The ZPD refers to the distance between the students' current state of knowledge and the potential level of development they can achieve when they interact with others. In this study, the author of this thesis was both the researcher and teacher, as facilitator or mediator, providing participants with guidance such as CT and CW definitions, specific CT skills and CW procedures, and encouraging participants to interact with each other with CT skills in class. The entire CW process was monitored by the teacher. As a result, participants in this study have completed the CW tasks successfully and demonstrated that the combination of CW practice and explicit CT instruction enables participants to apply and develop their CT in class.

The second key finding is that the participants application of CT can be investigated by examining dialogues during the CW process. Participants' dialogues were analysed through the analytical framework. The analytical framework of CT combined Storch's (2013) model of dyadic interaction with an adopted taxonomy of language functions from Lim and Kim (2016). The analytical framework was applied to observe and analyse participants' interaction features and produced language to explore how participants used CT during the CW process. As discussed in chapter 5 (see Section 5.1.1), all participants formed and engaged more in a collaborative interaction pattern (i.e. with high level of mutuality and quality for task engagement, see Section 4.2.1) and produced more CT-related language functions (e.g. arguing and justifying) at the end of the intervention. These changes were regarded as evidence of CT development, as participants applied and developed their CT to improve the level of task engagement and to work with their partners more effectively and collaboratively. Meanwhile, there were potential links between the interaction patterns that participants formed with the

language function they produced in class. As discussed in Section 5.1.1, the more CT-related language functions or responding language functions produced, the higher the level of mutuality and quality for task engagement. The analytical framework of CT presented in this study may be useful to teachers and researchers who are interested in developing their students' CT in collaborative activities. Further suggestions will be discussed in section 6.3.

The third key finding relates to participants' attitudes toward the intervention in this study. These were mostly positive regarding the effectiveness of adopting CW in class. Participants showed metacognitive awareness and agreed that CW and the intervention were beneficial for CT development and also for language learning. However, from the 'enjoyment' perspective, some participants noted that they experienced pressure during the CW process because of disagreements and arguments with partners. Hence, they were reluctant to engage in CW and preferred individual writing or partial CW (i.e. discussing or generating ideas collaboratively but writing individually) in daily practice. This related to the participants learning belief, prior learning experiences (as discussed in Section 5.2.2) and lack of familiarity with CW. Their negative attitude toward the disagreements and arguments that created stress during the CW process suggests that they were impelled to move from their comfort zone. However, negotiation skills are important to acquire, not only during study but in future life. This indicates a need to develop EFL students' negotiation and collaborative skills and attain an understanding of argumentation in the CT process. This shift in attitude and learning beliefs can be influenced with mediation from teachers. As discussed in Section 5.2.2, the teacher plays an important mediation role during the intervention. While participating students were somewhat reluctant to engage in CW and apply CT skills during this process, nevertheless, their CT performance in writing did develop during the CW process. The majority of participants therefore admitted that they would choose CW for academic purposes, such as for language learning or CT development. This suggests that CT can be taught and improved for EFL students in Asian HE contexts.

The three key findings summarised above suggest that it is beneficial for EFL teachers to promote undergraduate students' CT by using CW in Chinese EFL classes. It is not easy for an EFL teacher to integrate CT and CW in class, because EFL teacher herself/himself need to have clear understanding or training of CT and CW first. First of all, the findings of this study argue

for positive outcomes of integrating CT and collaborative activities into EFL classes, and then it suggests the application of student-centred teaching method for CT development and language learning. The CT related collaborative activities motivated students learning more efficiently and effectively in class. As evidenced in the participants' interviews, students valued the student-centred teaching method, in which the practice of CW and CT allowed them to think and learn more effectively than before in the teacher-centred class. Student A, for example, claimed that "both CW and CT are interesting, to compare with normal class (i.e. teacher-centred), CW class provides a better environment to show our CT skills". Student S also stated that, "I like the way of CW in the classroom, because it will promote more ideas during the collaborative process. It makes me become more open-minded". Both Student A and Student S valued the student-centred approach of CW in class, and its promotion on CT.

Secondly, this approach also meets the Curriculum requirements. The college English curriculum in China (CMoE, 2016) requires students not only to learn language skills but also gain different cultural knowledge and develop ways of thinking that enable the student to become a life-long independent learner. CT helps to prepare students as independent lifelong learners who understand their own learning and what they need to learn well - in other words through metacognitive awareness. CT and metacognition skills are regarded as important learning strategies that aid EFL students in achieving the requirements of Chinese EFL classes. Meanwhile, the promotion of CT and metacognition might reduce the problem of weak CT performance amongst Chinese EFL undergraduate students, as identified in Section 1.2 (Gao, 2012; Yang, 2017). CW in this study provided sufficient opportunities for students to practice both their CT skills and language skills. The emphasis of peer interaction and communication by CW (Storch, 2012) also meets the requirements from the College English curriculum in China that highlights the communication efficiency of students (CMoE, 2007; 2016). Therefore, teachers who wish to promote student language learning efficiency or independent learning capacity should integrate CT or metacognition by using collaborative activities in EFL classes.

The research findings also support the view that future researchers should further investigate how the students CT develops during the activity process. The analytical framework of CT developed in this study is not perfect and requires further refinement. The use of mixed methods and longitudinal interventionalist studies are recommended, as CT and metacognition

development need sufficient opportunity and time for implementation, embedding and impact. This study suggested possible ways to explore how to integrate CW and CT or metacognition in a Chinese EFL teaching context. Future studies or research can avoid the limitations this study faced (e.g. the choice of unappropriated rubric for writing) and further investigate other possible ways of expanding good practice.

6.2 Contributions of this study

This study makes a pedagogical, theoretical and methodological contribution as outlined below.

Firstly, as summarised in last section, this study contributes to the implementation of, and research into, the new English curriculum by EFL teachers and researchers in Chinese universities. The designed intervention, combining CW practice and explicit CT instruction was found to be a useful method to facilitate CT, metacognitive awareness, and language learning among EFL students. As introduced in Chapter One (see sections 1.1 and 1.2), current English language education in China is gradually attending to the development of students' CT (Wang and Seepho, 2017), but the understanding and application of CT among EFL students continues to be a problematic issue in China (Yang, 2017). EFL students and some teachers misunderstand or have insufficient knowledge of the notion of CT and its implementation (Guo and O'Sullivan, 2012), and as a result, students performed poorly on CT (Gao, 2012). Traditionally used English teaching methods (e.g. teacher-centred pedagogy) were not effective in promoting CT (Yang, 2017), indicating the need for a more effective teaching method for integrated language learning and CT development. Thus, this study is significant in developing an integrated teaching method for language learning and CT development for EFL teachers and course developers in China.

According to sociocultural theory, mediation is important for student to interact effectively with each other in class (Farmer et al, 2011). During the interaction process, teachers should provide students with different kinds of mediation, such as teaching materials, teaching instruction, and language support (Swain, 2010). Therefore, a mediation embedded teaching approach was adopted incorporating teacher's guidance for CW, explicit CT instruction and peer interaction. These mediation tools were helpful for participating students' CT development in the EFL class. Thus, this study offers a pedagogical model that may be helpful for other EFL teachers or

researchers who wish to design and investigate classes that create a collaborative learning environment for CT development in China and beyond.

Moreover, this study addresses a research gap in terms of theoretical concepts by investigating the application of CT during the CW process. CW strategy was previously mainly used to promote language learning in FL/SL contexts and in comparisons between CW products and individual writing products. Previous studies indicated that CW was helpful for improving language writing performance (Storch, 2013). This study contributes to the literature on the use of CW to promote CT and further suggests that CW can contribute to the application and development of CT when there are opportunities to practice CT during CW tasks over time. More importantly, previous studies related to CW found that students were reluctant to engage in CW. This study contributes to the understanding of the potential reasons for this reluctance. According to Vygotsky's (1978) notion of the ZPD, students can achieve their potential with assistance from more advanced individuals (peers or teachers). Some discomfort may be experienced during the transition to a higher level of functioning, or acquisition of new knowledge which "is often problematic, troubling and frequently involves the humbling of the participant" (Meyer and Land, 2005; p. 376). This level of challenge in learning can be related to the idea of the liminal phase. Meyer and Land (*ibid*) believe it is valuable to drive students into this liminal state of discomfort as it enables them to achieve higher thinking and learning. This suggests that discomfort is a necessary part of the liminal phase of learning, and it can have positive attributes in that it allow participants to rethink what argumentation is. Therefore, it is valuable for this study to promote participants into this state during the CW process. The feeling of discomfort may relate to participants' learning beliefs or confidence that they can learn from peers (McDonough, 2004) or the perception that disagreements and arguments with peers are a negative aspect of the process (as found in this study - see Section 4.3 and Section 5.2.2). Guidance or mediation from the teacher is necessary to enable participants to move beyond the liminal phase and to engage more confidently in CW interactions. According to the sociocultural theory applied in this study, mediation should ensure an appropriate level of challenge to enable students to achieve at a higher level (Swain, 2010). Having successfully engaged in challenging activities (mediated by the teacher and /or peers) students will eventually be able to achieve higher learning independently (i.e. without mediation). This study, therefore, suggests that a mediated CW integrated CT intervention can support language learners to meet the challenge of applying CT to the CW process.

This study also contributes to the existing analytical methodology for CT. The adapted analytical framework developed in this study may prove to be a useful tool for other researchers wishing to analyse participants' application of CT during an intervention process. It also addresses gaps in the existing body of literature, as only a limited number of previous studies have investigated CT through observing students during an intervention process. As discussed in the literature review (Section 2.1), some researchers (e.g. Slavin, 2011; Fung and Howe, 2014; Campbell, 2015) found that CT can be promoted by collaborative activities, but they mainly examined the test results or activity products. This study has revealed how participants applied CT during collaborative interactions and summarised various features of participants' CT development (see Section 5.1.1). Therefore, the innovative analytical framework of CT developed in this study may be helpful for other teachers and researchers to improve their understanding of how CT can be applied during the CW process in terms of interaction patterns and language functions. It may also be used to investigate CT development during other activities such as peer evaluation and the framework may be adapted for use with more language functions such as writing or organising functions, as this study focuses on CT-related aspects.

6.3 Reflecting on the research design: limitations and recommendations

This section reflects on the research design, considers its limitations and what might be changed about the research design in the future. This study provides a basis for other researchers to explore further the effectiveness of applying CW integrated CT instruction intervention to promote EFL students' CT and is one of the first to investigate integrate CT in CW. However, it is not without limitations, which are discussed as points that future researchers may wish to take into consideration when planning an intervention to promote CT.

First, the eight-week intervention conducted during this study paid more attention to the CW process rather than the CW products (i.e. writing texts) in class. The focus was on the changes that occurred and on making comparisons between participants themselves in different periods of the study. This helped me to observe and analyse participants' application of CT with more details during the CW process. The CW products were used as supplementary evidence of the CT application and consequent improvements in writing. However, the study did not pay great

attention to the CW products, and so participants' improvements in CT were not as obvious as they exemplified in the CW process. This could be regarded as a limitation and it may be beneficial if future studies focus on both process and product of CW to generate more comprehensive findings regard the application of CT. The produced CW texts can be regarded as a way to reflect on how students apply their CT. Teachers can use these outputs as a mediation tool to provide students with feedback on their writing and CT application.

Participants in this study were interviewed at the end of the programme to investigate their perceptions of CW and CT. This provided participants with the opportunity to reflect on their CW experience, and, as such, it was difficult to ascertain whether the research aims were achieved. However, if participants could be interviewed at different stages of the eight-week intervention, more comprehensive and instant reflections from participants might be provided. It can now be recognised that the interview can be used more appropriately to track participant perceptions throughout the eight-week CW process. According to sociocultural theory, students need assistance from advanced individuals (i.e. adults, teachers, or more capable peers) during the interaction, and the interview can be regarded as an opportunity for dialogic reflection for students (Swain, 2010). In other words, the interview is an additional form of mediation to enable participants to reflect on their experience of applying CT during the CW process. The interview could be used to mediate the reflectiveness on what participants were undertaking and achieving during the CW process. In this study, if participants' discomfort of using CW was discovered during the eight-week intervention, more targeted guidance could have been provided to participants during the CW process. For instance, mediation could be offered, providing instruction about how to solve difficult issues, or by monitoring the CW process and at the same time encourage metacognitive awareness, and talking to the participants about what they are gaining from the process or what they are finding most challenging, and how to deal with such issues. The interview could provide participants with opportunities to recognise exactly what they have achieved and to recognise the benefits of engaging in CW. It also provided participants with the benefits of metacognitive awareness of understanding their achievements and what support was required.

Therefore, a perceived limitation of this study was not to interview participants during and after the eight-week intervention, and this may be a methodological consideration for future studies.

The extensive use of dialogic reflection is an important part of mediation that can help to generate more in-depth qualitative data (Richards et al., 2012), and at the same time encourage metacognitive awareness. This data-led strategy could be combined with class observation or teaching intervention in a qualitative dominant mixed methods approach. Future studies may wish to adopt such methodological approaches to investigate CT development and the development of metacognition in collaborative activities.

The conflicting results between the CW process and CW products forms an additional consideration. The Washington State Critical and Integrative Thinking Rubric proved to be overly complex for application to the selected CW tasks in this study. Further studies can modify the rubric or select other types of writing tasks. This study selected a short argumentative essay writing task for participants as a tool to develop CT. It found that participants would apply their CT when they wrote argumentative essay, yet how participants would use their CT in other types of writing was not discovered in this study. Since participants' performance during different types of tasks may vary (Storch, 2013), it is of possible interest to investigate how EFL students develop their CT during different types of collaborative tasks. Other future studies may design different types of collaborative tasks to make comparisons about students' CT performance, and to explore more detailed features of CT application in writing.

To conclude, the implementation of the eight-week intervention in this study was generally successful for EFL university students' CT development. This study is one of the first to investigate the impact of using a CW integrated CT instruction intervention to promote EFL undergraduate students' CT. It adopts Vygotsky's (1986) sociocultural theory as a theoretical base, emphasising the role of peer and teacher mediation in class. This study contributes to the knowledge of explicit CT instruction, the multiple opportunities available to apply CT during the CW process and how these can contribute to student acquisition and application of CT and language learning. The qualitative dominant mixed-methods approach provided abundant and reliable data to explore university students' application of CT in the EFL class and this could be further analysed from different aspects. For example, the writing products could be further analysed with a writing rubric to investigate the students writing performance. The analytical framework for CT applied in this study could also be further developed with more CT related aspects. Accordingly, it is important to continue to explore EFL students' CT application, their

interaction features and writing performance in collaborative learning environments. As an EFL researcher and future teacher, this study has provided the researcher with more consideration as to how to design collaborative learning activities to promote effective classroom interaction, and how to design the curriculum to promote CT through collaborative activities that include CW. As revealed in this study, promoting EFL student-student interaction and explicit CT instruction can be beneficial to facilitate their CT. As a teacher-researcher in the future, therefore, the learning gained from this research will improve my competences and provide EFL students with explicit teaching of CT, appropriate mediation or guidance, and more opportunities for peer interaction in my future studies and teaching.

Appendices

Appendix A: Lesson Plans

Week 2- Lesson One: Introduction

Objective: To have a general understanding of concepts of critical thinking and collaborative writing

Teaching content: Introduction to various interpretations of critical thinking and collaborative writing procedures

Step 1: Activated activity (10 min)

Examples from Watson-Glaser critical thinking test were selected to activate students' interest in their own CT ability, and to encourage them to think.

A short video clip of Sherlock Holmes and John Watson's conversation was then used to allow students to discuss and exchange their ideas about critical thinking and critical thinking skills Sherlock Holmes and John Watson had used. After the discussion, students might have some ideas about CT.



Step 2: Teaching and understanding (15 min)

Some definitions of critical thinking were introduced to help students understand what CT is, and why it's important (as discussed in literature the understanding of CT is important). Some examples were presented to guide students specifically.

Teacher showed some definitions about critical thinking according to different perspectives:

- Robert Ennis' widely used definition, "critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do." (Norris and Ennis, 1989)
- Sternberg's (1986: 3) definition emerged from cognitive psychological approach, "the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts."
- "Seeing both sides of an issue, being open to new evidence that disconfirms

your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available facts, solving problems, and so forth" (Willingham, 2007, p. 8).

- Bloom's revised hierarchical taxonomy of critical thinking skills.

There is no general agreement on critical thinking's definition. However, most of the scholars believed that 'abilities' and 'dispositions' are two related entities of critical thinking. The abilities involve:

- ☐ analyzing arguments, claims, or evidence (Ennis, 1985; Facione, 1990; Halpern, 1998; Paul, 1992);
- ☐ making inferences using inductive or deductive reasoning (Ennis, 1985; Facione, 1990; Paul, 1992; Willingham, 2007);
- ☐ judging or evaluating (Case, 2005; Ennis, 1985; Facione, 1990; Lipman, 1988; Tindal & Nolet, 1995); and
- ☐ making decisions or solving problems (Ennis, 1985; Halpern, 1998; Willingham, 2007).

Therefore, teacher explained that students would focus on different critical thinking abilities and practice these skills in the future classes respectively.

Step 3: Application: Group work- Odd one out (20 min) A brain-storming activity for students to think from different perspectives, think critically with reasoning skills, and to provide students opportunity to practice CT.

Sample: 'Colourful' 'Behavior' 'Centre'

Answers:

'Colourful' is the odd one out. Both 'behaviour' and 'centre' can be noun.

'Behavior' is the odd one out. The spelling of 'colourful' and 'centre' are British English.

'Centre' ([ˈsentə(r)]) is the odd one out. Both 'colourful' ([ˈkʌləfəl]) and 'behavior' ([bɪˈheɪvjə]) consist of three vowels.

Question: 'Reply' 'Reaction' 'Analyze' which one is odd one out?

Answers:

'Analyze' is the odd one out. Both 'Reply' and 'Reaction' can be noun.

'Analyze' is the odd one out. Both 'Reply' and 'Reaction' have similar meaning.

'Analyze' is the odd one out. The first letters of 'Reply' and 'Reaction' are R.

'Reply' ([ˈrɪplai]) is the odd one out. Both 'Reaction' ([ˈriːækʃən, riː-]) and 'Analyze' ([ˈænəlaɪz]) consist of three vowels.

'Reply' is the odd one out. Only 'Reply' can be both noun and verb.

'Reaction' is the odd one out. Both 'Reply' and 'Analyze' can be verb.

Question: '3' '8' '12' which one is odd one out?

Answers:

'3' is the odd one out. '3' is odd.

'3' is the odd one out. '3' is the smallest.
'3' is the odd one out. '3' is not divisible by 2 or 4.
'8' is odd one out. '8' is not in the 3x table.
'12' is odd one out. '12' is a 2-digit number.
'12' is odd one out. '12' is the biggest.

Students were divided into small groups to complete the task:

- To find out which one is odd one out
- To give reasons to support your arguments
- To find out as much possibility as possible
- To evaluate other students' arguments in your group

Step 4: Feedback- Group presentation (5 min)

Students presented their answers. Due to time constraints, only two groups were selected at each class to share their answers with the class. After the presentation, the teacher provided some feedback to students' answers and to the extent they had applied their thinking skills.

Step 5: Collaborative writing (10 min)

Teacher introduced what is collaborative writing, and then showed how to practice it.

According to the process approach, the whole process of collaborative writing is similar with individual writing process:

A- Pre-writing stage: including collecting, planning, organizing ideas, finding new words and vocabulary and producing an outline.

B- Drafting and writing stage: with the emphasis on writing a draft of the whole essay from beginning to end. The main priority of this process is to use the ideas and vocabulary they had collected together during the pre-writing stage in their writing without paying any attention to grammatical, spelling or punctuation mistakes.

C- Revising stage: concentrating on the consistency of sentences: for instance, the use of tenses, changing unsuitable vocabulary and reorganizing paragraphs or sentences.

D-Editing stage: concerned with issues of linguistic accuracy such as spelling, grammar and punctuation.

The collaborative writing exercise required students to produce a jointly writing product at the end of class. They followed the same procedure of the individual writing process. However, students needed to work together with their partners during the whole writing process. They were encouraged to apply the taught CT skills in class such as: interpreting information, analysing arguments, reasoning, analysing etc. They could use those CT skills to share or exchange their ideas, negotiate or compare their ideas, and persuade each other to complete one writing

Step 6: Collaborative writing task (1 hour)

Students worked in pairs to try to complete a short argumentative essay. (This was their first practice of CW, so students did not have to finish the writing in class.)

They were asked to write about the following topic (at least 120/200 words) in pair: 'Some scholars believed that Asian students are not good at critical thinking and prefer to wait to be told the answers like John Watson. Do you agree or disagree? Why?'

Week 3- Lesson Two: Helping Strangers

Objective: To be able to identify an argument and reasoning statements

Teaching content: To introduce what is an argument, how to analyse arguments and to provide opportunities for learners to practice the skill.

Step 1: Revision

Teacher reviewed students' general understanding of CT they had been introduced in last week, and then reinforced their understandings.

Step 2: Activated activity

At this stage, teacher aimed to activate students' interest in analysing arguments, and to encourage them to identify arguments from different sentences by using their prior knowledge and CT skills.

Teacher presented some sentences and asked students to identify arguments:

"When people sweat a lot, they tend to drink more water."

"A couple lived happily together, and one day they decided to have a baby. But the baby grew up to be a very bad person, and they regret it very much."

"Can you come to the meeting tomorrow?"

"The death penalty should be abolished, because it is very inhumane."

"So, it is raining heavily, and this building might collapse. But I don't really care."

Step 3: Teaching and understanding

At this stage, teacher introduced what is argument and how to analyse an argument. It aimed to let students understand why it's important, and how to construct it in the argumentative essay. Some examples were presented to guide students specifically.

Definitions:

A crucial part of critical thinking is to identify, construct, and evaluate *arguments*.

In everyday life, people often use "argument" to mean a quarrel between people. But in logic and critical thinking, an argument is a list of statements, one of which is to make a conclusion based on analyse or evaluate relevant reasons (Daud, 2012).

To give an argument is to provide a set of premises as reasons to accept the conclusion. Arguments can also be used to support other people's viewpoints.

Argument indicators (involves conclusion indicators and reason indicators):

- since
- because
- firstly, secondly, ...
- for, as, after all,
- assuming that, in view of the fact that
- follows from, as shown / indicated by
- may be inferred / deduced / derived from

- therefore, so, it follows that
- hence, consequently
- suggests / proves / demonstrates that
- entails, implies

In writing, an argument is usually a main idea, often called a "claim" or "thesis statement," backed up with evidence that supports the idea. This is often confused with writing controversial topic that deliberately state an opposing viewpoint with others without support evidence. The argument is actually the support of the main theme, and is not an opinion, and is based on facts and evidence.

'Position', 'agreement/disagreement', 'argument'

Position: a point of view

(e.g. Free school meals are beneficial for students from low income families. I think it should be provided.)

Agreement/disagreement: to concur with someone's point of view or hold a different point of view from someone else

(e.g. I don't know much about free school meals, but I agree with you.)

Argument: Using reasons to support a point of view, so that known or unknown audiences may be persuaded to agree

(e.g. Schools should provide free school meals to students from low income families, because it will lower the child's living costs and saving low income families money.)

What to avoid:

Don't write in incomplete sentences

Error: Because animals can experience pain and suffering. Therefore, it is wrong to kill animals.

Correct: Animals can experience pain and suffering. Therefore, it is wrong to kill animals.

Don't include non-statement.

Error: Politicians are all the same. Therefore, why should I care about politics?

Correct: Politicians are all the same. Therefore, I have no reason to care about

politics.

Tips:

- We should make statement with reasons. Otherwise, when we are criticized, we will fail to give arguments to defend our own opinions.
- To improve our critical thinking skills, we should develop the habit of giving good arguments to support our opinions.
- To defend an opinion, think about whether you can give more than one reason to support it. Also, think about potential objections to your opinion, e.g. arguments against your opinion. A good thinker will consider the arguments on both sides of an issue.

Step 4: Application: Group Work- Identifying arguments by critical reading

Teacher provided several paragraphs to students. Some of the paragraphs contained arguments, while some didn't. This activity provided opportunity for students to apply their knowledge, understanding and thinking skills to identify and evaluate about arguments.

Students were divided into small groups to complete the task:

- Read the paragraphs carefully and individually
- Analyse each paragraph whether it involves an argument or not, and identify the argument
- Discuss with your group members and evaluate each paragraph about whether the writing contains good arguments with clear logic or reasoning.

Paragraph One: We should try to help others, no matter they are strangers or not. First, helping others is a virtue, and it will make our society more harmonious. Just imagine what a terrible world it would be if everyone was cold-hearted! Second, to some extent, helping others is helping oneself. We may come across some trouble and need others' help some day. Therefore, we should be glad to help others.

Paragraph Two: In recent years, a strange phenomenon has occurred in our country—people are very cautious of helping others, especially helping strangers, because a few people are getting involved in trouble when helping others. The opinion of whether we should help strangers differs from one person to another.

Paragraph Three: Some people may say helping others may bring us trouble or even put us in dangers. There are many people take advantage of others' sympathy to cheat. Although this is true, I cannot agree this point of view.

Paragraph Four: The William Shakespeare said, "Virtue is blood, and goodness never fearful". Helping others is helping yourself, we may come across some trouble and need help from others one day.

Paragraph Five: Some said that we should help strangers because this is our traditional virtue. However, not all the strangers are worth to help. Some of them may be dangerous and may try to harm you by pretending to need your help. So, we should be careful when strangers ask for help and ensure our own safety.

Paragraph Six: What is worth noticing fact is that sometimes we need to turn to strangers for help. So, helping strangers is a social responsibility. In January, this year, a bus packed with Chinese tourists rolled on a highway near the Hoover Dam killing seven passengers and injuring 10. People nearby ran to help them as much as possible, brought them water, blankets and called police and ambulance. Therefore, I believe the advantages are more obvious in helping strangers.

Step 5: Feedback -Group presentation

Students presented their answers. Due to time constraints, only two groups were selected at each class to share their answers with the class. After the presentation, the teacher provided some feedback to students' answers and performances of use of English and thinking skills of analysing arguments.

Step 6: Collaborative writing task

Students worked in pairs to complete an argumentative essay, and they were encouraged to apply thinking skills, especially the skills of analysing arguments.

They were asked to write about the following topic (at least 120/200 words) in pair: "Do you think we should give beggars money when we see them on the street? Give reasons and examples to support your answer."

Week 4-Lesson Three: Shopping online

Objective: To be able to identify assumptions

Teaching content: To introduce learners about assumptions, and to present some examples for students to identify underlying assumptions in arguments.

Step 1: Revision

At this stage, teacher reviewed students' understanding of arguments that they learned in last week. It could help students to understand and reinforce the previous knowledge about identify arguments.

Step 2: Activated activity-Word associations

A word association task was used to motivate students' interest, and to encourage them to think and to identify assumptions.

Teacher presented some key words and associated concepts, and then asked students to match the key words with associated concepts and explain reasons.

Key words: mountain (F), child (A), fruit extract (E), wall of fire (B), monkey (G), ring (C), shed or den (D)

Associated concepts:

A. innocence, caring, love, tenderness, softness

B. danger, bravery, speed, unstoppable

C. romance, marriage, happiness, being special or chosen

D. man being independent; a place woman isn't meant to go

E. healthiness, vitamins, well-being, flowing hair

F. natural freshness, refreshingly cool, outdoors, hardness

G. humour, playfulness, tricks

Step 3: Teaching and understanding

Teacher introduced some definitions of assumptions. Some examples were provided to show students how to identify assumptions.

In general, the word 'assumption' refers to, a belief or something that is accepted or 'taken for granted' by a speaker or writer but is not clearly stated or made explicit by them (Fisher, 2011: 50).

In critical thinking, 'assumption' refers to anything that is taken for granted in the presentation of an argument. These may be facts, ideas or beliefs that are not stated directly but which underlie the argument. Without them, the same conclusion would not be possible (Cottrell, 2011).

It is useful to identify the assumptions that underlie an argument so the overall argument can then be better understood and evaluated.

Thinking Map- a useful tool to analyse and evaluate arguments

1. What is/are the main conclusion(s)? (They are different ways to make a conclusion. It can be recommendations or explanations. Conclusion indicator words may help to make a clear conclusion.)
2. What are the reasons (data, evidence) and how they are organised? Are the reasons acceptable and do they support its conclusion (These include explicit reasons and unstated assumptions)?
3. What is assumed (perhaps in the context)?
4. Clarify the meaning of terms and claims that are unclear.

(Fisher, 2011)

Example One: Holidays are a time for relaxation and enjoyment. This year, the oil spills along our beaches become more serious. Therefore, thousands of people will have their holidays ruined by oil spills.

Assumption one: that holidays are for relaxation and enjoyment. This may seem obvious, but the original meaning of holidays was 'holydays', which were intended for religious observation. Some people still use holidays in that way. Others may use them for seeing family or, in the case of students, finding temporary work.

Assumption two: that thousands of holiday-makers will want to go to the beach.

Assumption three: that those holiday-makers who go to the beach will not like oil on the beach.

Assumption four: that oil on the beach in itself can ruin a holiday.

Assumption five: that the audience will understand words such as holiday, beach, relaxation, enjoyment, ruined, our, and oil spill and that these do not need to be defined.

Example Two: Free school meals would not be provided to middle income family students. So, schools should not provide free school meals to students from low income families. (A weak argument)

Main assumption: Students from middle income families and students from low income families are similar, school should treat them in the same way.

Paragraph One: Children are costing parents more. They demand more of their parents' time, expecting to be taken to activities after school, whereas in the past,

parents' own interests took priority. Parents are under more pressure to provide clothes and shoes with expensive designer labels, toys, trips and even more costly brands of food in order for their children to be accepted by their peers. Advertising aimed at children should be banned in order to reduce this excessive peer pressure.

Underlying main assumption: Advertising aimed at children is to blame for peer pressure. This may be true or untrue. The link between advertising and peer pressure isn't established in the passage itself.

Assumption two: Parents are the person who are responsible for spending money for children.

Assumption three: There is a peer pressure in terms of comparing clothes and food between children.

Paragraph Two: Online shopping is very convenient. People only need to sit at home and wait for the package to come instead of hovering outside in the cold wind. This is not only a better choice for the old, but also a great convenience for those who have no time to go shopping in person. We can buy almost everything without going out. Therefore, online shopping will become more popular in the future.

Underlying main assumption: Most people would like to choose more convenient way to buy things.

Assumption two: If people shopping in store, they will hover outside in the cold wind.

Assumption three: People do not like hovering outside in the cold wind to buy things.

Assumption four: Old people do not have enough energy to shop in stores.

Paragraph Three: Chinese parent tend to purchase foreign milk powder, because more and more milk powder incidents happened in China. They believe the foreign milk powder has high quality, which is better and safer than Chinese milk.

Underlying main assumption: Parents want to buy safe and high-quality milk powder.

Assumption two: Chinese milk powder has more incident than foreign milk powder.

Assumption three: Chinese milk powder has incident due to their low quality.

Assumption four: milk powder with low quality is not good for children.

Paragraph Four: I like to shop in stores. Although online shopping is convenient, it loses the enjoyment of retail shopping. Many people enjoy shopping with others, and it is often a good way to make social connections. When shopping online, the enjoyment lost. So, I still prefer the way of in-store shopping.

Underlying main assumption: When people shopping, they sometimes also want to make a social connection with others.

Assumption two: When people shopping in stores, they often go with other people, such as friends.

Assumption three: Online shopping cannot help people making social connections with others.

Paragraph Five: With the development of the Internet and the popularization of computer, online shopping becomes very normal in our life. But I do not think it is a good way for consumers. Although you can find many cheaper products, these products are fakes. And unlike shopping in real store, there are many deceptive advertisements on the Internet. Therefore, shopping in stores is better.

Underlying main assumption: Cheaper products are fakes, and shopping in store does not have many deceptive advertisements.

Assumption two: Consumers don't want to buy fakes.

Assumption three: People want to buy cheaper products.

Paragraph Six: Online shopping is better than shopping in stores, because consumers have more choices and can do some comparison when they are shopping on the Internet.

Underlying main assumption: Consumers want to have more choices, and they like to make comparison.

Assumption two: In-store shopping cannot provide more choices than online shopping.

Step 5: Feedback -Group presentation

Students presented their answers. After the presentation, the teacher provided some feedback to students' answers and performances of using thinking skills of identifying assumptions.

Step 6: Collaborative writing

Students worked in pairs to complete an argumentative essay by encouraging them to use their critical thinking skills of identify, analyse and evaluate assumptions.

They were asked to write about the following topic (at least 120/200 words) in pair: "Which do you prefer, shopping online or shopping at the real store? Give reasons and examples to support your answer."

Week 5-Lesson Four: Telling persuasive stories

Objective: To be able to identify assumptions in different contexts

Teaching content: To reinforcement the skill of identifying and analysing assumptions and to provide more opportunities for learners to practice these skills.

Step 1: Activated activity

At this stage, teacher presented several sentences as listed below to ask students identify the hidden assumptions. These daily and simple example sentences were used to activate students' interest about identifying assumptions in different contexts, and to encourage them to identify and analyse assumptions by using think skills.

What are the hidden assumptions?

We'll decorate the room pink as they have two girls.

(This reinforces the stereotype that girls like pink.)

We had better make sure there is roast beef on the menu so that the British tourists have something they are able to eat.

(This reinforces the stereotype that British people only eat roast beef and won't eat food from other countries.)

We should have expected that he could not control his temper, seeing he has red hair.

(This reinforces the stereotype that all red-headed people are hot-tempered.)

We should have expected trouble as there were so many football fans in the crowd.

(This reinforces the stereotype that football fans are trouble-makers.)

They won't be interested in fashion or computers: they are both retired now.

(This reinforces the stereotype that people are not interested in fashion or computers once they reach a certain age.)

Step 2: Revision and reinforcement

The teacher reviewed what they had learnt last week to make sure students had a clear understanding about assumption according to their performance in activated activity above. The further examples then were offered to guide students on analysing assumptions in different contexts.

Then teacher emphasized the role of 'context' in analysing assumptions and arguments.

Why is context important?

Arguments, explanations and so on are always presented in some context, and the context contains all sorts of assumptions, presumptions, background beliefs, facts relevant to interpreting what is meant.

For example:

We should have expected that he could not control his temper, seeing he has red hair.

The context of an argument may influence its interpretation and evaluation. Arguments can carry different weights in the contexts of different countries and histories, where underlying assumptions and values are different (Fisher, 2011).

Step 3: Application: Group work -Find out the identity of a person

Students were divided into small groups to complete the task:

- Read the provided information
- Recognise assumptions and make suggestions individually
- Discuss with your group member and reach an agreement

Find out the identity of a person

Below is a picture of the rubbish that was found outside a person's house. Can you work out what kind of person he/she is by looking at what they have thrown away?



Bus ticket



Baby Pacifier



lipstick



Eiffel Tower



Paris Museum Pass



swimming goggles



The identity of the Person

Gender:

Age:

Hobby:

Other:

During this activity, students were required to use their thinking skills of identifying and analysing assumptions to help them make their own conclusion or argument of the person's identity.

Step 4: Feedback -Group presentation

Students presented their answers. After the presentation, the teacher provided some feedback to their answers and the extent they had applied their thinking skills of identifying and analysing assumptions.

Step 5: Collaborative writing task

Students worked in pairs to complete an essay by encouraging them to use their critical thinking skills of identifying, analysing, and evaluating underlying assumptions.

They were asked to write about the following topic (at least 120/200 words) in pair: "Do you think the person you identified in group discussion is a spy, can you predict and analyse what the person is going to do according to the same rubbish? Give reasons to support your answer or argument."

Week 6-Lesson Five: Being detectives

Objective: To be able to understand and apply inference skill

Teaching content: To introduce learners about inference, and to present some examples of inference.

Step 1: Revision

Teacher reviewed what students had learned in last week about assumptions. It could help students to understand and reinforce the previous knowledge.

Step 2: Activated activity

At this stage, teacher used a picture to activate students' interest in inference, and to encourage them to think critically by asking some following questions as listed below:

To present a picture and ask students what do they see?



Questions:

Who can you see in the photograph? Do you know for certain that the children are boys? How?

What are they doing?

What else can you see?

Can you tell where the children are from the picture?

Who do you think they are? How can you tell?

What do you think they are doing? How do you know from the picture?

How do you think they are feeling? How can you tell?

Why do you think that the children are sitting in that way?

What do you think happened before this picture was taken?

What do you think will happen next?

Step 3: Teaching and understanding

Teacher introduced the definition of inference. Meanwhile, teacher pointed out that it is similar with deduction, but had different functions. Some examples were provided to show the differences and functions.

Definitions:

Inference is a "foundational skill" — a prerequisite for higher-order thinking and 21st century skills (Marzano, 2010)

Inference = to come to a conclusion about something based on evidence.

Readers think about and search the text, and sometimes use personal knowledge to construct meaning beyond what is literally stated.

Student Definition: Use clues to figure out what it really means.

When you infer, you use observations, prior knowledge and experiences, and details from the text to make connections and come up with ideas.

Examples:

People commonly infer all sorts of things from other things we know. For example, if you know that Mary is a new-born human baby, you might infer that she cannot yet feed herself, walk or talk-and you could be very confident about such inferences.

We also make inferences about which we cannot be so confident; for example, if you know that John is a 15-year-old schoolboy, you might infer that he is likely to have a mobile phone (because so many do) but of course you cannot be sure of this in John's case.

What can you ***infer*** from this sentence?



The man stepped out of his house and opened his umbrella.



Sally put on her hat and her coat.

What inferences are in arguments?

People start from one belief (or several) and 'move' from these to other beliefs which they take to be justified by the first ones.

In arguments, we infer our conclusion from our reasons. Arguments always consist of both reasons and inferences, and 'inferences' are the moves we make from

reasons to conclusions.

For example: some people have solved their own unemployment problem by searching from the Internet, so all the unemployed could do this.

The inference is the move from 'some people have solved their own unemployment problem...' to 'all the unemployed could do this'. The first claim justifies the second, and hence can be inferred from it.

One simplified model for teaching inference includes the following assumptions:

- We need to find clues to get some answers.
- We need to add those clues to what we already know or have read.
- There can be more than one correct answer.
- We need to be able to support inferences.

Marzano (2010) suggests teachers pose four questions to students to facilitate a discussion about inferences.

- **What is my inference?**

This question helps students become aware that they may have just made an inference by filling in information that wasn't directly presented.

- **What information did I use to make this inference?**

It's important for students to understand the various types of information they use to make inferences. This may include information presented in the text, or it may be background knowledge that a student brings to the learning setting.

- **How good was my thinking?**

According to Marzano, once students have identified the premises on which they've based their inferences, they can engage in the most powerful part

- Infer as much as you can and give reasons.

2. Mr Peters was dead.
3. The car in the garage had been stolen.
4. Someone had broken into the garage.
5. The robber got away through the park.
6. Mr Peters was asleep when he saw the robber.
7. The robber was trying to steal the car.
8. Mr Peters told the police what the attacker was wearing.
9. Mr Peters was mending his car when he was attacked.
10. The robber was wearing a red woolen pullover.
11. The robber cut his hand when he broke into the garage.
12. The robber could not get Mr Peters' car to start.
13. The robber dropped his gloves next to the bunch of keys.
14. Mr Peters was much stronger than the robber.
15. Mr Peters jumped on the robber before the robber opened the garage.
16. The robber got into the garage but he could not get into the car.



Students presented their answers. After the presentation, the teacher provided some feedback to their answers and the extent they had applied their thinking skills of inference.

They were asked to write about the following topic (at least 120/200 words) in pair: "What do you think has happened if you look at the crime scene again? Can you infer and analyse the whole event according to those given clues? Make inferences and give evidence to support your answer."

Week 7-Lesson Six: Love relationship

Objective: To be able to understand and apply deduction skill

Teaching content: To introduce learners about deduction, and to present some examples of deductions.

Step 1: Revision

Teacher reviewed what students had learned in last week. It could help students to reinforce the previous knowledge about inference.

Step 2: Activated activity

Teacher used a simple deduction task to activate students' interest in deduction, and to encourage them to think.

Activity One:

Don, Brain, and Shelley, whose favourite colours are red, white, and blue, are 9, 10, and 11 years old. Study the clues to solve the puzzle.

- Don is older than the girl but younger than the person who likes red.
- The youngest person likes white.

Deductions

Don: 10 years old and likes blue

Shelley: 9 years old and likes white

Brain: 11 years old and likes red

Activity Two:

Four friends, Lauren, Matthew, Robby, and John had a Frog Jumping competition. The four frogs' final distances were two feet, three feet, four feet, and six feet. Use the clues below and see if you can figure out how far each person's frog jumped.

- Matthew's frog jumped further than John's and Lauren's but not as far as Robby's.
- Matthew's frog jumped twice as far as John's.

Deductions

2 feet: Lauren

3 feet: John

4 feet: Matthew

6 feet: Robby

Step 3: Teaching and understanding

Teacher introduced the definition of deduction. Some examples were provided to show students how to make deduction exactly.

Deductive reasoning has generally been thought of as involving mathematically well-defined procedures for drawing out consequences which follow with certainty or of necessity from some body of evidence (Lassiter and Goodman,

2014).

The inference from a case and a rule to a result is called deduction. Deduction is a necessary inference.

Deduction, in which particular instances are deduced to follow from general laws or assumed premises.

Deduction involves going from a general premise to a particular conclusion.

Deduction

Rule: All beans in this bag are white

Case: These beans are from this bag

Result: These beans are white

Induction is the inference from a case and a result to a rule. Induction has often been used to describe the creation of new rules.

Induction, in which general laws are induced from particular examples or instances.

Induction goes from particular cases to a general conclusion:

Induction

Case: These beans are from this bag

Result: These beans are all white

Rule: All beans in this bag are white

Deductive validity

It is one important standard/test to judge and evaluate inferences and arguments.

The test to decide whether an inference is deductively valid is this: Can you think of any way the reason (s) could be true and the conclusion false (however unlikely)?

If the answer to this question is 'No', then the inference- the move from reasons to conclusion- is deductively valid.

Thus, if an argument is deductively valid, the truth of its reasons absolutely guarantees the truth of its conclusion; if the reasons are true, the conclusion must be true- there are no other possibilities.

For example: Andy is taller than Bessie, and Bessie is taller than Charlie, therefore Andy is taller than Charlie.

There is no way the reasons could be true and the conclusion false. So, this is a deductively valid argument.

The pattern is: If A then B and if B then C, so if A then C.

Another example: If the consumption of petrol by cars across the world is not significantly reduced soon, exhaust emissions will continue to damage the ozone layer. Since petrol consumption will not be reduced, car exhaust emissions will continue to damage the ozone layer.

The pattern is: If A then B and A is true, so B must be true.

The example of not deductively valid:

If the world's climate is getting warmer, we should find that some of the ice at both the North and the South Pole is melting at an unusually high rate. If the ice is melting, we should see its effect in the raising of the level of the sea. There is evidence that this level is increasing, so the world's climate must be getting warmer.

With the added assumption 'there is no other possible explanation', which makes the argument deductively valid.

Are they deductively valid arguments?

Tom hates everyone Mary loves, and Mary loves Tom. So, Tom must hate himself. (It is deductively valid, but if it means Tom hates everyone Mary loves other than himself, then it is not deductively valid.)

If people who claim to have been abducted by aliens really have been abducted, then we would need to take reports of UFO sightings very seriously. However, such claims are very unlikely to be true. Therefore, we do not need to take reports of UFO sightings seriously. (Not deductively valid)

Step 4: Application: Group work -Deductive reasoning

Students were divided into small groups to complete the task:

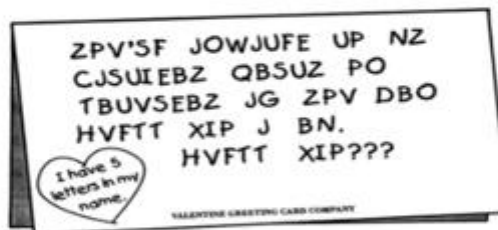
- Read the provided information carefully (The Mystery Valentine)
- Discuss the clues with other people in the group
- Complete the deduction step by step collaboratively
- Reach an agreement in each group

The Mystery Valentine

The background information: Your friend Anthony has received a mystery valentine card on February 14. There is no name on the card, and it could have been from someone in his class. Could you help Anthony to find out who sent him the mystery valentine card?

Step One: A coded message

There is a coded message on the card. Read it carefully and try to figure out the meaning of it.



Hint: "HVFTT XIP???" = "GUESS WHO???"
"J" could be "A" or "I"

According to the hint, the coded message said:

Step Two: A birthday clue

The message above is inviting Anthony to a birthday party. You now need to find out who has a birthday in February. There are following clues:

1. Tony and Amber were both born on Abraham Lincoln's birthday.
2. Chris's birthday is three weeks before Amber's.
3. Peter celebrates his birthday once every four years.
4. Holly's birthday is one week before Peter's.
5. Eric and Daisy have birthdays in the same month, but no one else in their class has birthday during this month.
6. David shares a birthday with Martin Luther King.

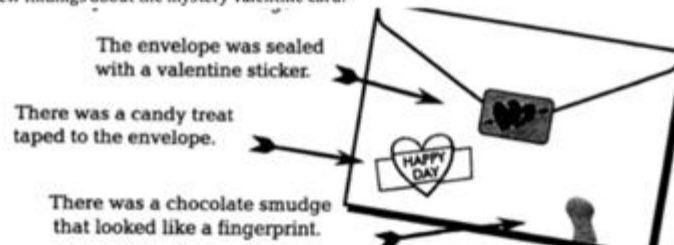
	January	January	February	February	February	February	March	March
Tony								
Amber								
Chris								
Peter								
Holly								
Eric								
Daisy								
David								

Step Three: More clues

Now you have found there are four students might send Anthony an invitation to a birthday party in February. You can list them below and make some notes with more information:

Name ↴	Notes ↴

New findings about the mystery valentine card:



Information about those students:

1. Tony, Amber, Peter, Chris and David sealed their valentine envelopes with valentine sticker.
2. At treat time, Amber had a chocolate-covered biscuit, Chris had a chocolate cupcake, and Holly had a brownie.
3. Amber, Peter, Eric, and Daisy taped candy treats to their valentine envelopes.

Your Conclusion:

The person who sent the mystery valentine was _____

This was the most likely person because _____

Step 5: Feedback -Group presentation

Students presented their answers. After the presentation, the teacher provided some feedback to their answers and the extent they had applied their thinking skills of deduction.

Step 6: Collaborative writing task

Students worked in pairs to complete an argumentative essay by encouraging them to use their CT skills of analysis, deduction, and evaluation.

They were asked to write about the following topic (at least 100/120 words) in pair: "What do you think about high school students involve in a love relationship? Use your logic and deduction skill to analyse from different perspectives. Give reasons and examples."

Week 8-Lesson Seven: Job recruitment

Objective: To be able to understand how to use the interpreting information skill

Teaching content: To introduce learners about how to interpret useful information critically, and to present some examples of it.

Step 1: Revision

Teacher reviewed what students had learned in last week about deduction. Students' understanding of this CT skill could be reinforced.

Step 2: Activated activity

Teacher used a Fact or Opinion activity to activate students' interest in interpreting information skill, and to encourage them to think.

Fact or Opinion Activity

(Read following statements, are they facts or opinions?)

	Fact	Opinion
The earth is round.		
I didn't have a coat.		
We think Mark stole the car.		
The church is the tallest building in the town.		
I believe he can win.		
My favourite colour is red.		
The temperature outside is 20 degrees.		
You might get wet if you forget your umbrella.		

(Read following information, can you find out three facts and two opinions?)

I've got a new car. It is blue. I think it is fantastic! It goes very fast and makes me feel special. People will think I'm really cool driving this car. I worked hard and saved up a lot of money (10 thousand dollars) to buy it.

Facts:

The car is new; The car is blue;

The car cost 10 thousand dollars.

Opinions:

The car is fantastic; Driving this car is really cool.

The car costs a lot of money.

Step 3: Teaching and understanding

Teacher introduced the skill of interpreting information. Some examples were provided to show how to interpret information successfully.

1. Introduction of interpretation:

Interpretation: understanding or explanation of something

Two teams play a game. The result of the match will be the same, no matter which side you are on, but your view of the match will be different –that is interpretation.



The picture above can be interpreted as two faces or a cup.

2. Information in context:

The process of reasoning often encounters a need for clarification. Terms may be used, or claims may be made, whose meaning is unclear, vague, imprecise or ambiguous. In order to evaluate an argument skilfully we must first understand it; this means not only being reasonably clear what reasons, conclusions and assumptions are being presented, but also being reasonably clear what all of these mean (Fisher, 2011).

Categorizing information is an essential process that helps us to recognize links between different kinds of information. This enables us to: compare information more easily; contrast information more easily; and refer to sets of information as a group, so that our account is more succinct (Cottrell, 2012).

In our writing context, we can simply interpret and categorize whether the provided information is fact or author's opinion.

Fact: is a true statement. It is something that can be shown to be true, to exist, or to have happened.

Opinion: is a personal view. It can be a statement that tells what someone thinks about an issue. It also can be the views held by most people.

For example:

Pizza is delicious. Pizza comes from Italy.

Running man is boring. Running man is a TV program about reality show.

3. Interpreting as a reader

Interpretation is particularly important to critical thinking. Donaldson (1978) found that people often get questions wrong because they do not adhere closely enough to what is asked or stated.

Incorrect interpretations can arise because reading is either over-focused on small details or it pays insufficient attention to details. Some common mistakes are:

- Over-focused reading: the reading is too slow, focusing excessively on individual words and sections of the text. Although close reading is a necessary part of critical reading, it is also important to interpret specific details in the wider context of the argument and the theoretical perspective.
- Insufficient focus: the reading is too superficial, taking in the big picture but lacking a sense of how the main theories and arguments are supported by specific details and evidence.
- Insufficient attention to the exact wording: missing out essential words such as 'not', or not following the exact sequence closely.
- Failing to draw out correctly the implications of what is stated.

In order to interpret texts accurately, it helps to vary the focus of attention when reading, alternating between:

- The big picture and the fine detail;
- A consideration of the exact words and unstated implications and assumptions.

(Cottrell, 2012)

Look at the picture for 30 seconds, then try to answer questions on them without the picture.



1. Briefly describe what you saw in the picture.
2. What type of event is this?
3. How many students were directly in front of the performer?
4. What colour was the performer's shoes?

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4. Interpreting as a writer

It is common in argumentative contexts for there to be some lack of clarity about what is meant.

The thinking map of clarifying ideas skilfully

1. What is the problem? (Is it vagueness, ambiguity, a need for examples, or something else?)
2. Who is the audience? (What background knowledge and beliefs can they be assumed to have?)
3. Possible sources of clarification:
 - a) a dictionary definition,
 - b) a definition/explanation from an authority in the field,
 - c) deciding on a meaning; stipulating a meaning.
4. Ways of clarifying terms and ideas:
 - a) giving a synonymous expression-or paraphrase,
 - b) giving necessary and sufficient conditions,
 - c) giving clear examples,
 - d) drawing contrasts,
 - e) explaining the history of an expression.
5. How much detail is needed by this audience in this situation?

Step 4: Application: Group work -Job recruitment

Students were divided into small groups to complete the task:

- Read the provided information individually and carefully
- Share and interpret the information with group members
- Discuss and analyse information to make a conclusion.

Holiday Inn hotel Recruitment Scheme

Read the information below, interpret and analyse the given information to make a final decision.

Situation: you and your partners are the owners of Holiday Inn hotel in a remote ski resort in France. You need an experienced assistant hotel manager, to help with the running of the hotel.

The duties would include: running the reception and hotel office; organising part-time staff when they are needed; Helping out in the restaurant in busy periods; child care for the hotel manager when she is away on business for her 8-year-old son and 5-year-old daughter.

Candidates: an international employment agency has short-listed 3 candidates:

<p>CV</p> <p>Peter Bell</p> 	<p>CV</p> <p>Anne Johnson</p> 	<p>CV</p> <p>Jonas MacDonald</p> 
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Task: work in groups. You are the **interviewer** and are in charge of selecting the best one from the 3 candidates above.

- 1) Please read the information card carefully and make sure you understand everything.
DO NOT shows your card to anyone.
- 2) When you **all** finished reading the information on your card, then share your candidate information one by one and make notes in the table below.
 (Please **use** full sentences and **ask** questions when not clear. You **must not** discuss your ideas at this stage)

<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto; border-radius: 50%;"></div> <p style="font-size: 1.2em; font-weight: bold; margin-top: 10px;">Recruitment requirement</p>	<ol style="list-style-type: none"> 1. Be able to use French and English fluently. 2. Have some basic computer skills 3. Experience of hotel work 4. Skiing experience 5. Experience of caring for young children
---	---




Esier Advantages: Disadvantages: Others:
Anne Advantages: Disadvantages: Others:
Jonas Advantages: Disadvantages: Others:

3) Now discuss and analyse which candidate is the best choice according to the job duties and requirements, and then make the decision and give some reasons.

Group Decision:



Candidates' information:

<p>○</p> <p>Peter Bell Aged 28</p> 	<p>○</p> <ol style="list-style-type: none"> 1. Ex-professional skier. 2. Has a lot of experience with children-ski instructor in summer camps. 3. Can speak good Spanish, English and some German. 4. Be able to use computer very well. 	<p>○</p> <ol style="list-style-type: none"> 5. Retired from skiing due to a knee injury. 6. Friendly and enthusiastic, seems hard-working 7. Plans to open his own hotel in a ski resort—wants to get experience in all aspects of hotel work.
<p>○</p> <p>Anne Johnson Aged 35</p> 	<p>○</p> <ol style="list-style-type: none"> 1. Two years' experience as a nanny. 2. Several years' experience as a hotel receptionist 3. Can speak English and German very good. 4. A good skier 	<p>○</p> <ol style="list-style-type: none"> 5. Rather quiet and shy, but very pleasant. 6. Experience with young children 7. Excellent references from previous employers
<p>○</p> <p>Jonas MacDonald Aged 46</p> 	<p>○</p> <ol style="list-style-type: none"> 1. Eight years' experience as an assistant manager in a ski resort. 2. Can speak good French but hasn't used it for a long time. 3. Limited computer skills. 4. Cannot ski. 	<p>○</p> <ol style="list-style-type: none"> 5. Recently divorced and wants a complete change in his life. 6. Has a 7-year-old son and 4-year-old daughter—he will bring them with him if he gets the job. 7. Seems capable, flexible and friendly.

Step 5: Feedback -Group presentation

Students presented their answers. After the presentation, the teacher provided some feedback to their answers and the extent they had applied their thinking skills of interpreting information.

Step 6: Collaborative writing task

Students worked in pairs to complete an argumentative essay by encouraging them to use their critical thinking skills of interpreting and analysing information. They were asked to write about the following topic (at least 120/200 words) in pair: "Look at the job recruitment activity again, now if you are the candidates, which skill(s) do you think is the most important and will develop it to be a hotel manager assistant according to the job requirement? Why?"

Week 9-Lesson Eight: Conclusion

Objective: To be able to review and reflect what students had learned previously
Teaching content: To reflect previous teaching knowledge and critical thinking skills. To make sure students had learnt and understood what teacher taught them before.

Step 1: Activated activity

Teacher listed several logical questions for students to answer, which might encourage them to use their CT skills they had learned.

Try to answer the following questions by using your critical thinking:

- If one year has 7 months that have 31 days in them and 11 months that have 30 days in them, how many months have 28 days in them? **(12)**
- A woman gives a beggar 50p; the woman is the beggar's sister, but the beggar is not the woman's brother. How come? **(The beggar is her sister.)**
- Two men play five games of checkers. Each man wins the same number of games. There are no ties. Explain this. **(They are not playing with each other.)**
- What question can you never truthfully answer "yes" to? **(Are you asleep?)**
- I have two U.K. coins totalling 55p. One is not a 5 pence piece. What are the coins? **(50p piece and a 5p piece. One is not a 5p piece; the other is 50p)**

Step 2: Revision

This was the last lesson, so there was no teaching section. Instead of teaching new knowledge, teacher reviewed what they learnt last 7 weeks to make sure students have a clear understanding about what is critical thinking and how to use critical thinking skills to in their writing. The definitions and examples were offered again to guide students on applying critical thinking.

Critical thinking

Thinking from both sides, and open minded; It is about the ability to analyse and make connections, to use knowledge effectively, to solve problems and to think creatively and reflectively; It is about developing mental strategies.

Encourage exploration and discovery.

Learn to ask questions

Who?

What?

Where?

When?

Why?

How?

Feeling and emotions (social emotional domain)

Critical thinking skills we learnt:

The ability of analysing arguments

In logic and critical thinking, an argument is a list of statements, one of which is the conclusion and the others are the premises or assumptions of the argument (Fisher, 2011).

To give an argument is to provide a set of premises as reasons for accepting the conclusion. Arguments can also be used to support other people's viewpoints.

Examples: Motorcycle helmets have been proven to reduce the frequency of motorcycle related injuries.

Motor cyclists should wear a motorcycle helmet.

Motorcycle helmets have been proven to reduce the frequency of motorcycle related injuries, so motor cyclists should wear a motorcycle helmet.

Argument indicators are helpful to identify arguments, such as therefore, because, firstly, secondly...

Tips:

We should make statement with reasons.

We should develop the habit of giving good arguments.

Think about potential objections to your opinion (counter argument).

The ability of making assumptions

In critical thinking, 'assumption' refers to anything that is taken for granted in the presentation of an argument. These may be facts, ideas or beliefs that are not stated explicitly but which underlie the argument. Without them, the same conclusion would not be possible (Cottrell, 2011).

The context of an argument may influence its interpretation and evaluation. Arguments can carry quite different weights in the contexts of different countries and histories, where underlying assumptions and values are different (Fisher, 2011).

Examples: We should have expected that he could not control his temper, seeing he has red hair.

(all red-headed people are hot-tempered.)

Context of argument is important. Arguments can carry quite different weights in the contexts of different countries and histories, where underlying assumptions and values are different (Fisher, 2011).

The ability of making inferences and deductions

To come to a conclusion about something based on evidence.

Inference is to use observations, prior knowledge and experiences, and details or clues from the text to make connections and come up with ideas.

In arguments, we infer our conclusion from our reasons. Arguments always consist of both reasons and inferences, and 'inferences' are the moves we make from

reasons to conclusions.

Deduction is a kind of inference: the inference from a general premise to a particular conclusion. Deduction is a necessary inference.

Inference can have more than one correct answer, while deduction only has one correct answer.

Examples:

Are they deductively valid arguments?

Women's brains are on average smaller than men's, therefore women are less intelligent than men.

If you have memorized the key points in this book you will do well in the critical thinking examination. Now you do have memorized them, so you will do well in the exam.

The ability of interpreting information

Interpretation-understanding or explanation of something; people may have different interpretations of one thing.

Information needs clarification and categorization.

(Such as facts and opinions; advantages and disadvantages)

In order to interpret texts accurately, it helps to vary the focus of attention when reading, alternating between:

The big picture and the fine detail;

A consideration of the exact words and unstated implications and assumptions.
(Cottrell, 2012)

Thinking map for a writer:

Focused on topic, audience, sources and ways of clarification, and how much detail is needed.

Collaborative writing

"the co-authoring of a text by two or more writers"; a social process that involves negotiation, coordination, and communication.

Follow the process approach:

A- Pre-writing stage: including collecting, planning, organizing ideas, finding new words and vocabulary and producing an outline.

B- Drafting and writing stage: with the emphasis on writing a draft of the whole essay from beginning to end. The main priority of this process is to use the ideas and vocabulary they had collected together during the pre-writing stage in their writing.

C- Revising stage: concentrating on the consistency of sentences: for instance, the use of tenses, changing unsuitable vocabulary and reorganizing paragraphs or sentences.

D-Editing stage: concerned with issues of linguistic accuracy such as spelling,

grammar and punctuation.

Elements of argumentative essay: position, reason, evidence/example, assumption, conclusion, counter argument, hypothetical reasoning.

Step 3: Application: Group work -Decision making

Students were divided into small groups to complete the task:

- Look at the provided information carefully (balloon debate)
- Discuss with group members
- Make decision with your critical thinking skills
- Reach an agreement in each group

The Balloon Debate

To work together with your group members and make a decision according to the information below.

The background information: High above the ocean, there is a hot air balloon. Inside the basket of the balloon are 6 people: a football player, a doctor, a biology teacher, a farmer, a gardener, and a policeman. The balloon is heading to the desert island.



The problem: There are so many people in the basket that the balloon cannot arrive the desert island in safety. You have to decide which 2 people will be thrown from the balloon and which other 4 people will survive to arrive the desert island.

Hint:

You can think about the skills needed on the desert island, any useful skills that your character has based on their occupation, and any extra skills your character might have from hobbies or younger life.

Step One: try to find out the skills or advantages of the six characters

The football player



The doctor



The biology teacher



The farmer



The gardener



The policeman



Step Two: making decision

Which 2 people will be thrown off the balloon? And what are your reasons?

Step 4: Feedback -Group presentation

Students presented their answers. After the presentation, the teacher provided some feedback to their answers and the extent they had applied their CT skills.

Step 5: Collaborative writing work

Students worked in pairs to complete an argumentative essay by encouraging them to use their critical thinking skills.

They were asked to write about the following topic (at least 250 words) in pair: "Look at the balloon debate activity again, which two people do you think can survive in the desert island more successfully? Why?"

Appendix B: Marking Criterion for Writing

Critical & Integrative Thinking: Short Form

Washington State University 2009

Work No. _____ Rater Initials _____ Average Score _____

For each of the seven criteria below

- a) identify specific phrases on the accompanying longer form which describe the work, and
- b) circle a numeric score on the short form for each criteria. Notes:
 - A score of 4 represents competency for a student graduating from WSU
 - Assess by *what is appropriate to the specific context/task*. Not all criteria / descriptors apply to every communication mode or assignment.
- c) average all the scores and entering that number above, with your initials and paper no.

1. Issue Identification and Focus

0 - Absent	1 - Minimal	2 - Emerging	3 -Developing	4 -Competent	5 - Effective	6 - Mastering
This dimension focuses on identifying, focusing on and thoroughly exploring the issue and significant underlying or implicit issues, aspects, or relationships integral to effective analysis.						

2. Context and Assumptions

0 - Absent	1 - Minimal	2 - Emerging	3 -Developing	4 -Competent	5 - Effective	6 - Mastering
This dimension focuses on the context, scope and assumptions connected to the issue, considering other integral contexts, background information, and the challenges regarding complexity and bias. Work demonstrates understanding of social, political, and ethical implications.						

3. Sources and Evidence

0 - Absent	1 - Minimal	2 - Emerging	3 -Developing	4 -Competent	5 - Effective	6 - Mastering
This dimension focuses on search, selection, and source evaluation skills—including accuracy, relevance, and completeness. High scores effectively analyze and integrate multiple appropriate pieces of evidence, acknowledge biases, and distinguish correlations from causal relationships.						

4. Diverse Perspectives

0 - Absent	1 - Minimal	2 - Emerging	3 -Developing	4 -Competent	5 - Effective	6 - Mastering
This dimension focuses on identifying and integrating diverse relevant perspectives, including contrary views and evidence.						

5. Own Perspective

0 - Absent	1 - Minimal	2 - Emerging	3 -Developing	4 -Competent	5 - Effective	6 - Mastering
This dimension focuses on ownership of an issue, indicated by the justification and advancement of an original view or hypothesis, recognition of own bias, and skill at integrating multiple perspectives or interpretations.						

6. Conclusion

0 - Absent	1 - Minimal	2 - Emerging	3 -Developing	4 -Competent	5 - Effective	6 - Mastering
This dimension focuses on integrating previous dimensions and identifying conclusions or consequences / pulling the work together, as a professional, ethical, and socially-responsible citizen. May provide future action, outcome, significance, issue summary or essence, overarching question.						

7. Communication

0 - Absent	1 - Minimal	2 - Emerging	3 -Developing	4 -Competent	5 - Effective	6 - Mastering
This overarching meta-dimension focuses on intentional and purposeful strategies to communicate an identified purpose and message while managing relationships and affect with intended audiences, with particular resources and constraints. May include delivery/mode, media, activities, interactions, rhetorical moves, tone, style, language, and conventions.						

Appendix C: Taxonomy of Language Functions

(Adapted from Li and Kim, 2016)

Language Functions		Definition
Initiating (I) (Proposing new ideas or initiating peer interaction)	Clarifying	Stating, clarifying, identifying, describing (but not explaining) or defining one's new idea, or the idea discussed earlier, posting, writing content or sharing information. E.g. I support the idea. / I choose the doctor and the policeman.
	Suggesting	Offering suggestions about writing structure and format etc. E.g. I think we can divide it into several parts to support it.
	Eliciting	Inviting or eliciting opinions, comments, etc. from others. E.g. Just say something. / Which two person you chose?
	Interpreting Information	Explaining and elaborating on self's or others' ideas with more details. E.g. I think this means... so I ...
	Asking Question	To confirm or clarify others' idea by asking questions. E.g. What is it?
	Exemplifying	Providing examples to support the ideas. E.g. For example, sometimes they will cheat us.
Responding (R) (Reacting to others' ideas)	Clarifying	Stating, clarifying, identifying, describing (but not explaining) or defining one's idea to respond to others. E.g. I think you said that the doctor can cure others...
	Suggesting	Offering suggestions about writing structure and format etc. to respond to others. E.g. OK, I understand, maybe you also can add one sentence here.
	Eliciting	Inviting or eliciting opinions, comments, etc. from others. E.g. Keep saying. / Can you tell me the reasons?
	Interpreting information	Explaining, elaborating, and contributing further new information to support the ideas.
	Supplementing	Adding information to respond to and supplement other's uncomplete ideas. E.g. A: Yeah, and... B: to shoot the animal
	Asking Question	To confirm or clarify others' idea by asking questions. E.g. Policeman?
	Criticising	Tend to express disapproval and further inquiry by asking questions. E.g. Why should we be careful?
	Exemplifying	Providing examples to support the ideas. E.g. A program, for example.
	Agreeing	Expressing agreement with others' viewpoints without reasons. E.g. Yes, you are right.
	Disagreeing	Expressing disagreement with others' viewpoints without reasons. E.g. No, I don't think so.
	Arguing and Justifying:	Expressing disagreement or agreement with others' ideas or defending one's own ideas with reasons. E.g. No, we suppose she has... because...
	Confirming and Acknowledging:	Making confirmation or acknowledgment of others' ideas, comments, and capabilities. E.g. Good job. / Yeah, that is it.
	Concluding:	Making conclusion or rephrasing earlier ideas. E.g. What you mean is he..., so...

(Note: Language functions highlighted with the colour of blue are categorized as CT-related; The examples were directly drawn from the current intervention, and language errors were not removed)

Appendix D: Interview Questions

Interviews with students

课后访问

Part One: about critical thinking

第一部分：有关辩证思考能力的调查

1. Did you know what critical thinking was about and how to use it before this study?

(Probe: Were you taught about critical thinking and how to use it before this study? And if you did, what was your definition of critical thinking previously?)

你在这次实验之前知道什么是辩证思考（或者曾经学习过辩证思考）并如何应用它吗？如果听说过，那你之前对辩证思考的定义（或者理解）是什么？

2. Did you consider yourself a good critical thinker previously?

(Probe: What you do thinking about yourself as a critical thinker now?)

你觉得自己以前擅长辩证思考吗？你认为你现在的辩证思考能力有没有得到进步？

3. Do you think teaching critical thinking help with your English writing skill?

(Probe: Do you think teaching critical thinking help with your language learning?) Why or why not?

你认为辩证思考能力的提高对你的英语写作水平（和英语语言学习）有帮助吗？为什么？

4. In general, do you think learning critical thinking skills is beneficial in your study and life? If you do, try to show how is that important?

总的来说，你觉得学习辩证思考能力是一件有价值的事情吗？（它重要吗？或是有用吗？）如果你觉得有价值，请试着举例说明。

Part Two: about collaborative writing

第二部分：关于协同写作

1. Did you know what collaborative writing was about **before**?

在这次实验前你知道什么叫做协同写作吗？

(Probe: Have you experienced collaborative writing before?)

你以前有过协同写作的经历吗？

2. Which writing style do you prefer in class? Individual writing, cooperative

writing, or collaborative writing?

在课堂上你更喜欢哪种写作方式？独自写作、合作写作还是协同写作？

3. How do you evaluate the collaborative writing activity according to your experience? Give examples and reasons.

你如何评价这次有关协同写作的体验？请具体举例说明。

（比如有哪些利和弊；是增加或是减少了写作压力？）

4. **During the writing process**, how did you work (interact) with to your partner?

在写作过程中你是如何与你的搭档合作交流的？（请简单描述一下你们的协同过程）

5. During the writing process, did you ever disagree with your partner? If you did, when the disagreement happened, and how did you two solve your differences?

在写作过程中，你和你的搭档有意见不统一的时候吗？如果有，是在什么样的情况下，你们又是如何解决这种不统一的呢？

6. During the writing process, did you use any critical thinking skills? If you did, could you give me an example of how and when you used it?

在写作过程中你有应用你的辩证思考技能吗？如果有，你是如何使用的？（在哪种情况下使用的）

7. During the writing discussion, did you use more Chinese or English? And when did you use them?

在写作讨论过程中，你们是常常用英语还是用中文交流？（哪个比重大？或者是一半一半？）通常是在讨论什么的情况下用？

8. Do you think collaborative writing is a useful strategy to improve students' critical thinking skills? Why or why not?

你觉得协同写作这种方式可以有效的提高一个学生的辩证思考能力（和英语写作水平）吗？请说说原因。

9. Any suggestions for further study?

请问你对如何改进这个课程有什么建议吗？或者有该课程什么不足之处？（课程时间和协同的方式等）

Appendix E: A Sample Test of W-GCTA

(adapted from Watson and Glaser, 2014)

Watson-Glaser critical thinking appraisal (Test A)

华格批判性思考技能测量表（A 卷）

Name 姓名:

Gender 性别:

Date 日期:

0

Part One: Analysing Arguments

第一部分：分析论证

Instructions:

When making important decisions, it is useful to be able to distinguish between a strong argument and a weak argument. A strong argument is both important and directly related to the question. A weak argument is not directly related to the question, or is of minor importance or may be related to a trivial aspect of the question, or confuses correlation with causation (incorrectly assuming that because two things are related, they cause each other to happen).

In this series of questions, each question is followed by a series of arguments. For this section you must regard each argument as true, regardless if it is weak or strong.

If you consider an argument to be strong, select "Strong Argument", or if you consider an argument to be weak, select "Weak Argument". Judge each question and argument individually. Try not to take into account individual opinion or general knowledge since each argument is considered to be true.

测试说明：

能有效的区分强论证（说服力强的论证）和弱论证（说服力弱的论证）的能力在做重要决定的时候是十分有用的。强论证可以直接与问题相联系并且十分重要。而弱论证与问题不直接相关，或者是与问题不重要的部分相关，甚至造成因果关系的混乱（例如：错误的假设两者之间有联系所以彼此可以互相促进。）

该部分测试的所有问题和陈述，每个问题都跟随了几个论证。这些论证不论是说服力强的还是弱的，都是确实有效的论证。

如果答题者认为某个论据是有说服力的论证，请在“强论证”右边打钩。如果答题者认为某个论据是无力的论证，请选择“弱论证”。请每个答题者独立作答。并且因为测试中的所有论证都被认为是真实有效的，所以请答题者不要在做判断的时候代入个人的情绪和相关知识信息。

Statement One 陈述一:

“Should motor cyclists be legally obliged to wear a motorcycle helmet?”

“在法律上，应不应该要求骑摩托车的人骑车时必须带安全帽？”

1. Argument One: Yes; motorcycle helmets have been proven to reduce the severity and frequency of motorcycle related injuries.

论证一：应该，因为安全帽已经被证明可以减少因骑摩托车而受伤的严重程度和降低伤亡的发生频率。

Strong Argument 强论证

Weak Argument 弱论证

2. Argument Two: No; car users are not forced to wear helmets so neither should motor cyclists.

论证二：不应该，开汽车的司机并没有被要求戴安全帽，所以骑摩托车的人也不应该。

Strong Argument 强论证

Weak Argument 弱论证

3. Argument Three: No; motorcycle helmets limit a cyclist's range of vision, increasing the likelihood of injury or death.

论证三：不应该，安全帽限制了骑摩托车的人的视野，这也会导致受伤和死亡概率的增加。

Strong Argument 强论证

Weak Argument 弱论证

4. Argument Four: Yes; governments are entitled to enact laws deemed necessary and useful.

论证四：应该，政府部门有权利制定他们认为必须且有用的法律。

Strong Argument 强论证

Weak Argument 弱论证

Statement Two 陈述二:

“Should basic human rights be extended to other great ape species?”

“基本的人权应不应该适用到其他类人猿种族身上？”

5. Argument One: Yes; scientific testing on animals is a morally wrong act and should therefore be outlawed.

论证一：应该，因为在动物身上做科学实验是不道德的事情，所以应该被宣布非法。

Strong Argument 强论证

Weak Argument 弱论证

6. Argument Two: No; the use of great ape species in scientific research will lead to life saving medicines for human beings.

论证二：不应该，类人猿在科学实验中可以帮人类找到拯救生命的药物。

Strong Argument 强论证

Weak Argument 弱论证

7. Argument Three: Yes; great apes are intelligent beings, which are being harmed due to their lack of human rights unnecessarily.

论证三：应该，类人猿是有智生命，如果他们没有基本的人权保障就会受到不必要的伤害。

Strong Argument 强论证

Weak Argument 弱论证

8. Argument Four: Yes; keeping wild animals in zoos negatively affects the numbers of wild populations of animals.

论证四：应该，把野生动物关在动物园里会对野生动物的数量造成消极影响。

Strong Argument 强论证

Weak Argument 弱论证

Statement Three 陈述三：

“Should governments provide tax relief for renewable energy production?”

“政府部门应不应该对可再生能源产品提供税款减免？”

9. Argument One: No; renewable energy costs more to generate than it makes through sale, making renewable energy sources non-viable, costing the government money.

论证一：不应该，生产可再生能源的成本高于其市场价值，无法形成良性可再生能源生产，而且造成政府额外支出。

Strong Argument 强论证

Weak Argument 弱论证

10. Argument Two: Yes; Tax relief would help encourage consumers to lower their carbon footprint, preventing global warming.

论证二：应该，税款减免对鼓励消费者减少碳排放量有帮助，可以防止全球变暖。

Strong Argument 强论证

Weak Argument 弱论证

11. Argument Three: Yes; holes in the ozone layer could potentially threaten human populations.

论证三：应该，臭氧层空洞可能威胁人类。

Strong Argument 强论证

Weak Argument 弱论证

12. Argument Four: No; governments use tax income to fund important public services, such as healthcare and education.

论证四：不应该，政府部门需要用税收来支持重要的公共设施建设，例如医疗保健和教育。

Strong Argument 强论证

Weak Argument 弱论证

Statement Four 陈述四：

“Should schools provide free school meals to students from low income families?”

“学校应不应该给低收入家庭的学生提供免费的学生餐？”

13. Argument One: No; school meals would not be provided to middle income family students.

论证一：不应该，因为来自中产阶级家庭的学生没有免费的学生餐。

Strong Argument 强论证

Weak Argument 弱论证

14. Argument Two: Yes; free school meals have been provided as standard until recently.

论证二：应该，因为最近，提供免费的学生餐已经愈加成为学校的标准配置。

Strong Argument 强论证

Weak Argument 弱论证

15. Argument Three: No; children will take advantage of the system in order to gain free meals.

论证三：不应该，学生们会利用该体系来获得免费的学生餐。

Strong Argument 强论证

Weak Argument 弱论证

16. Argument Four: Yes; free school meals will lower the child's living costs, saving low income families money.

论证四：应该，免费的学生餐将会减少学生的生活开销，帮助低收入家庭省钱。

Strong Argument 强论证

Weak Argument 弱论证

Part Two: Assumptions

第二部分：做假设

Instructions:

An assumption is something which is presumed or taken for granted. When a person says "I will see you tomorrow", it is taken for granted that they will be around tomorrow, and that they will not have last-minute plans which prevent them from seeing you tomorrow.

In this section you will be provided with a number of statements. Each statement will be followed by a series of proposed assumptions. You must decide which assumptions are logically justified based on the evidence in the statement. If you think that the assumption is taken for granted in the statement, and is therefore logically justified, select "Assumption Made". If you think that the assumption is not taken for granted in the statement, and is not therefore logically justified, select "Assumption Not Made". Remember to judge each question individually and base your responses on the statements provided.

测试说明：

做假设是指认为某件事或者某样东西理所当然。例如，当一个人说“明天见”，我们就理所当然的认为他明天也会露面，并且他没有其他临时的计划妨碍你们明天见面。

该部分测试的所有问题和陈述，每个问题都跟随了几个假设。基于相对应的陈述，答题者需要对每个假设做出有根据的判断。如果你认为某个假设基于该陈述是理所当然的，请在“假设成立”右边打钩。如果你认为某个假设基于该陈述是不成立的，请选择“假设不成立”。

请每个答题者独立作答，并根据给出的陈述做出选择。

Statement One 陈述一:

"In order to gain a competitive advantage over our competitors, the company's marketing budget must be increased."

“为了在与其他企业的竞争中占据优势，我们企业必须增加营销预算。”

1. Assumption One: The company's marketing budget is failing the company.

假设一：该企业的营销预算是失败的。

Assumption Made 假设成立

Assumption Not Made 假设不成立

2. Assumption Two: The current marketing budget does not provide a competitive advantage.

假设二：该企业现在的营销预算没有竞争优势。

Assumption Made 假设成立

Assumption Not Made 假设不成立

3. Assumption Three: The company's competitors currently have a competitive advantage over the company.

假设三：其他竞争企业现在是处于优势的。

Assumption Made 假设成立

Assumption Not Made 假设不成立

Statement Two 陈述二:

"As the standard of living continues to improve in China, Chinese companies will eventually lose business to countries which pay their workers lower wages and can therefore offer lower production costs."

“在中国，随着人们基本生活水平的持续提高，中国企业将最终不敌那些处于工资水平较低的国家，而且能够降低生产成本的同行企业。”

4. Assumption One: Chinese companies are paying higher wages than competitor countries.

假设一：中国企业现在支付给员工的薪酬比其他国家的同行竞争企业要高。

Assumption Made 假设成立

Assumption Not Made 假设不成立

5. Assumption Two: Low production costs will help to attract business.

假设二：低生产成本将有利于商业竞争。

Assumption Made 假设成立

Assumption Not Made 假设不成立

6. Assumption Three: Production costs in China depend on the national standard of living.
假设三：中国的生产成本的高低取决于国民基本生活水平的高低。

Assumption Made 假设成立

Assumption Not Made 假设不成立

Statement Three 陈述三：

"Individuals of all ages need to ensure they engage in at least 30 minutes of exercise per day, at least 5 days per week."

“每个年龄阶层的人都应该至少保证每周至少五天，每天 30 分钟的锻炼。”

7. Assumption One: 20 minutes of exercise per day is insufficient.
假设一：每天 20 分钟的锻炼是不足的。

Assumption Made 假设成立

Assumption Not Made 假设不成立

8. Assumption Two: Exercise is essential for maintaining good health at all ages.
假设二：锻炼有利于每个年龄阶层的人保持身体健康。

Assumption Made 假设成立

Assumption Not Made 假设不成立

9. Assumption Three: Individuals are responsible for the amount of exercise they undertake.
假设三：每个人都要保证自己有一定的运动量和运动时间。

Assumption Made 假设成立

Assumption Not Made 假设不成立

Statement Four 陈述四：

"When making job applications, it is essential that application forms are completed clearly, honestly and comprehensively in order to maximize your chances of getting hired."

“在申请工作的时候，保证申请表内容的简明、真实、并且易懂，能最大限度的提高你被录取的机会。”

10. Assumption One: Honesty is an important part of a successful job application.

假设一：诚实这个品格在申请工作的过程中是成功的重要因素。

Assumption Made 假设成立

Assumption Not Made 假设不成立

11. Assumption Two: A well written application form guarantees a successful job application.

Part Three: Deductions

第三部分：推断

Instructions:

In this section, a statement will be provided followed by a series of suggested conclusions. Here, you must take the statement to be true. After reading each conclusion underneath the statement, you must decide whether you think it follows from the statement provided. If you agree that the conclusion exactly follows the statement, choose Conclusion Follows. However, if you do not agree that the conclusion exactly follows then choose Conclusion Does Not Follow. You must select your answer based only on the information presented; not using general knowledge. Similarly you are

Statement One 陈述一:

"The world trade organization (WTO) is an organization headquartered in Switzerland, tasked with supervising and liberalizing international trade between nations. The WTO is comprised entirely of 159 member states, and 25 observer states, with 14 states being neither members nor observers. Accession to membership involves an application, which involves becoming an observer state prior to accession. Iran is currently the largest non-member economy and Tajikistan being the organization's newest member."

"世界贸易组织(WTO)总部设立于瑞士,负责监管国际贸易并让贸易自由化。该组织由159个成员国和25个观察员国组成。有14个国家既不属于世界贸易组织的成员也不属于该组织的观察员。想要注册成为该组织的成员国需要申请,并在成为正式成员国之前会先成为观察员国。伊朗目前是世界贸易组织最大的非成员国,而塔吉克斯坦是该组织最新加入的成员国。"

1. Conclusion One: Iran is unaffiliated with the world trade organization.

结论一: 伊朗不属于世界贸易组织的一员。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

2. Conclusion Two: Tajikistan was an observer state before becoming a member.

结论二: 塔吉克斯坦在成为成员国之前曾是观察员国。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

3. Conclusion Three: There are more member nations of the world trade organization than there are non-member nations.

结论三: 世界贸易组织的成员国数量多于非世界贸易组织成员国数量。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

4. Conclusion Four: Switzerland is a member of the world trade organization.

结论四: 瑞士是世界贸易组织成员国的一员。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

Statement Two 陈述二:

"All members of staff are legally entitled to join a trade union (but most do not). All members of staff are legally obliged to wear a hard hat and high visibility jacket when at the work site and only non-union affiliated staff are not required to wear steel cap boots at the work site. Union affiliated staff are required to carry their union membership card"

and either wear their hard hat or high visibility jacket (but not both) when working offsite."

“在法律上，所有工人都有权利和资格加入一个工会（但大多数人没有加入）。在法律上，所有工人在建筑工地工作时都必须穿戴安全帽和安全夹克，而只有非工会成员在工地工作时不被要求穿安全鞋。工会所属成员在非建筑工地工作时，要求携带工会会员卡，并穿戴安全帽或者安全夹克（不要求同时都穿）。”

5. Conclusion One: Union affiliated staff must carry their union membership cards at all times.

结论一：工会成员必须一直带着他们的工会会员卡。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

6. Conclusion Two: A minority of staff are required to wear steel cap boots at the worksite.

结论二：只有小部分的工人被要求在建筑工地工作时穿安全鞋。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

7. Conclusion Three: Union affiliated staff may wear their high visibility jacket both offsite and at the worksite.

结论三：工会成员不论是在建筑工地工作还是在非建筑工地工作时，都可以穿安全夹克。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

8. Conclusion Four: When working offsite, all staff must bring their Union membership card.

结论四：当在非建筑工地工作的时候，所有工人都必须携带工会会员卡。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

Statement Three 陈述三：

"Both apes (classified into greater apes and lesser apes) and monkeys (classified into old world and new world monkeys) are the two constituents of the order of primates.

组成成分。所有的猿类没有可见的尾巴，而大多数猴子有可见的尾巴。猴子和小猿被认为是具有智能的动物，但是大猿类（包括人类、黑猩猩、大猩猩和红毛猩猩）被认为比任何种类的猴子都更智能。”

9. Conclusion One: Apes are considered to be more intelligent than monkeys.

结论一：猿类被认为比猴类聪明。

Conclusion Follows 结论成立

Conclusion Does Not Follow 结论不成立

10. Conclusion Two: Most primates have visible tails.

结论二：大多数灵长类动物有可见的尾巴。

Part Four: Inferences

第四部分：推论

Instructions:

An inference is a conclusion drawn from observed or supposed facts. For example, if someone presses a light switch but the light does not turn on, they might infer that the filament has burnt out. However, inferences may or may not be correct. For example, in this case, the bulb could be missing, or a fuse could be blown.

The questions in this section of the test will begin with a statement of facts that must be regarded as true. After each statement you will be presented with possible inferences which might be drawn from facts in the statement. Analyze each inference separately and decide on its degree of truth.

For each inference you will be provided with 5 possible answers: TRUE, PROBABLY TRUE, MORE INFORMATION REQUIRED, PROBABLY FALSE, and FALSE.

Select TRUE if you believe the inference is definitely true, i.e. it correctly follows beyond a reasonable doubt.

PROBABLY TRUE if, based on the facts at hand, you think the inference is PROBABLY TRUE; that it is more likely to be true than false, but not TRUE beyond a reasonable doubt.

MORE INFORMATION REQUIRED, if you decide that there is not enough data to make a

测试说明：

推论是指从观察到或者被告知的事实中得到的一个结论。例如，如果某人按下了电灯的开关但是灯却没有亮，那人们可能会推论灯丝被烧断了。但是推论不一定是正确的。例如在这个例子里，也有可能是灯泡不见了或者是保险丝融化了。

该部分测试中，每个陈述都被看做是确实有效的事实，每个陈述下面都会有几个可能的推论。答题者需要对每个推论进行分析，并在 5 种答案中作出判断。

Statement One 陈述一:

"The Barbary pirates were a loosely affiliated fleet of pirates and privateers originating from the Barbary states of north Africa. Pirates operating from ports of Tunis, Tripoli and Algiers plundered European and American ships, taking an estimated 800,000 to 1.25 million people for sale on the North African and middle eastern slave trade. Although officially constituents of the Ottoman empire, the Barbary states were largely autonomous dependencies. Following the independence of the USA from the British empire, the US government was forced to pay \$1 million dollars per year in ransom fees and tributes to secure the release of Americans captured by Barbary pirates. However, in response to Barbary piracy, in 1801 the USA declared war on the Barbary states and announced the commission of 6 extra frigates to protect America's interests in the region."

“巴巴里海盗是一个松散的海盗组织，曾隶属于北非诸国的私掠舰队。海盗们以突尼斯、的黎波里和阿尔及尔的港口为据点，掠夺欧洲各国和美国的来往船只，并将大约 80 万到 125 万的人卖到了北非和中东的奴隶市场。尽管行政上受土耳其帝国的管辖，北非诸国在很大程度上是自治管理的。随着美国从大英帝国的独立，美国政府每年被迫要向巴巴里海盗交付一百万美元的赎金和贡品来确保被掠夺的美国公民被释放。然而，1801 年，美国向巴巴里宣战并宣布由 6 艘额外的护卫舰来保护美国在该地区的利益。”

1. Inference 1: The Barbary pirates operated outside of North Africa.

推论一：巴巴里海盗在北非海域外活动。

True 正确的

Probably True 可能正确的

More Information Required 需要更多信息

Probably False 可能错误的

False 错误的

2. Inference 2: Prior to the USA's independence from the British empire, the Barbary states did not attack American ships.

推论二：在美国从大英帝国独立之前，巴巴里海盗没有袭击美国的船只。

True 正确的

Probably True 可能正确的

More Information Required 需要更多信息

Probably False 可能错误的

False 错误的

3. Inference 3: The Barbary pirates acted directly on behalf of the Ottoman empire.

推论三：巴巴里海盗的行为直接代表了土耳其帝国。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

4. Inference 4: The USA expanded the size of its navy as a response to the declaration of war.
推论四：美国扩展海军为了响应宣战而做出的部署。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

5. Inference 5: The US government continued to pay \$1 million dollars in ransom fees and tributes after the declaration of war.
推论五：美国政府在宣战后继续交付一百万美元的赎金和贡品。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

Statement Two 陈述二：

"Evaluating the effectiveness of work place training is frequently stated to be of high priority to training and development departments, along with organizations as a whole. However, the vast majority of organizations evaluate solely using reaction sheets, capturing employee's subjective opinion regarding the program's perceived effectiveness. However, reactions data has been shown to offer little predictive value as to the true effectiveness of the training program. Measuring reaction data however, is cheaper and more convenient than a more relevant, in-depth analysis of training outcomes, such as return on investment, improved knowledge/skills and increased job performance. The costs of training evaluation must be balanced with the costs of such methods, often leading to the omission of thorough training evaluation in organizations."

"对工作场所员工培训的有效性进行评估，常被企业培训和发展部门认为是至关重要的。"

但是，大部分的企业仅仅只用反馈表来进行评估，来获取员工对该项目的有效性的主观感知意见。这种主观反馈对培训项目的真正有效性只提供了很少的预测价值。然而，检测这些反馈信息比其他更深入的培训结果分析方法要更方便也成本更低。这些分析方法有：投资利润率、员工相关知识技能的提高和越来越好的工作表现。在培训评估上的花费总是与在该评估方法上的花费保持平衡，这常常导致了企业对整个培训详尽评估的疏忽。”

6. Inference 1: Most organizations do not collect training evaluation data.

推论一：大多数企业不收集培训评估的反馈信息。

True 正确的

Probably True 可能正确的

More Information Required 需要更多信息

Probably False 可能错误的

False 错误的

7. Inference 2: Reaction sheet data is the cheapest method of evaluating training programs.

推论二：用反馈表收集培训评估信息是成本最低的方法。

True 正确的

Probably True 可能正确的

More Information Required 需要更多信息

Probably False 可能错误的

False 错误的

8. Inference 3: Few organizations measure the direct return on investment of their training programs.

推论三：少量企业检测培训项目的投资利润率。

True 正确的

Probably True 可能正确的

More Information Required 需要更多信息

Probably False 可能错误的

False 错误的

9. Inference 4: Measuring employees increase in job performance offers greater predictive value of training program effectiveness compared to reaction sheet data.

推论四：与反馈表相比，检测员工们在工作表现上的成长能对评估培训的有效性提供更好的预测价值。

True 正确的

Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

10. Inference 5: Organizations rarely state that training evaluation is a high priority of theirs.

推论五：很少有企业认为对培训进行评估是他们的首要职责。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

Statement Three 陈述三：

"In ecological biology, a keystone species is a species of organism that exerts a disproportionately large effect on its environment, relative to its size and abundance. The term 'keystone species' was coined in 1969 by zoologist Robert Paine in order to explain the relationship between a species of starfish and its local environment. The classic example of a keystone species is the Sea Otter. Sea Otters feed on Sea Urchins and other grazers of kelp, keeping their numbers in check and preventing them from damaging underwater kelp forests. North Pacific areas which are devoid of Sea Otters are often urchin barrens, areas with large numbers of sea urchins, but little to no kelp. The Sea Otter therefore protects kelp forests from over grazing by Sea Urchins, maintaining the ecological balance of their local environment."

"在生态生物学中，微生物是一种基石物种。它能对它周边的环境产生很大的影响，这种影响和它的大小和丰富程度有关。‘基石物种’这个词语是在 1969 年由动物学家罗伯特·佩因首先提出的，用来解释一种海星和它当地生长环境的关系。海獭是基石物种的一个经典案例。海獭以海胆与其他食草海藻为食来抑制它们的数量，并防止水底的海藻森林被破坏。北太平洋地区如果缺少海獭就会常常形成海胆荒野。荒野上有着大量的海胆而很少有海藻。所以海獭可以防止海藻森林被海胆过度的吃掉，保证了当地环境的生态平衡。"

11. Inference 1: Sea Urchins are an example of a keystone species.

推论一：海胆是基石物种的一个例子。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息

Probably False 可能错误的
False 错误的

12. Inference 2: North Pacific Urchin barrens occur when Sea Otters abandon the area.
推论二：当海獭离开北太平洋区域时，海胆荒漠会出现。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

13. Inference 3: Kelp forests are vulnerable to grazing Sea Urchins.
推论三：海藻森林容易受到海胆的损害。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

14. Inference 4: Over hunting of Sea Otters leads to the damaging of Kelp forests.
推论四：过度扑捉海獭会导致海藻森林被破坏。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

15. Inference 5: The Sea Otter was the first stated example of a keystone species.
推论五：海獭是第一个基石物种的例子。

True 正确的
Probably True 可能正确的
More Information Required 需要更多信息
Probably False 可能错误的
False 错误的

Part Five: Interpreting Information

第五部分：解读信息

Instructions:

The following questions will consist of a passage of information, followed by a series of conclusions. You are instructed to assume all information in the passage is true. The task is to judge whether or not each of the proposed conclusions logically flows beyond a reasonable doubt from the information given in the paragraph.

If you think that a conclusion follows beyond a reasonable doubt (but perhaps not exactly, or necessarily, unlike in section 3), select "Conclusion Follows". If you think the conclusion does not follow beyond a reasonable doubt based on the facts given, select "Conclusion Does Not Follow". Do not use general knowledge when answering, only use the information provided in the passage. Remember to judge each conclusion individually.

测试说明：

该部分测试的所有问题和陈述都包含了一段信息，每段信息下面都有几个相关的结论。每段信息都假定为真实有效的信息。请答题者根据给出的信息对每个相关的结论做出有逻辑的判断。

如果答题者认为某个结论是可以从相关信息中得出的，请在“可得出结论”右边打钩。如果答题者认为某个结论是不能从已给的信息中得出，请选择“不可得出结论”。请每个答题者独立作答。并且请答题者不要在做判断的时候代入个人的情绪和相关知识信息，请仅用已给的信息做判断。

Statement One 陈述一:

"Biotechnology is the use of living organisms and systems to develop or make useful products, or provide services. Biotechnology may be used in the production of medicines, drugs or in agriculture. Similarly, industrial biotechnology has applications in industrial processes, such as eliminating hazardous chemicals. The use of biotechnology raises unique ethical issues regarding the role of living organisms in business."

"生物技术是指用各种生物体和生物系统来开发有用的产品或提供服务。生物技术可应用在医学产品、药物产品和农业产品上。同样，工业上的生物技术已经被应用在工业生产过程中。例如，消除有害化学物质。生物技术的使用引发了有机生物在商业使用中产生的相关道德问题的思考。"

1. Conclusion One: Biotechnology could include the application of genetically modified organisms.

结论一：生物技术可以包括转基因生物的应用。

Conclusion Follows 可得出该结论

Conclusion Does Not Follow 不可得出该结论

2. Conclusion Two: The use of living organisms in business is considered unethical.

结论二：生物体在商业中的使用被认为是不道德的。

Conclusion Follows 可得出该结论

Conclusion Does Not Follow 不可得出该结论

3. Conclusion Three: Using algae to remove a dangerous oil spill would be an example of biotechnology.

结论三：用海藻来消除危险的石油泄漏是有关生物技术的一个例子。

Conclusion Follows 可得出该结论

Conclusion Does Not Follow 不可得出该结论

Statement Two 陈述二:

"The terrestrial coconut crab is the world's largest living land arthropod. The coconut crab is a true crab, weighing up to 4kg, with a leg span of more than 3 feet. The coconut crab is a typical example of island gigantism, increasing in size due to the lack of predators on islands home to coconut crabs."

"椰子蟹是世界上现存最大的陆地节肢动物。椰子蟹是一种大螃蟹，体重可高达4千克，一条腿的跨度可长于3英尺（约等于91厘米）。椰子蟹是一个典型的岛屿巨型化的例子。它们数量的增长是由于它们所处的岛屿缺少其捕食者所导致的。"

4. Conclusion One: The coconut crab is the world's largest species of crab.

结论一：椰子蟹是世界上最大的蟹类。

Conclusion Follows 可得出该结论

Conclusion Does Not Follow 不可得出该结论

5. Conclusion Two: Attacks from predators have led to the increased size of the coconut crab.

结论二：来自捕食者的袭击会导致椰子蟹数量变多。

Conclusion Follows 可得出该结论

Conclusion Does Not Follow 不可得出该结论

6. Conclusion Three: The coconut crab may weigh over 3.5kg.

结论三：椰子蟹可能重于 3.5 千克。

Conclusion Follows 可得出该结论

Conclusion Does Not Follow 不可得出该结论

Statement Three 陈述三：

"Socialism is an economic system promoting social ownership of the means of production, along with cooperative management of the economy. Socialist theorists differ on the meaning of social ownership, with varying opinions on markets, central planning and total nationalization. Socialist economies are designed to satisfy human needs, rather than generate profit, as seen in a capitalist economy."

"社会主义是一种经济体制，能促进生产资料的社会公有制，和对经济的协同管理。社会主义理论家对社会公有制的定义有着不同的理解，并在市场，中央规划和全部国有化等问题上有着不同的主张。社会主义经济的出现是为了满足人类的需求，而不是为了像资本主义经济一样创造利润。"

7. Conclusion One: Socialism is against the private ownership of property.

结论一：社会主义反对财产私有制。

Conclusion Follows 可得出该结论

Conclusion Does Not Follow 不可得出该结论

8. Socialism may advocates a state run economy.

结论二：社会主义可能提倡国有经济。

Conclusion Follows 可得出该结论
Conclusion Does Not Follow 不可得出该结论

9. Capitalist economies do not satisfy human needs.
结论三：资本主义经济不能满足人们的需求。

Conclusion Follows 可得出该结论
Conclusion Does Not Follow 不可得出该结论

Statement Four 陈述四：

"A calendar effect is a market anomaly which appears to be related to the calendar. These effects may include stock market behavior on different days, times, months or seasons. The January effect involves an unexplained financial security price increase in the month of January, allowing investors to purchase stock in December and sell them the next month at a profit."

"日历效应是一种金融市场不寻常的现象。它的出现与日历日期有关。这些效应可能会在不同的日期、时间、月份、或是季节影响股票市场行为。一月效应是一种无法解释的金融现象，指证券市场在一月份的证券价格比其他月份的价格要高，导致投资者们在12月份买入股票再在1月份卖出而获利。"

10. Conclusion One: Investors can profit from market anomalies.
结论一：投资者可以从市场不寻常现象中获利。

Conclusion Follows 可得出该结论
Conclusion Does Not Follow 不可得出该结论

11. Conclusion Two: The cause of the January effect is not well understood.
结论二：导致一月效应的原因没有得到充分解释。

Conclusion Follows 可得出该结论
Conclusion Does Not Follow 不可得出该结论

12. Conclusion Three: Stocks and share prices are unrelated to specific dates.
结论三：股票和证券的价格和特殊的日期没有关系。

Conclusion Follows 可得出该结论
Conclusion Does Not Follow 不可得出该结论

Appendix F: A Sample of Initial Data Coding

Data-Student A and B

Instructions: vocabularies or sentences in () mean something they didn't speak out explicitly; vocabularies or sentences in " " mean something they wrote down or want to write when they were speaking; vocabularies or sentences in [] are the translations.

Below are episodes observed from the whole **Lesson 8**: wrote about which two people can survive in the desert island more successfully.

Started from 0:01 min to 2:09 min.

No.	Ss	Content	Language functions
1	A:	First, let's talk about which person you choose will be the... the...	
2		will be survive (in the desert island more successfully)? Which	Eliciting
3		two persons?	
4	B:	I choose the doctor and the policeman.	Clarifying-R
5	A:	Policeman?	Asking Question-R
6	B:	Yeah.	Confirmation-R
7	A:	So, at the beginning, can you told me what is the reason?	Eliciting
8	B:	Because, we think the doctor is good at curing when=	Elaborating-R
9	A:	=Curing?	Asking Question-R
10	B:	When somebody gets hurt, we can use...use ability to...to help him or her.	Elaborating-R
12	A:	But in desert, curing...he has no medicine or something to help...	Arguing-R
13	B:	No, we suppose she have...has, we suppose she has, because you	Justifying-R
14		don't know whether she has or not.	
15	A:	In desert, what the person... most im... most important (thing) is	Arguing-R
16		the water, but how you can cure, cure somebody in...	
17	B:	She knows Chinese medicine, so in the desert, desert land she	Justifying-R
18		can use the... 草药 to...	
20		[Chinese medicinal herb]	
21	A:	But I think... I think what we should point to, is about the	Arguing-R
22		survival ability, not to cure somebody or help somebody recover.	
23	B:	You...er...	Clarifying-R
24	A:	你可以用中文说，没事。我就是觉得你说医生她可以帮助救治别人。	Suggesting-R Clarifying-R
25		[You can speak Chinese, I think it's okay. I think you said that the	

Appendix G: Comparison of Coding of Language Functions

Pair One

Episode 1a: from Lesson Two (Helping beggars)

Turn	Ss	Content	Language functions	
			Coded by Colleague	Coded by Researcher
1	A:	随便说[<i>Just say something.</i>] I support the idea because some poor people are real...是真的穷啊, 一些情况 [<i>They are really poor, in some cases.</i>]	SUGGESTING-I; SELF-ELABORATING-I	Eliciting-I; Clarifying-R; Self-elaborating-I
2	B:	I think, I think we can divide it into...	SUGGESTING-I	Suggesting-I
3	A:	Ah?	ASKING QUESTION-R	Asking Question-R
4	B:	several parts to support it, we can, from the, start from the beggars. The beggars, how self and... What is it?	CLARIFYING-I	Suggesting-I; Asking Question-R
5	A:	嗯, 主要是这两个方面。 [<i>Yes, it's mainly these two parts.</i>]	AGREEING-R	Agreeing-R

Episode 3a: from Lesson Eight (Survival in desert island)

Turn	Ss	Content	Language functions	
			Coded by Colleague	Coded by Researcher
1	A:	First, let's talk about which person you choose will be the... the...will be survive (in the desert island more successfully)? Which two persons?	SUGGESTING-I; ASKING QUESTIONS-I	Eliciting-I
2	B:	I choose the doctor and the policeman.	CLARIFYING-R	Clarifying-R
3	A:	Policeman?	ASKING QUESTION-R	Asking Question-R
4	B:	Yeah.	CONFIRMING-R	Confirmation-R
5	A:	So at the beginning, can you told me what is the reason?	ELICITING-I	Eliciting-I
6	B:	Because, we think the doctor is good at curing when=	JUSTIFYING-R	Elaborating-R
7	A:	=Curing?	ELICITING-R	Asking Question-R
8	B:	When somebody gets hurt, we can use...use ability to...to help him or her.	ELABORATING-R	Elaborating-R
9	A:	But in desert, curing...he has no medicine or something to help...	CRITICISING-R	Arguing-R
10	B:	No, we suppose she have...has, we suppose she has, because you	JUSTIFYING-R	Justifying-R

Pair Two: Episode 4a: from Lesson Two (Helping beggars)

Turn	Ss	Content	Language functions	
			Coded by Colleague	Coded by Researcher
1	Y:	"In recent years, a strange..." 应该不是 [Should not be] "strange" ... hum...	ASKING QUESTION-I	Clarifying-I
2	S:	可以是, 因为之前很多人都帮了, 现在都不帮了, 可以是个很奇怪的现象. [It can be, because lots of people helped in the past, but they don't help now. It can be a strange phenomenon.]	DISAGREING-R; ARUGING-R	Acknowledging-R; Elaborating-R
3	Y:	可以写这个吗? [Can we write this?] "People are..." 这怎么读? [How to pronounce it?] "cau...tious"?	JUSTIFYING-R	Asking Question-R
4	S:	Cautious, cautious...	SUPPLEMENTIGN-R	Clarifying-R
5	Y:	"cautious...are very cautious, helping..."	SUPPLEMENTIGN-R	Clarifying-R
6	S:	"beggars"	SUPPLEMENTIGN-R	Supplementing-R
7	Y:	"hum... the beggars, especially..." 什么什么什么 [And what?]	SUPPLEMENTIGN-R	Asking Question-R

Pair Three: Episode 7a: from Lesson Two (Helping beggars)

Turn	Ss	Content	Language functions	
			Coded by Colleague	Coded by Researcher
1	D:	[I suppose, "we should not give beggars money, not give..."]	ARUGING-I	Suggesting-I
2	E:	["No, not give."]	AGREEING-R	Clarifying-R
3	D:	[Right]	AGREEING-R	Confirming-R
4	C:	["not give..."]	CLARIFYING-R	Clarifying-R
5	E:	["not give money..."]	SUPPLEMENTIGN-R	Supplementing-R
6	D:	["give food"]	SUPPLEMENTIGN-R	Supplementing-R
7	E:	[But we can provide other help.]	ARUGING-R	Arguing-R
8	D:	[Yes, just like food...]	AGREEING-R; SUPPLEMENTIGN-R	Agreeing-R
9	E:	[If he is a real (beggar), if he is a liar, if he is a liar...]	SUPPLEMENTIGN-R	Clarifying-R
10	D:	[If he only wants the money, then he is a liar]	SUPPLEMENTIGN-R	Supplementing-R
11	E:	[Yes, why real beggar needs money only.]	AGREEING-R; SUPPLEMENTIGN-R	Agreeing-R
12	C:	[Wait a second, here I have an example. If one child's parents are badly ill and living in a hospital, they need money, what will you do?]	EXAMPLING-R	Exemplifying-R
13	E:	[We can help the child by telling him/her to report this situation to the public media]	ELABORATING-R	Suggesting-R
14	D:	[Right.]	AGREEING-R	Agreeing-R

Appendix H: Comparison of Writing Marks

Comparison of Individual Writing Marks

Student A

Criteria	Marker	Score (pre-)	Comments	Score (post-)	Comments
1. Issues Identification & Focus	Colleague	1	(+): good to introduce the given topic (-): yet the introduction is too long, and the standpoint should have been clarified.	4	(+): it is very good to introduce in the topic via briefly explaining what the traditional teaching is. The introduction is then effective in terms of provision of the background information, summary of the topic, and the writer's standpoint. (-): the argument is not appropriate in the introduction, which is about the fresh and fun online teaching.
	Researcher	1	The writing topic is clearly introduced, but some information can be simplified (e.g. different people had different opinions). The writer's standpoint is not clear.	3	The issue is identified very clear in the introduction section, which is about the traditional teaching and online teaching. Trying to state the main argument, but do not explain well.
2. Context & Assumptions	Colleague	1	(+): good awareness of the contrary contexts	2	(+): good awareness of using the contrary contexts and the sub-dimensions of the preferred to underpin his/her initial

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			(-): the assumptions are not fairly clear to the readers, as too many assumptions come together without a clear focus.		standpoint (-): assumptions are not clearly identified. E.g., when saying the traditional teaching enables us to put energy and time on study. So, what does it matter? Is it an argument, or is it working for a certain argument?
	Researcher	2	The basic awareness of own assumption is showed, and begins to consider the context. However, the focus is not clear enough as many assumptions are pointed out in the writing.	2	Presents some relevant contexts regarding the issues, but some assumptions are needed further explanations. For example, the writer suggested face-to-face teaching is good for students to 'get in touch with different students', does it assume online teaching cannot do that? That is not current.
3. Sources & Evidence	Colleague	2	(+): sources and evidence are fairly relevant (-): yet the sources are loosely organized	2	(+): the provided sources and evidence are relevant, such as when giving examples of the students who are addicted to the internet will get puzzled and tempted from the internet (-): not all the arguments are unpinned with the relevant sources and evidence.
	Researcher	2	Tring to provide examples to support the ideas, but lack of reliable and persuasive evidence.	2	Some examples are showed, but many of them are simplistic or lack of adequate justification. For example, the writer mentioned students can put more energy and time on study in face to face teaching, how and why?

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4. Diverse Perspectives	Colleague	2	(+): it is good to see more than one perspective is taken into account (-): more integrity would be suggested	2	(+): more than one perspective, even though sometimes losing the focus, can be seen. (-):
	Researcher	2	Showing awareness of integration of different perspectives (i.e. talking about both Western and Chinese learning style), but only with minimal analysis.	2	It is good to mention some limitations of online teaching, and provide example. However, the analysis is insufficient (i.e. only three sentences). This part can be further developed with more details.
5. Own Perspective	Colleague	2	(+): provision of self-interpretation and evaluation can be seen. (-): lack of integrity of the interpretations from different perspectives	2	(+): a bit interpretation from the writer's perspective can be seen, (-): interpretation is far from enough
	Researcher	2	The writer's own perspective is minimally identified, and try to clarify the established position, but failed. Little evidence of reflection	3	The writer's own perspective can be seen, which includes some original thinking. The way to establish his/her own perspective is clearer.
6. Conclusion	Colleague	0	(+): (-): lack of a conclusion	1	(+): (-): no more than a re-iteration of the consistent point of view.

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	Researcher	0	There is no conclusion section at all.	2	It is good to see the writer summarised his/her own position in the conclusion, but should not suggest new ideas in this section (e.g. traditionally educated civilization).
7. Communication	Colleague	2	(+): some ideas are clear (-): some expressions are redundant; the logic should have been clearer	3	(+): the overall structure is clearer, the majority of the ideas can be understood (-):
	Researcher	1	The structure of the essay is clear, but there are some grammar mistakes and informal language during the writing (e.g. 'You know'). Not adequately identify why the issue (i.e. Learning styles) is relevant to this audience.	3	The whole structure of the essay is clearer, and the use of language is better. The main ideas of this essay can be understood.
Total Score	Colleague	10	Additional comments:	16	Additional comments:
	Researcher	10		17	

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Student B

Criteria	Marker	Score (pre-)	Comments	Score (post-)	Comments
1. Issues Identification & Focus	Colleague	3	(+): good introduction to the give topic and clear standpoint clarification (-): the related background information and the related aspects could be briefly mentioned	5	(+): very effective background information for introducing in the given debate (i.e., development science and technology – emergence of online teaching – debate of online teaching vs. traditional teaching – his/her preference); also, good to identify the reasons to choose the traditional teaching (i.e., based on the benefits) (-): raising a question in the introduction is not necessary; would be better to outline the perspectives that the students can benefit from
	Researcher	3	This is a good introduction, which with identified issue and the writer's standpoint. More background information about the topic (i.e. learning style) can be presented.	5	This is a very good and effective introduction, which involved identified issue (i.e. the debate), the background information (i.e. development of technology), and the standpoint (i.e. prefer the traditional teaching). Very good.
2. Context & Assumptions	Colleague	2	(+): good awareness of the contrary contexts	3	(+): the contrary contexts are integrated in the discussion from different dimensions; assumptions are relevant (i.e.,

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			(-): assumptions are a bit loose, lacking of some inter-related links		interpersonal relationships, learning and teaching, physical health, ability to enter into the community) (-): yet some assumptions might be too general, such as 'learning and teaching' and 'entering into the community'. Therefore, it would be better to specify and narrow down the focus.
	Researcher	2	Shows awareness of some basic own assumptions, and the different contexts. However, the link between some assumptions are weak.	3	Explores relevant contexts regarding the issues, and made own assumptions (e.g. interpersonal relationship). However, some of the recognition of context and assumptions are needed further explanation. For example, why teacher can answer students' inquiry quickly in face to face learning rather than in online teaching?
3. Sources & Evidence	Colleague	3	(+): sources are fairly relevant (-): yet some are not closely linked to the related arguments, or more explanations were expected.	4	(+): sources are fairly relevant. it is good to see the casual relationship to underpin the proposed argument, e.g., promoting internal relationship attributes to the face-to-face interaction. (-): it would be better to keep some balance for different arguments; also, as the focus is the advantage of the traditional teaching, it would be better not to put too much ink

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					discussing the disadvantages of the online teaching (see the interpersonal relationship)
	Researcher	3	Tring to provide appropriate sources and examples, but some of the evidences needs more explanation, and some are not very relevant with the argument. (e.g. cannot find jobs in the future)	3	Many relevant examples are showed (i.e. communication style and health problem), and the examples are analysed critically to support the argument. However, some arguments are supported with insufficient details.
4. Diverse Perspectives	Colleague	3	(+): the perspectives are more than one, including the different contexts, also including the perspectives that the learning can benefit the learners. (-): integrity of the different perspectives is needed to have the more focused arguments	3	(+): the perspectives are diverse, which is pretty good (-): 3 sub-dimensions would be better, as more than that, the discussion cannot be fully extended within the limit word count and time as well.
	Researcher	3	Showing different perspectives of ideas (e.g. both advantages and disadvantages, both Western and Chinese learning styles). The integration of multiple viewpoints can be developed further.	3	Diverse perspectives are involved, but some of the discussion can be further developed with more detail information. For example, the perspectives of health problem and the comprehensive ability.

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5. Own Perspective	Colleague	2	(+): the views are generally justified and the own interpretation are fairly provided. (-): it would be better to recognize the bias or limits of the preferred learning style.	3	(+): the essay shows his/her original arguments and good interpretation of the underpinning sources; very good to recognize the limits of online teaching (-): some interpretation is a bit loose, the interpretation should have been more focused, particularly when discussing the second perspective; should have shown the limits of the traditional teaching even though it is his/her preference
	Researcher	3	The writer's own perspective is identified, and try to justify the established position, but is not very well. Little evidence of reflection	3	The writer's own perspective is clear, which includes some original arguments. However, the writer's own perspective can be established better if his/her develop and interpret some arguments with more details.
6. Conclusion	Colleague	3	(+): good conclusion to be consistent with the initial standpoint, supported by the reasons. (-): It would be better to summarize the perspectives from which the learning style can benefit the learners.	2	(+): consistency is kept (-): to briefly summarize and show the implications or prospective of the future teaching would be better.
	Researcher	3	The writer summarised the standpoint clearly in conclusion, with supporting	2	Writer's standpoint is summarised, but the conclusion is too brief. Recommendations and consequences connected with

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			reason. Try to relate consequences to conclusions next time.		the conclusion can be summarised as well.
7. Communication	Colleague	3	(+): though a bit mechanical, the ideas are conveyed clearly, the format is appropriate (-): some sentences could be concise and brief and the different points should have been well linked.	3	(+): good understanding of the structure of the essay, also showing the ability to underpin the arguments by appropriate evidence (-): some expressions should be more concise. And different points should well-linked to each other
	Researcher	3	The structure of the essay is clear, and the main ideas can also be understood clearly. Be careful when linking two sentences, that sometimes need more explanations.	3	A clear structure of the essay is presented, and the use of language is understandable. The main ideas and arguments are very clear. The expression of sentences can be improved.
Total Score	Colleague	19	Additional comments:	23	Additional comments:
	Researcher	20		22	

Appendix I: Information Sheet for Student Participants (English Version)



Information Sheet (for Student)

Project Title: Developing critical thinking skills of EFL students through the collaborative writing strategy

Researcher: Yuqi XIAO

Sponsoring institution: Newcastle University

Purpose of the research:

This study aims to investigate any effects of collaborative writing in English on promoting Chinese university students' critical thinking.

Reasons for choosing your university:

Your university and you have been selected because this study focuses on undergraduate EFL students in China. The students in your university may be representative most of the Chinese undergraduate students. As your university is also one of the famous and key universities supported by the state "Project 211" in China and. Besides, the English language department is a main faculty in your university, which can benefit from this or my research purpose.

Therefore, you and your university have been selected. Before data collection, your written consent will be required, so you will be required to sign and date the consent form. Then, you can join the project and complete a questionnaire and a test of critical thinking prior to the experiment.

Details of the project:

The project uses an experimental classroom-based research approach. The estimated duration of the experiment is about 12 weeks. Instead of recording regular classroom, the researcher will construct the experiment as an extra writing training class. The extra class will maintain 2 hours per week. About 60 students and one teacher are expected to be recruited to the project. Data from multiple sub-methods will be collected including questionnaires, classroom observations, interviews, and pre- and post- tests of students' critical thinking skills.

During the experiment period, you will be randomly divided into one control group and one experimental group. For observation purposes, all the participants' contributions to the EFL classrooms will be both video and audio recorded. You do not have to do anything in particular but perform your roles as usual.

After the experimental classes, you will complete the post-test and questionnaire again to compare with the results before the experiment. I would also like to conduct the interview with some of you (about 10-15) after the class. Each interview will take about 30 minutes.

Information Sheet (for Student)

Terms for withdrawal:

Your participation in the research is on a voluntary basis. You are free to withdraw from the project at any time and any stage. If you withdraw, you can leave the experimental classroom at any time. Researcher will disregard the data you have supplied, and will not share your data with any other people. In this case, your participation and performance in the previous video and audio recordings will be excluded from the data analysis. The researcher will only analyse and present other participants' audio recording data in the class, and will recruit other participants as replacement. If you would like to participate in the project but do not like to be video-recorded, you can sit in a corner of the classroom that is not recorded by the video camera.

Data usage and storage:

The data all participants provide will be used for academic purpose only. The result of the study will be disseminated in the forms of thesis publications and oral presentations. During those publications and presentations, all the data will only be presented as anonymised transcription or tables.

All the original data will be anonymised immediately after it has been collected. To ensure anonymity and protect personal information, each of you will be given a coded ID in all the data collected, including questionnaire data, video and audio recordings, produced written texts, and critical thinking tests. Your images and sounds in the recordings will not be used directly in any data presentation. The whole research study will strictly comply with the ethical requirements to keep the confidentiality of the information and the records of individual participants. I may share the copies of the data with my supervisors or other researchers only if I have permission from you.

In order to store the data safely, I will use a secure, big space on the school's computer under my university account. It requires my unique password to access the data. No one else can know the password and will be allowed to access the data.

Potential risks and benefits:

The experiment may involve slight psychological risks. These include students' uncomfortable feelings during the recording in the class. To address the risks, the researcher will inform you that your academic performance will not be assessed based on the recordings. Also participants are free to withdraw if you are not willing to be recorded during the process and can speak to the researcher who will do her best to help.

More importantly, this project can contribute to the advancement of knowledge on developing critical thinking skills, applying collaborative writing effectively, and improving students' L2 argumentative writing skills in China.

Information Sheet (for Student)

Contact information for further enquiry:

The researcher: Yuqi XIAO

Email: y.xiao3@ncl.ac.uk; Address: School of Education, Communication and Language Sciences, King George VI Building, Newcastle University, Newcastle upon Tyne. NE1 7RU

The supervisor: Dr Mei LIN

Email: mei.lin@ncl.ac.uk; Telephone: +44 (0) 191 208 5070

Address: Room 2.24 KGVI, School of Education, Communication & Language Sciences, King George VI Building, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK.

Appendix J: Information Sheet for Student Participants (Chinese Version)



调研须知 (学生)

课题名称:

论如何用协同写作的方式来提高英语课堂上学生的辩证思考能力

调研人员: 肖雨奇

主持研究计划的部门: 英国纽卡斯尔大学

研究目的:

该研究旨在以课堂写作过程为框架, 分析协同写作对学生在英语课堂上提高辩证思考能力的影响。

选择您和您学校的原因:

调研人员选择您和您所在的学校作为调研场所是因为该项目只针对在中国大陆学习英语的大学本科。

调研前, 需要您书面签署知情同意书, 然后您才能参与这项研究。

研究过程概述:

该研究为一个基于课堂的实验型研究。整个调研过程持续大约 12 周。大约 30 名学生将参与到活动中来。研究数据收集方式包含了实验前后测验、课堂观察和一对一访问。

首先, 调研的第一步您需要完成一个关于辩证思考能力的测试和一篇论述文的英文写作。然后在课堂活动的过程中, 您和其他参与者会被分配成两个人一组, 并一起完成课堂写作。同时, 为了达到最好的调研观察效果, 您所在的课堂会被全程录像录音。除此以外, 只需要和平日一样正常上课并完成课堂活动。

调研结束后, 您将被邀请完成一份和调研前相似的辩证思考能力的测验和英文写作。该测验和写作的结果将用来和之前的结果进行比较和分析。调研者还会随机选取一部分参与者 (10 到 15 个学生) 进行一对一的访问。每个访问时长大约 30 分钟。

关于参与和取消参与实验:

您的参与完全自愿。是否参加, 是否中途退出, 是否要求销毁已录制内容, 都由您自己决定。不参与或者中途退出您都无须担负任何责任, 不会受到任何责罚。如果您想要中途退出您可以向老师或者是研究人员提出, 然后请安静的离开实验教室。如果您

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中途退出并要求销毁已录制内容，之前有您参与的所有视频和音频都不会被调研人作为数据进行分析。

数据收集和保密：

所有您和其他参与者提供的数据将仅用于这项研究。收集的数据会仅用文字转录和数据图表的形式在文章发表和演讲中展示出来。并且，所有展示出来的数据会采用匿名或者假名的方式。收集的数据会根据相关转录原则进行转录并根据研究问题进行分析。没有您的许可，调研人不会与其他人分享收集的数据。基于信息保密原则达成的情况下，材料备份可以上交调研人导师或与其它研究者共享。

整个研究与伦理安全要求准则一致，确保个人信息安全。您的所有数据都会匿名化。不论是在数据录制、转录和分析过程中，调研人都会严格遵守匿名原则。材料会妥善保管在调研人自己的设备内并设置密码，包括电脑、移动硬、光盘等。除调研人以外的人都不会知道密码而接触到收集的数据。

潜在的风险和好处：

您可能会因为录制感到不适或者紧张。请尽力忽略摄像和录音设备，因为该研究是个长期项目并且不会对您的课堂表现进行评估。同时，您也可以向调研人员咨询任何相关问题或者寻求帮助。

该研究有利于促进对辩证思考能力的理解和提高，有利于加强对协同写作这一方法的应用，并对提高您的英语写作能力有很大帮助。

后续信息咨询联络方式：

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Appendix K: Consent Form for Student Participants (English Version)



Consent Form for Student Participants

Title of Project: Developing critical thinking skills of EFL students through the collaborative writing strategy

Name of Researcher: Yuqi XIAO

Nature of the study: to explore whether the collaborative writing strategy can be used to improve students' critical thinking skills in foreign language learning context.

I, as a participant, will sign to agree to take part the above project, confirm that (please tick box as appropriate):

1.	I have read and understood the information about the project, as provided in the Information Sheet dated.	<input type="checkbox"/>
2.	I understand the aims of research and the use of the data in research, publications, sharing and archiving.	<input type="checkbox"/>
3.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	<input type="checkbox"/>
4.	I understand that the classroom interaction both video and audio recorded will be anonymous and stored securely.	<input type="checkbox"/>
5.	The procedures regarding confidentiality have been clearly explained to me (e.g. use of names, pseudonyms, anonymised, etc.).	<input type="checkbox"/>
6.	The publically use of the data in research has been explained to me. And I will give my permission to allow researcher to use the video and audio data for presentations at conferences and publications.	<input type="checkbox"/>
7.	I understand my video and audio data will be destroyed if I withdraw.	<input type="checkbox"/>
7.	I allow the researcher to submit the copies of the data to her supervisor or other researchers only for research use.	<input type="checkbox"/>
8.	I understand that I can enquire about any aspects of the study, including the process and the outcome of the data.	<input type="checkbox"/>
9.	I voluntarily agree to participate in the project, and the researcher can conduct the fieldwork in the English teaching classroom where I am in.	<input type="checkbox"/>
10.	I, along with the Researcher, agree to sign and date this informed consent form.	<input type="checkbox"/>

Name of Student:

Signature:

Date:

Name of Researcher:

Signature

Date:

Appendix L: Consent Form for Student Participants (Chinese Version)



学生参与者知情同意书

课题名称: 论如何用协同写作的方式来提高英语课堂上学生的辩证思考能力

调研人员: 肖雨奇

课题性质: 该研究旨在以课堂写作过程为框架, 分析协同写作是否能提高学生在英语课堂上辩证思考的能力。

我, 作为一名学生, 将要签署同意参与上述课题调研人在我所在的教学课堂进行实际课堂调研, 确认已知悉以下信息 (请在对应的信息前打勾)。

1	我已经阅读参与调研须知并理解该课题的信息。	<input type="checkbox"/>
2	我已知情课题的研究目标, 有关收集的材料的使用、发表、共享以及存档都已经向我说明。	<input type="checkbox"/>
3	我已知情我可以自主决定参加与否, 并随时退出并不需要解释理由, 也不会被惩罚或就退出一事被问询。	<input type="checkbox"/>
4	我已知情课堂录音和录像会匿名处理并被安全妥善保管。	<input type="checkbox"/>
5	我已知情调研人关于信息保密方面的安排, 这些已经和我做了详细的说明 (如, 采用假名和匿名等等)。	<input type="checkbox"/>
6	我已知情被收集的数据会如何使用。我授权于调研人员, 在不泄露我的个人隐私前提下, 在发表文章和会议演讲中使用我在参与实验过程中的数据。	<input type="checkbox"/>
7	我将授权于调研者在学术研究的前提下, 把我参与调研过程的数据与其导师和其他调研人员分享。	<input type="checkbox"/>
8	我已知情我可以就该研究的任一方面进行咨询, 包括收集材料的过程和结果。	<input type="checkbox"/>
9	我自愿同意调研人可以在我所在的课堂进行实地调研。	<input type="checkbox"/>
10	我同意, 与调研人一起, 在该调研知情同意书上签名。	<input type="checkbox"/>

学生参与者姓名:

签名:

日期:

调研人姓名:

签名:

日期:

Appendix M: Sample Essay of Post-tests

Writing Topic: Which do you prefer as a university student, online teaching or traditional face-to-face teaching?

Example 1 by Student B

College students should accept the traditional education

With the development of science and technology, online teaching is gradually emerging as a kind of distance education. This mode of education and the traditional face-to-face education caused widespread hot debate. As a college student, how should we treat it? In my opinion, I prefer the traditional teaching, because we can benefit a lot from this way as a college student.

For the following reasons: First of all, the traditional teaching can promote interpersonal relationships. Because with the development of science and technology in today's society, more and more electronic products appear and it is become more and more popular. Especially in the aspect of communication, young people prefer online communication, real communication reduced, the understanding of each other is not enough. When they meet each other, it will inevitably appear awkward and strange situation. However, face to face teaching is more friendly, more real. It is not only can increase the interaction between people, but also can enhance the friendship, and it is a good method for college students to learn how to deal with interpersonal relationship.

Second, in the aspect of learning and teaching, when students have problems , the teacher can answer quickly , and it is easier for students to understand the class .And the teachers can grasp the learning situation of students easily and directly , in order to adjust the teaching methods and progress.

Third, the traditional teaching needs students to enter the school classroom, which can also exercise the students' body, so as to avoid the radiation from the computer by sitting too long time, it can reduce the harm of the health.

The most important thing is that college students are about to enter the community, they need more experiences and enhance the ability of all aspects, they need to practice. But in the online education is not to be done, so the traditional face to face teaching is very important.

Online education is a time-saving and energy-saving way of teaching. But for college students, this kind of education 's effect is not so obvious. And this requires communication is very developed, or out of the situation it is inconvenient to timely repair, such as student assignments, classroom interaction.

In brief, the traditional face to face teaching is essential to the university student, this way is more able to exercise the university students.

Student B's CT development according to marking criteria

Criteria	Score (post-)	Comments
1. Issues Identification & Focus	5	(+): very effective background information for introducing in the given debate (i.e., development science and technology – emergence of online teaching – debate of online teaching vs. traditional teaching – his/her preference); also, good to identify the reasons to choose the traditional teaching (i.e., based on the benefits) (-): raising a question in the introduction is not necessary; would be better to outline the perspectives that the students can benefit from
2. Context & Assumptions	3	(+): the contrary contexts are integrated in the discussion from different dimensions; assumptions are relevant (i.e., interpersonal relationships, learning and teaching, physical health, ability to enter into the community) (-): yet some assumptions might be too general, such as 'learning and teaching' and 'entering into the community'. Therefore, it would be better to specify and narrow down the focus.
3. Sources & Evidence	4	(+): sources are fairly relevant. it is good to see the casual relationship to underpin the proposed argument, e.g., promoting internal relationship attributes to the face-to-face interaction. (-): it would be better to keep some balance for different arguments; also, as the focus is the advantage of the traditional teaching, it would be better not to put too much ink discussing the disadvantages of the online teaching (see the interpersonal relationship)
4. Diverse Perspectives	3	(+): the perspectives are diverse, which is pretty good (-): 3 sub-dimensions would be better, as more than that, the discussion cannot be fully extended within the limit word count and time as well.
5. Own Perspective	3	(+): the essay shows his/her original arguments and good interpretation of the underpinning sources; very good to recognize the limits of online teaching (-): some interpretation is a bit loose, the interpretation should have been more focused, particularly when discussing the second perspective; should have shown the limits of the traditional teaching even though it is his/her preference
6. Conclusion	2	(+): consistency is kept (-): to briefly summarize and show the implications or prospective of the future teaching would be better.
7. Communication	3	(+): good understanding of the structure of the essay, also showing the ability to underpin the arguments by appropriate evidence (-): some expressions should be more concise. And different points should well-linked to each other
Total Score	23	Additional comments:

Example 2 by Student C

Traditional face-to-face teaching

Nowadays, with the development of technology, teaching ways are becoming more and more diverse. E.g. online teaching, traditional face-to-face teaching and so on. Everyone is unique, and of course has different methods of studying. There is a way suitable for you. As for me, a college student, prefer traditional face-to-face teaching.

The process of learning contains remember, repeat, analyze, understand and apply. Or as Chinese proverb says, plunge zealous eyes, mouth and mind into learning. If a teacher stood in front of you, she or he would communicate with you by eyes, body language and language. It must be more interesting and vivid than online teaching. At least, different gestures teachers make and diverse places they stand in give us something fresh or change. But about online teaching, it is easy to be tired in vision, and then affect the enthusiasm in studying.

About the degree of expression's accuracy, face-to-face teaching is more accurate, compared to online teaching. In online teaching, we receive just sound and rigid screen. But in traditional teaching, the tone of sentences and body language and eyes can deep our understanding and remembering.

And atmosphere is also important. We Chinese students, most of us absorb traditional teaching ways, and some things special have plunged into our heart. I think, traditional teaching method fits me, to be exact.

There are many ways to learn something. I think, fitness is the best, those fit yourself are the best.

Student C's CT development according to marking criteria

Criteria	Score (post-)	Comments
1. Issues Identification & Focus	4	(+): very good introduction, including the related background information to lead the given topic in (i.e., technology – diverse teaching –given topic; clear preference (-): a bit redundant. i.e. "there is a way suitable for you" it means little in the introduction; also, would be better to outline the main aspects that would be discussed in the following parts
2. Context & Assumptions	3	(+): very good to keep the contrary contexts in mind; fairly relevant assumptions, i.e., interesting classroom, accurate expressions, (-): yet the last assumption about atmosphere is not clear; also, a bit overlapping when mentioning body language twice in the two different assumptions; it would be better to raise the assumptions prior to the extensive discussions, or in other words, a topic sentence would work better
3. Sources & Evidence	4	(+): sources are highly relevant. The extended discussion well shows the casual relationship. E.g., the traditional teaching is more interesting due to the teacher's eye contact and body language being seen and felt; the comparison is also effective, such as fresh and changing in traditional teaching vs. tired in vision caused by online learning (-): no underpinnings of the third argument (i.e., atmosphere can be seen)
4. Diverse Perspectives	4	(+): very good to show the diverse perspectives which integrates the different contexts and sub-dimensions to underpin his/her point of views. (-): even arguing much on the advantages of traditional teaching, its limits should have been seen so as to have a more comprehensive thought.
5. Own Perspective	3	(+): fairly showing his/her original interpretations (-): it would be better to show how these perspective work together for underpinning his/her sentences.
6. Conclusion	1	(+): just keeping the consistency (-):
7. Communication	4	(+): In general, language is OK regarding conveying the ideas; fairly appropriate transitions to connect the ideas (-):
Total Score	23	Additional comments:

Example 3 by Student S

Traditional teaching

With the development of the society, we are entering era, everything is changing, the traditional education pattern also be hit, online learning is growing. So what kind of education way do you prefer ? As for me, I prefer the traditional face-to -face teaching. My reasons are following.

Firstly, traditional education is that we have used. And we get used to it and be familiar with it. Although online teaching is very popular these days. But it is hard for us to receive a fresh thing. As we know, most of us take the traditional face-to-face teaching as a child. So this is one of the reasons that I like it.

Secondly, traditional education can let us solve the study problem more convenient. Because when you have a problem with your study, you can hands up to ask teacher for help. So, you can solve your questions as soon as possible. But for the online teaching maybe not, because the teacher can't accompany you all the time. As for this aspect, so I prefer the traditional teaching.

Last but not least, online teaching can't promise the quality of teaching. In many online autonomous learning classes. I saw many students was just watching movies or playing games or doing other things. But in the traditional class, if you do other thing you will be criticized by the teacher, so you can pay more attention to the class and learn more. Not everyone has good consciousness. So compare to online teaching, I prefer the traditional face-to-face teaching.

Although this is a Internet age, most of things we can do through Internet. but to the way of teaching, I prefer the traditional face-to-face teaching.

Student S's CT development according to marking criteria

Criteria	Score (post-)	Comments
1. Issues Identification & Focus	5	(+): good awareness of providing the background information related to the context in which the given issue is rising; also good awareness of and skills in interpreting the given topic; clear standpoint is provided (-): the way of providing the related background information is much general and mechanical, e.g., 'with the development of the society' which actually is lack of specific nature for the given topic.
2. Context & Assumptions	5	(+): demonstrating her/his understanding of the two contrary contexts; the scope (i.e., in terms of acceptance of new way of teaching, convenience and efficiency of teaching) and assumptions are very well linked to the issues (i.e., all orient to show that traditional teaching outweighs the online learning. (-): little awareness of reflecting the limitations and complexity of the preferred way of learning.
3. Sources & Evidence	4	(+): various sources and evidence are used to support the proposed argument, such as explaining the different natures of the two ways of learning and using examples. Most assumptions are well justified by the extensive explanation. (-): yet a couple of assumptions or arguments are not convincingly justified, such as the causal relationship between difficulty in receiving a new thing and difficulty in accepting online learning.
4. Diverse Perspectives	5	(+): very good to make assumptions and then provide justification of the two ways of learning all the way through the essay. Three different sub-perspectives all work for his/her standpoint and are also well-integrated. (-): no awareness of arguing the positive aspect of the dispreferred standpoint
5. Own Perspective	4	(+): well showing his/her original points of view, and highly skill at using the sources to strengthen or re-iterate his/her views. (-): lack of a clear summary of different perspectives to have a deeper reflection of the main argument or standpoint.
6. Conclusion	2	(+): good awareness to make a conclusion and keep the consistent position. Showing awareness of the fact that internet is widely used (-): yet, mentioning the use of internet seems to have nothing to do with the reiteration of his/her point of view. Also, still a hasty conclusion which only contains the standpoint re-iteration
7. Communication	4	(+): The messages or the ideas generally are clearly conveyed. The general needs can be met. (-): some errors cause communication breakdown.
Total Score	29	Additional comments:

Appendix N: Sample CW Texts

The CW written by Student A & B in Lesson Two

It's a fact that there are many beggars in the world. So what can we do to help them? Nowadays, there is a hot discussion about whether we should give the money to the beggars on the street when we see them. In my opinion, we should give our hands to them.

As an old saying goes, helping others is a virtue, and it will make our society more harmonious. While we are helping others, it's not only beneficial to the beggars but ourselves. First, the beggars needn't to worry about the problems of food if we give them money. Besides, we can gain happiness from helping others.

Some people may say helping others may bring us into trouble or even put us into dangers. That's true that some of them are hypocritical to us. Therefore, we should be careful and think twice before we decide to help them.

What is worth noticing fact is that some times we need to turn to strangers for help. So we should help the beggars when we meet them. Because a little love also change one's life.

The CW written by Student A & B in Lesson Eight

Once there are some people are trapped in desert island. All of them have dealed well with their jobs including football player, farmer and doctor etc. As an ending of this unfortunate story, only two people had survived but others accepted the doom.

The two people could be conservated are the football player and the farmer of course. It is my best wish and possible prediction. Following are some reasons that I will share with all of you.

At first, the football player as an athlete who have enduring so many years for strict training. Except for that, he will have know some special knowledge from an excellent coach. Particularly in heavy stress, he could take the stubborn of competition. Another one I'd like to introduce is a farmer. As we all know, farmer's life won't be so easy that he has to struggle with his life. He lives a terrible environment than someone else, but now he just will face a worse situation. Therefore, I do believe he could fit for it quickly than others.

That's all, general speaking, who wants to live in a desert island for a long time, too many factors we can't ignore. One is about personal body requirement. He must be strong and healthy very much. Another is about the realization of suffering the pain. One should have the ability to face the challenge. I support the football player and farmer so much from the two views.

The CW written by Student A & B in Lesson Eight

Once there are some people are trapped in desert island. All of them have dealt well with their jobs including football player, farmer and doctor etc. As an ending of this unfortunate story, only two people had survived but others accepted the doom.

The two people could be conserved are the football player and the farmer of course. It is my best wish and possible prediction. Following are some reasons that I will share with all of you.

At first, the football player as an athlete who have enduring so many years for strict training. Except for that, he will have know some special knowledge from an excellent coach. Particularly in heavy stress, he could take the stubborn of competition. Another one I'd like to introduce is a farmer. As we all know, farmer's life won't be so easy that he has to struggle with his life. He lives a terrible environment than someone else, but now he just will face a worse situation. Therefore, I do believe he could fit for it quickly than others.

That's all, general speaking, who wants to live in a desert island for a long time, too many factors we can't ignore. One is about personal body requirement. He must be strong and healthy very much. Another is about the realization of suffering the pain. One should have the ability to face the challenge. I support the football player and farmer so much from the two views.

The CW written by Student S & Y in Lesson Two

The Willian Shakespeare said. "Virtue is blood and goodness never fearful". So I do agree with the point of view, which we should give beggars money when we see them on the street.

In recent years, a strange phenomenon has occurred in our contry-people are very cautious of giving beggars money. There are more and more beggars take advantage of other' sympathy to cheat. Although this is true, there are still many people really need to be given a hand.

Firstly, sympathy is human's nature, and it's also one of the traditional virture. So we should help people in trouble. Secondly, helping others is helping yourself. We may come across some troubles and need help from others one day. Therefore, I believe the advantages are more obvious in helping others. As the old saying goes, "The roses in her hand, the flavour in mind".

The CW written by Student S & Y in Lesson Eight

High above the ocean, there is a hot air balloon. Inside the basket of the balloon are 6 people: a football player, a doctor, a biology teacher, a farmer, a gardener, and a policeman. The balloon is heading to the desert island. And now, the balloon arrive the desert island in safety. But which two guys can live better on this island? The answer we think is the doctor and the farmer. The reason is following.

As for the doctor, she has rich clinical experience and skills. So she knows how to cure people who is hurt by wild animal. Secondly, the doctor is familiar with people's physiologic structure, so she knows how to save strength to stay longer-lived. Thirdly, the doctor can recognise the herbal medicine which can cure someone who is ill. So the doctor is very important to stay.

As for the farmer. Farmer can understand the crop deeply and he can find something to eat or plant food by himself. So he has the ability to solve the problem of food, and won't starve to death. Usually, in order to keep the crop grow healthy, and farmer should observe the weather very often, so farmer know the nature very much. So the farmer is also very important to stay.

Comparing to the football player, he will be burdensome. Although he has a strong body, he just knows how to play football and he will eat much food to keep up his strength. As we know, there is not much food on the island, so the football player can't live longer.

Comparing to advantages of their, we think the farmer and the doctor can live longer on this desert island.

The CW written by Student C & D in Lesson Two

There are many kinds of beggars in our society. Such as disabled and healthy. Some of them are tricksters. So it is unnecessary to give them money. but we can offer them some specific help.

As a normal citizen, we are not rich enough to help everyone, but we can provide them with food or clothes. Most beggars will not refuse our goodness. If he or she is a trickster what he or she really want is just money.

It is impossible for us to help everyone. So we can use the power of the public and government. For example, we can think the medium to raise money or we can contact with local belief agency which is built by government.

In a word, we can offer them specific help instead of money.

The CW written by Student C & D in Lesson Eight

There are 6 people: a football player, a doctor, a biology teacher, a farmer, a gardener and a policeman in the desert island. Nevertheless, in our opinion, we think only the policeman and the doctor can live longer than others.

As we all know, there are many dangers in the desert island, so the person who want to live longer than others he or she must have the ability to protect themselves. Maybe the policeman is more suitable than others because he must have received many professional training. As for the football player, he just have the strong body, but doesn't have the professional skills and rich experience.

In addition, the doctor is reasonable enough to stay longer than others. She know many first-aid knowledge. Therefore, if she feel uncomfortable, she can cure herself and feel better.

All in all, if we want to live longer in the desert island, we should know how to protect and cure ourself from the dangerous. So we believe the doctor and policeman can live longer.

Appendix O: Sample Coded Transcripts in Class Interaction

Below are episodes observed from the whole **Lesson 8**: wrote about which two people can survive in the desert island more successfully.

Started from 0:01 min to 2:09 min.

No.	Ss	Content	Language functions
1	A:	First, let's talk about which person you choose will be the... the...	
		will be survive (in the desert island more successfully)? Which two persons?	Eliciting
2	B:	I choose the doctor and the policeman.	Clarifying-R
3	A:	Policeman?	Asking Question-R
4	B:	Yeah.	Confirmation-R
5	A:	<u>So</u> at the beginning, can you told me what is the reason?	Eliciting
6	B:	Because, we think the doctor is good at curing when=	Elaborating-R
7	A:	=Curing?	Asking Question-R
8	B:	When somebody gets hurt, we can use...use ability to...to help him or her.	Elaborating-R
9	A:	But in desert, curing...he has no medicine or something to help...	Arguing-R
10	B:	No, we suppose she have...has, we suppose she has, because you don't know whether she has or not.	Justifying-R
11	A:	In desert, what the person... most <u>im</u> ... most important (thing) is the water; but how you can cure, cure somebody in...	Arguing-R
12	B:	She knows Chinese medicine, so in the desert, desert land she can use the... 草药 to... Tr. [Chinese medicinal herb]	Justifying-R
13	A:	But I think... I think what we should point to, is about the survival ability, not to cure somebody or help somebody recover.	Arguing-R
14	B:	You... <u>er</u> ...	Clarifying-R
15	A:	你可以用中文说，没事。我就是觉得你说医生她可以帮助救治别人。 Tr. [You can use Chinese. I think it's okay. I think you said]	Suggesting-R Clarifying-R

		that the doctor could cure others...]	
16	B:	对呀，还有一个（人）。我还没说完。	Confirming Clarifying-R
		Tr. [Yes, and I have one more (person). I have not finished.]	
17	A:	我知道，还有一个是警察对吧？但是我要强调个人的生存能力，在沙漠里面，是个人的生存能力。你医生救助他人，但是不一定她自己就能生存下去。在这个时候强调的应该他这个人自己能够在这种恶劣的环境当中适应生存下去比较重要。所以我认为是这样的。	Confirming-R Arguing-R
		Tr. [I know, and the policeman, right? But I want to emphasize the personal ability to survive in the desert. The doctor can help others, but it not means she can help herself to survive longer. In this situation, we should focus on their own personal ability to survive in such a harsh environment is more important. I think so.]	
18	B:	哦，我懂了，那你再继续总结哦。	Agreeing-R
		Tr. [Oh, I see. Then you can continue with your summary.]	Suggesting-R

From the 2:10 min

1	A:	嗯	Confirming-R
		Tr. [well]	
2	B:	The policeman, er he must, had been trained for a long time, right?	Clarifying
3	A:	Yeah.	Agreeing-R
4	B:	And he has strong body. So, he is good at fighting.	Elaborating-R
		If, if they, if they meet, er dangerous animals in the desert island, he can protect her, and, and use, use his gang, you know, gang.	
5	A:	Haha , I know, I know.	Confirming-R
6	B:	Yeah, and...	Clarifying
7	A:	To shoot the animal, ((inaudible)) animal...	Supplementing-R
8	B:	Yes, and if, if he get hurt, she can help him.	Agreeing-R Elaborating-R
		If he... doesn't get hurt, she can, 啊不, he... Tr. [...oh no ...]	
9	A:	protect him... protect the doctor.	Supplementing-R
10	B:	Yes. They can help each other.	Agreeing-R
		And, what more, he is strong enough to find, find some woods to make a boat to leave that island.	Elaborating-R
11	A:	呃，不是沙漠吗？不是掉在沙漠里面吗？	Asking

			Question-R
		Tr. [Well, isn't it a desert? Didn't they fall in the desert?]	
12	B:	荒岛, island.	Clarifying-R
		Tr. [desert island]	
13	A:	哦, 荒岛。	Confirming-R
		Tr. [Oh, desert island.]	
14	B:	Desert island	Clarifying-R
15	A:	等下, 在哪里呀? ...desert, desert island, 不是沙漠吗?	Asking Question-R
		Tr. [Wait, where is it? ... desert, desert island, isn't it a desert?]	
16	B:	desert island	Clarifying-R
17	A:	It means, 主要是沙漠嘛。	Arguing-R
		Tr. [it's mostly desert.]	
18	B:	没有, 问了老师了, 荒岛, 这是荒岛	Justifying-R
		Tr. [No, I asked the teacher. Desert island. This is desert island.]	
19	A:	就是, 如果, 如果说, 你说可以用木头制船的话, 荒岛它不一定是说, 它可能只要跑出这个荒岛就行了, 并不是说它就一定有海, 或者说有江河之类的。我只是, 我只是, 只是习惯性的会, 会提出一些质疑。其实有些细节是可以忽略的, 你也不要太在意。	Arguing-R Suggesting-R
		Tr. [That is, if, if you said you could make a boat out of wood, a desert island, it doesn't necessarily mean that it could just run off the island. It doesn't have to be a sea or a river or something. I'm just, I'm just, I'm just used to questioning. In fact, some details can be ignored, you don't need to care too much.]	
20	B:	所以呀, that's my opinion.	Concluding-R
		Tr. [So, that's my opinion.]	
21	A:	你...	
		Tr. [You...]	
22	B:	你觉得, 哪两个?	Eliciting
		Tr. [Which two people do you think?]	
23	A:	你看, 其, 其实, 你, 我觉得你是一种, 比较... 呃, 我说实话, 比较, 比较牵强的融合进来, 你觉得他们两个可以互助, 是比较相互促进的。但事实上...	Arguing-R
		Tr. [You see, it's, uh, actually, you, I think you are a kind of, uh, more... Well, to be honest, a more, more far-fetched combination, you think the two of them can help each other, they are mutually reinforcing. But in fact...]	
24	B:	而且一男一女呢。也可能还可以结合哦。哈哈	Elaborating-R
		Tr. [And they are a man and a woman. Maybe they could get	

		married. Ha ha]	
25	A:	这不重要。不管是男是女。主要，荒岛...	Arguing-R
		你看过一个节目吗？	Exemplifying-R
		Tr. [It doesn't matter. Whether it's a man or a woman. Mainly, the desert island... Have you ever seen a show?]	
26	B:	看过什么？贝爷啊？	Asking Question-R
		Tr. [What have I seen? Survivor Games?]	
27	A:	对，呃，差不多吧。他们就是，	Confirming-R
		非常，非常的强壮。我觉得这一点很重要。	Elaborating-R
		然后就是什么，一种意识。	
		有那种先进的深沉的意识也比较重要。	
		首先是，要有一种体魄，就是身体上非常的优秀。	
		然后就是，就是精神上，思想上也是非常的，强烈的。	
		所以说，我觉得在身体和思想上这两个达到要求的才算是，	Concluding-R
		我认为要选的。	
		Tr. [Yeah, uh, something like that. They're just very, very strong. I think that's important. And then, a kind of consciousness, it's important to have that kind of advanced and deep consciousness. First of all, to have a body, that is, a very good body. And then, just mentally, mentally, it's also very, very strong. So, I think the two that meet the requirements, physically and mentally, are the people I should choose.]	
28	B:	你看到了吗，他肯定... 警察嘛，肯定受训特别严格的。	Arguing-R
		他肯定也...	
		Tr. [Did you see him? He must have... He is the policeman, so he must have been trained strictly. He must also...]	
29	A:	可以，我没说...	
		Tr. [Yeah, I didn't say...]	
30	B:	他也可以去那个...	
		Tr. [He could go to the...]	
31	A:	我没说警察不行啊...	Agreeing-R
		Tr. [I didn't say the policeman can't...]	
32	B:	然后，医生，医生她知道...	Justifying-R
		她救人的嘛，肯定知道生命有多重要，所以...	
		Tr. [And then, the doctor, the doctor, she knew... She saved lives. I'm sure she knows how important life is, so...]	
33	A:	如果说...	
		Tr. [If...]	
34	B:	她求生意识也肯定会强	
		Tr. [I am sure she also has a strong sense of survival.]	
35	A:	如果说你在这个沙漠里面待的不是一天两天，而是一个月，	Criticizing-R

		你怎么生存下去？	
		这个时候，这个时候的话，你可能说，	Arguing-R
		你说什么枪啊药物啊弹药都用完了，药也可能用完了，	
		这只能靠你自己生存。就是自己一种，基本的生存能力。	
		相当于回到原始社会一样。	
		所以说这个时候我觉得应该选一些，就是，	Suggesting-R
		生活比较，就是比较，一开始就类似于，在荒野生活的人一样。	
		所以说你看，足球运动员。	Elaborating-R
		我觉得他是，你知道，作为运动员就是那种训练特别刻苦的。	
		而且他们的训练意识，也会被教练经常的提起。	
		所以说我觉得，像运动员和农民，是我比较更倾向的一类，选择。	Concluding-R
		Tr. [If you were in this desert not for a day or two, but for a month, how would you survive? In this case, in this case, it might be, you know, it might happen that all the guns and medicine are running out, you're probably running out of medicine, and you're on your own. It's a kind of basic survival ability by oneself. It's like going back to primitive society. So, at this point I think we should pick someone, which is more, more, which is, like people living in the wilderness. So, like the football player. I think he was, you know, as an athlete his training is especially hard. And their training in consciousness is also emphasized by their coach frequently. So, I think the football player and the farmer are the people that I prefer to choose.]	
36	B:	haha	
37	A:	农民嘛...	
		Tr. [The farmer...]	
38	B:	其实，我觉得这个悬念比这个更，难度更大，真的。	Arguing-R
		Tr. [Actually, I think this person is more difficult than this one, really.]	
39	A:	你是说这个（足球运动员）难度，比他，警察生存难度更大吗？	Asking Question-R
		Tr. [Are you saying that this (football player) is more difficult to survive than he, a policeman?]	
40	B:	对啊。	Confirming-R
		Tr. [Yeah.]	
		(the 5:50 min)	
41	A:	为什么？ Why?	Eliciting-R
		Tr. [Why? Why?]	
42	B:	他只是练球而已，但是，这警察，各项...	Arguing-R
		Tr. [He's just training and practicing with football, but, this policeman, the...]	

43	A:	不是...	Disagreeing-R
		Tr. [No...]	
44	B:	各项方面((inaudible))...	Supplementing-R
		Tr. [The various aspects ((inaudible)) ...]	
45	A:	练足球的话，是他的主要的项目，	Justifying-R
		但是，你知道，作为运动员他，他，他提升自己的肌肉能力，	
		什么，身体的各方面，也是通过不同的方式，你知道吧。	
		并不是...	
		Tr. [His main aim is to practice football skill, but, you know, as an athlete he, he, he builds his muscles, and, all aspects of his body, also in different ways, you know. It's not...]	
46	B:	警察是啊	Arguing-R
		Tr. [So do the policeman.]	
47	A:	警察也是，没错。都是，都可以通过训练。	Acknowledging-R
		但是如果你要说的话，嗯... 在我们社会当中的话，	Criticizing-R
		你觉得是一个，是一个运动员更好看，还是一个警察更好看呢？	
		从他的体型上来讲。谁的，体型更加的强，强壮？	
		就说谁的体格更加吸引人？应该是运动员吧？	
		Tr. [So do the policeman, yeah, they both, both can be trained. But if you want to say, um... In our society, who do you think look better, a football player or a policeman? In terms of his body, whose body is stronger? Whose body is more attractive? A football player, right?]	
48	A:	你看，应该是运动员吧。应该是吧？	Arguing-R
		你自己想一想。	
		从，从大范围的方面来讲的话，运动员他应该是，	
		这方面是训练的比警察要好的。就是说，警察他有什么优势呢。	
		他就是，他就是那种保护，他是保护人嘛。	
		所以说他这方面会比较好。他就是，对于，危机意识会比较强。	
		因为警察他这方面的训练，他毕竟是，人民警察是要，有这方面的训练的。	
		而，运动员，可能说他身体方面比其更加出色，	
		但意识上，可能就比他要差一点。	
		Tr. [You see, it must be the football player. Is that right? Think for yourself. On a large scale, the football player should be, should be better trained than the policeman in terms of their body. That is to say, what advantage does a policeman have? He is, is willing to protect, he is a protector. So, this is his strong point. He will have a stronger sense of crisis. Because the training in this area, he is, after all, as the policeman, he	

		must have training in this area. The football player, on the other hand, may say that he is physically stronger than the police, but mentally weaker.]	
49	A:	那我觉得, 我选择农民的话,	Elaborating-R
		也是因为, 农民他是比较低阶级的生活。	Justifying-R
		所以说他的生活方式本来就比较贫苦。	
		在这种环境当中, 只是降低了一个小的等级而已。	
		所以说他生存下去的概率也会更, 加的大。	
		Tr. [Then I think, if I choose the farmer, that is because he is a lower class in society. So, he had a very poor lifestyle. This kind of environment (desert island) is only a small level of degradation for him. So he has a better chance of surviving here.]	
50	B:	我不是这么想的。我觉得这个, 农民他...	
		知识比较((inaudible)) 所以目光短浅。他不能够...	Arguing-R
		Tr. [I don't think so. I think the, the farmer... has less knowledge ((inaudible)) that he is shortsighted. He can't...]	
51	A:	知识有限的人...	
		Tr. [People with limited knowledge...]	
52	B:	他的危机意识没那么强...	
		Tr. [He doesn't have a strong sense of crisis...]	
53	A:	知识有限的人实在是太多了。	Justifying-R
		因为我们也知道一些土著居民, 人家都是闭塞的社会里面,	Exemplifying-R
		在那种原始森林里面生存, 一样可以, 延续下去,	
		他们, 祖祖辈辈。也就是说...	
		Tr. [Too many people have limited knowledge. Because we also know that there are some of the indigenous people, who are isolated societies, they live in that kind of primeval forest, can live well, and they, lived for generations. That is to say...]	
53	B:	人家是生活在那里久了。他只是个农民。	Arguing-R
		那如果, 你现在就把一个农民放在一个大城市里面,	
		你让他...	
		Tr. [They have lived there for a long time. He's just a farmer. If you put a farmer in a big city right now, and you let him...]	
54	A:	不是...	Disagreeing-R
		Tr. [No...]	
55	B:	怎么啦?	Asking Question-R
		Tr. [What?]	
56	A:	问题是我们现在是什么, 是把他放在, 一个更加难的生存环境。	Justifying-R
		而不是说, 你是, 城市以及, 这个荒岛...	
		他们, 没错...	
		Tr. [The problem is we are now putting him in a much more	

		difficult environment. Instead of saying you're in the city, the desert island... they, yeah...]	
57	B:	那你也可以想象...	
		Tr. [Well, you can imagine...]	
58	A:	如果...	
		Tr. [If...]	
59	B:	如果你把一个, 现在一个农民, 农民丢到一个荒岛, 和把一个警察丢到一个荒岛, 谁的生存能力强? 或者...	Criticizing-R
		Tr. [If you put a, now, a farmer, a farmer to a desert island, and a policeman to a desert island, whose survival ability is stronger? Or...]	
60	A:	我觉得是农民	Clarifying-R
		Tr. [I think it is the farmer.]	
61	B:	...一个农民和一个医生, 谁, 能力强?	Criticizing-R
		Tr. [... a farmer and a doctor, who is stronger (survival ability)?]	
62	A:	我觉得是农民	Clarifying-R
		Tr. [I think it is the farmer.]	
63	B:	我觉得是警察或者, 警察...	Disagreeing-R
		Tr. [I think it's the policeman or, policeman...]	
64	A:	如果是...	
		Tr. [If it's...]	
65	B:	在我看来, 警察是绝对的	Suggesting-R
		Tr. [In my opinion, it's absolutely the policeman.]	
		(the 8:18 min)	
66	A:	没有什么, 我, 我告诉你, 这全都是开放性答案。你说谁都有理。只是说你的观点能更, 更加的强烈。	Arguing-R
		Tr. [Nothing, I'm, I'm telling you, it's all open-ended question. Anyone has a strong point. It's just that your opinion can be stronger, much stronger.]	
67	B:	我觉得他的可能性大呀。	Justifying-R
		Tr. [I think he has a good chance.]	
68	A:	没有什么绝对的。这个时候哪有什么绝对。我觉得你就是说, 你说可能性大可以。	Arguing-R
		Tr. [Nothing is absolute. There is nothing absolute in this case. I think you're saying, it is okay for you to say he has a good chance.]	Agreeing-R
		(the 8:34 min)	
70	A:	我没有, 没有完全的, 我也, 我可以说是...	Clarifying-R
		这个, 我没有说我一点都不赞成警察。	Concluding-R
		但是, 我可以说不大赞成医生的。	
		我是这样想的。	

		Tr. [I don't, don't completely, I also, I can say... Well, I didn't say I didn't approve of the policeman at all. However, I am not very agreed to choose the doctor. That is my opinion.]	
71	A:	嗯... 然后你说什么, 嗯... 生物老师, 这个, 园艺师的话... 就没有考虑了, 是不?	Asking Question
		Tr. [Well... and then what do you say, um... the biology teacher, and the, the gardener... we are not going to consider them, are we?]	
72	B:	我们也说了她...	Clarifying-R
		Tr. [We also talked about her.]	
73	A:	应该说老师的知识点也还比较广的, 嗯...	Suggesting-R
		Tr. [The teacher also has a wealth of knowledge um...]	
		(the 9:07 min)	
74	A:	嗯, 那是... When you think about the, when you think about the...	
		这个, 什么... that, when, er... 作文的,	Asking Question
		when you think about the, 这作文怎么说的? 作文?	
		Tr. [Well, that's... When you think about the, when you think about the... the, what, that, when, er... composition, when you think about the, how to say, 'the composition'? 'composition'?]	
75	B:	er... Com... ((inaudible)) composition...	Clarifying-R
76	A:	唉, 管他的。	
		就是当你构思这些, 当你构思这些...	Clarifying
77		Tr. [oh, whatever. I mean when you think about this, when you think about this...]	
78	B:	...composition	Supplementing-R
79	A:	当你构思这篇作文的时候, 你是用了警察和医生, 然后就论述你的观点是吧?	Asking Question
		Tr. [When you came up with this essay, you choose the policeman and the doctor, and then you discussed your point of view, right?]	
80	B:	对啊, 先写背景, 背景, 背景就这个介绍。	Confirming-R
		背景, 然后再写出, 提出问题, 然后写自己的观点。	Elaborating-R
		观点就是这两个, 然后我们直接先, 说两个的理由。	
		然后, 先说他们两个为什么能, 然后再说他们四个为什么=	
		Tr. [Yeah, background first, background, that's the introduction. Background, then write, the problem, and then write your opinion. Those are the two points of view, and then let's just go ahead and say the reasons for both. To talk about why choose these two first, and then discuss why the other four=]	

81	A:	=不能, 你还分析了他们是吗?	Asking Question-R
		Tr. [=cannot. You analyzed them too, didn't you?]	
82	B:	对啊	Confirming-R
		Tr. [Yeah.]	
83	A:	哦	
		Tr. [Okay.]	
84	B:	然后, 因此, 综上所述才得出了...	Clarifying
		Tr. [Then, from what has been discussed above, it comes to the conclusion that...]	
85	A:	你, 你还通过了比较... 嗯... 其实有时候,	Suggesting
		看问题不能说你用一个人的优势去比另一个人的短, 短处。	
		所以说我们需要, 综合的进行比较。	
		Tr. [You, you also used the comparison... well... sometimes, you can't use one person's advantages to compare with another person's disadvantages. So, we need to make a comprehensive comparison.]	
86	B:	我们说啦, 我们有对比呀。	Justifying-R
		Tr. [We talked about that; we have comparisons.]	
87	A:	你已经, 你已经构思了你的吧?	Asking Question
		Tr. [You've, you've conceived your idea, haven't you?]	
88	B:	对啊	Confirming-R
		Tr. [Yeah]	
89	A:	那这次就选我的吧	Suggesting-R
		Tr. [Then how about take mine this time?]	
90	B:	行啊	Agreeing-R
		Tr. [All right.]	
91	A:	要不然我们, 如果, 从另一方面来讲的话, 就是说,	Suggesting
		如果我们选一样的话也没什么, 给老师看也没什么更加新鲜的特色	
		Tr. [Or we could, if, on the other hand, that is, if we choose the same thing, there's nothing new to show to the teacher.]	
92	B:	对啊, 哈哈	Agreeing-R
		Tr. [Yeah, ha-ha]	
93	A:	所以说, 其实我们说实话, 这一二三四五六七八,	
		八个里面我觉得六个人都是可以选的。	Suggesting
		你可以任意组合, 只要你说的有道理, 都是可以的。	Self-elaborating
		对这种开放性的答案, 不要看得太死。	
		你也要宽容的接纳别人的建议。我是这样想。	
		Tr. [So, actually, let's be honest, this one two three four five six seven eight, I think six of the eight can be choose. You can make any combination, as long as what you say makes sense. Don't take this open-ended answer too seriously. You should	

		also be open to other's suggestions. I think so.]	
94	B:	我, 我((inaudible))	
		Tr. [I, I ((inaudible))]	
95	A:	那, 那现在, 写吧。	Suggesting
		来, 看一下。你写这么多? 你...	Asking Question
		Tr. [So, now, let's write. Let me have a look, you have drafted so much? You...]	
96	B:	这里	Clarifying-R
		Tr. [Here.]	
97	A:	挺长的。It's a long time to finish the work.	Acknowledging-R
		Tr. [It is very long.]	
98	B:	你可以写, 写短一点。	Suggesting-R
		Tr. [You can, make it short.]	
99	A:	我, 我文章写一遍就行了。	Clarifying-R
		Tr. [I will write just once.]	
100	B:	随便你了。	Agreeing-R
		Tr. [It's up to you.]	
101	A:	我们来... 嗯, 这个时候, 既然是...	Clarifying
		Tr. [Let's...well, at this point, since it's...]	
102	B:	如果, 如果你写, 你要, 要考虑一下你的读者,	Suggesting
		你不能直接写答案。因为你要先介绍一下是怎么回事。	
		Tr. [When, when you write, you have to, you have to think about your audience. you can't write the answer directly, because you need to explain what's going on.]	
103	A:	嗯, 我也想这样介绍的。	Agreeing-R
		就是...	
		Tr. [Yeah, that's what I wanted to introduce. It's...]	
		There are some people,	
		you can think about the skill on the desert island.	
		The useful skill, and ((inaudible reading the instruction))	
		(The 11:30 min)	
104	A:	直接接着(写)?	Asking Question
		Tr. [Then, go straight on (writing)?]	
105	B:	对啊, 就说, ((inaudible))有六个人, 有什么, 然后...	Confirming-R
		写他们要落到一个荒岛上...	Suggesting-R
		Tr. [Yeah, let's say, ((inaudible)) there are six people, and then... let's say they are going to fall into a desert island...]	
		((inaudible because of the noise))	
		(The 11:45 min)	
106	A:	我就编一个故事吧?	Suggesting
		Tr. [How about I just make up a story?]	

		(The 12:03 min)	
107	A:	你们这么说太短了。	
		Tr. [What you mentioned are too short.]	
108	B:	短吗? 我写的那么长。	
		Tr. [Short? I think mine is long enough.]	
109	A:	看一下。(after 6 seconds) 没看懂。	
		Tr. [Let me have a look. I don't quite understand.]	
		(The 12:58 min)	
110	A:	那个陷入困境的 be trapped in, 那个 trap 怎么拼呀?	
		Tr. [The 'be trapped in' be trapped in, how to spell the 'trap'?]	
111	B:	T-r-a-p-p-e-d, trapped.	
		(The 21: 24 min)	
112	A:	那个运动员怎么拼呀? Athlete?	
		Tr. [How to spell the 'athlete'?]	
113	B:	Athlete	
114	A:	A-t-l-e-t-e... A-t-l-e-t-e,是这个吗? 这个是名词吗?	
		Tr. [Is that it? Is this a noun?]	
115	B:	哎, 不对。我查一下。	
		Tr. [Oh, no. Let me check.]	
		(after 25 seconds)	
116	A:	A-t-h... 我查了, 我知道了。	
		Tr. [I checked. I got it.]	

Below are episodes observed from the whole Lesson Eight by Pair Two, and the writing topic is about which two people can survive in the desert island more successfully.

Started from the 0: 18 min

1	Y:	我们先要假设一个情境。就这个，这个情境，就，就他们…	Clariying
		Tr. [First, we need to assume a situation, just in this..., this situation, they...]	
2	S:	但是他们，就是他们六个人到了，已经到了这个荒岛，然后…	Supplementing-R
		Tr. [But they, it is they six persons that arrived, have arrived at this desert island, and then ...]	
3	Y:	六个人？是六个人？	Asking Question-R
		Tr. [Six persons? Just six persons?]	
4	S:	假如说，你可以在六个人里选两个，假如说他们都到了荒岛上，	Eliciting
		然后哪两个人活的，更那个好一点。	
		Tr. [Supposed that, you can choose two out of the six persons, and supposed that they arrive at the desert island, and then the two persons alive live better there.]	
5	Y:	不，不应该是四个人吗？	Asking Question
		Tr. [No, shouldn't it be four persons?]	
6	S:	((inaudible))选两个	Clarifying-R
		Tr. [((inaudible)) choose two]	
7	Y:	反正就考虑两个人，就说…	
		Tr. [Anyway, we only consider two of them, say ...]	

Started from the 1: 02 min to 3: 05 min.

1	Y:	就，开头就说‘在这个海洋上有个热气球’，然后…‘这里有很多人在里面’，然后就说他们已经安全到达了(荒岛)，没有说他	Clarifying
		们没到达，就说他们已经安全到达了。然后就说，就，类似于	Interpreting information
		就说‘你觉得…最后…’大概是…	
		Tr. [So, it can start like 'There is a hot-air balloon soar above the ocean and... there are a lot of people inside the balloon', then we can say they arrived (the island) safely. So, something like 'you think... at last... who maybe...']	
2	S:	'Who will live in the desert...'	Supplementing-R
3	Y:	两个人	Supplementing-R
		Tr. [Two of them]	
4	S:	er... 'Which two...'	Clarifying-R
5	Y:	'people' ha-ha	Supplementing-R
6	S:	hum... 'Which two guys...'	Clarifying-R
7	Y:	要不我们列一下吧，这里，他们分别是…这个，这个，这个…哪。	Suggesting

		然后就说，应该会哪两个…	
		Tr. [Maybe we can list them one by one. They are...whom, whom, and whom... ex and which two of them...]	
8	S:	然后我们就，‘we should…’ 一个，两个，少两个人。	Supplementing-R
		Tr. [Then we can say, ‘we should…’ One, two... two people are missing.]	
9	Y:	没有。我们第一段就类似于那个情景介绍一下。然后就说在这	Suggesting-R
		六个人当中，最后就打个问号，就以问号的形式就说最后到底	
		会由… ‘what do you think…’ 或者 ‘what do we think’，‘你认为’？	Asking Question-R
		还是 ‘我们认为’？‘你认为’？	
		Tr. [No, the first paragraph can introduce the background information. Then explain that here are six people. We can use a question at last of the paragraph to ask... ‘what do you think...’ or ‘what do we think’, ‘you’? or ‘we’? ‘you’?]	
10	S:	可以…一个设问。就先问 ‘Do you think which two can live better	Agreeing-R
		in that islands?’ ‘We think…’ 然后就说 ‘我们认为…’ 是这样的。	Clarifying-R
		Tr. [Okay, we can use a question. So let’s ask ‘Do you think which two can live better in that islands?’ ‘We think...’ and show ‘what we think are...’]	
11	Y:	那最后 ‘我们认为’ 是要写在第一段还是写在第二段，一大段呢？	Asking Question-R
		第二段一大段写两个人吗？	
		Tr. [Should we write the ‘what we think’ at the first paragraph or the second paragraph? Write the (why we choose these) two people at the whole second paragraph?]	
12	S:	嗯…第一段就可以抛出我们的观点。	Clarifying-R
		Tr. [Hum...we can present our opinion at the first paragraph.]	
13	Y:	第一段？	Asking Question-R
		Tr. [The first paragraph?]	
14	S:	然后第二段就可以写那两个人能留下来有哪些优势。	Suggesting
		Tr. [And then analyze what are the advantages of the two people can be survived at the second paragraph.]	
15	Y:	那我们第三段要写？	Eliciting-R
		Tr. [How about the third paragraph?]	
16	S:	我们第三段就写结论。	Suggesting-R
		[We write our conclusion.]	
17	Y:	写结论？写什么结论？	Asking Question-R
		Tr. [Conclusion? What kind of conclusion?]	
18	S:	就是这两个人… ‘How the… the advantages to that…’	Clarifying-R
		Tr. [Something like... ‘How the... the advantages to that...’]	
		((noising and discussing with the whole class))	
		(From the 3: 56min)	

1	Y:	先写吧，第一段应该很好写	Suggesting
		Tr. [Go ahead with the writing. It should be easy for the first paragraph.]	
		((noising and discussing with the whole class))	
		(From the 6: 55min)	
2	Y:	好吧，就说… 就说在海洋上空有个热气球。然后，	Clarifying
		里面有，很多人… 他们安全的到达了荒岛，荒岛，	Interpreting information
		他们分别是这个这个这个。	
		然后，就。留，哪两个人会生存，下来，会生存的更久	
		Tr. [Well, let's say ... just say there's a hot-air balloon soaring above the ocean, and then, there is, many people ... They safely arrived at the island, the desert island. They are whom, whom and whom respectively. Then, ex which two will survive, and live longer.]	
3	S:	就。生存的更好	Suggesting-R
		Tr. [So, live better]	
4	Y:	那就差不多这个。所以我们可以…	Agreeing-R
		Tr. [That's pretty much it. <u>So</u> we can ...]	
		(From the 7: 58min)	
5	Y:	这怎么读啊？bu...bu...	
		Tr. [How do you read this? bu...bu...]	
6	S:	a balloon	
7	Y:	啊？	
		Tr. [What?]	
8	S:	a balloon	
9	Y:	bal...loon, balloon, inside, inside, there are six of, a bal...loon, are two people... ex six people, six people...	
10	S:	开头怎么写？	Eliciting
		Tr. [How to write at the beginning?]	
11	Y:	开头就写，在海洋的上空有一个热气球，就...写...	Clarifying-R
		Tr. [To start with such description that there is a hot-air balloon above the ocean, just ... write ...]	
12	S:	然后就说他们已经到了那个荒岛	Supplementing-R
		Tr. [Then we say they have arrived at that desert island.]	
13	Y:	哪。他们就。就这个篮子里面有六个人，他们，	Supplementing-R
		他们已经安全，也可以先写他们这个篮子里面有六个人，	Interpreting information-R
		然后写这个这个，这个	
		Tr. [Eh, they just, there are six people in this basket, th ... ex they have been safe. You can also first write that there are six people in the basket, and then write this, this and this.]	
14	S:	哪。还可以再...	Suggesting-R
		Tr. [Eg you can also include ...]	
15	Y:	哦。我觉得这段可以完全抄下来，因为他说他，	Suggesting
		海洋上空有一个热气球，然后它一个热气球正前往这个...	Interpreting

			information
		荒岛。然后，可以说，说荒岛已经达到了，安全的到达了。	
		这个热气球已经安全的到达了这个荒岛，然后就问。	
		哪两个人可以，活的久。就这一段可以完全抄下来。	Concluding-R
		Tr. [Oh, I think this paragraph can be completely copied, because he said he, there is a hot-air balloon above the ocean, then a hot-air balloon is heading for this ... island, and then, we can say that, they have reached the desert island, arrived safely. This hot-air balloon has safely arrived at this desert island, and then it is asked that, which two people can ... live longer. This paragraph can be completely copied.]	
		(after 15 seconds)	
16	S:	然后你要想一下这两个人的优点--优势在哪里	Eliciting
		Tr. [Then you should think about the advantages of these two people ...]	
17	Y:	doctor... 医生-- 对，对-- 医生--	Clarifying-R
		Tr. [doctor ... doctor ... yes, yes ... doctor ...]	
18	S:	可以-- 面对各种突发事件((inaudible))受伤--	Supplementing-R
		Tr. [So they can...face the injuries resulting from various emergency events ((inaudible))...]	
19	Y:	应对紧急事件--	Supplementing-R
		Tr. [to address emergency events...]	
20	S:	我觉得她可以，那个，识别草药，可能是个中医	Clarifying
		Tr. [I think she can, that, recognize herbal medicine, maybe she is a doctor of traditional Chinese medicine.]	
21	Y:	识别草药，就可以得出，哪个是--有毒的	Supplementing-R
		Tr. [Recognize the herbal medicine and she can tell which is ... poisonous.]	
22	S:	感觉生物老师也可以	Clarifying-R
		Tr. [I think a biology teacher is also acceptable.]	
23	Y:	可是，ha-ha	Disagreeing-R
		Tr. [But, ha-ha]	
24	S:	我是想着她是个中医嘛	Clarifying-R
		Tr. [I thought she is a doctor of traditional Chinese medicine.]	
25	Y:	她可以救人，可以救人，可以救人--	Clarifying-R
		Tr. [She can save people, can save people, can save people...]	
26	S:	就说她医术非常精湛	Supplementing-R
		Tr. [It is said she has excellent medical skills.]	

started from 11.39 min to 12.18 min.

			Coding
1	S:	到时候我们要不要那个，就是反方向说一下？	Suggesting
		Tr. [Do we need to argue from the opposite side?]	
2	Y:	反方向说谁呀？--说他(足球运动员)吗？	Asking Question-R

		Tr. [Opposite side? about whom? ...him (the football player)?]	
3	S:	'the football...' haha, 'just know how to play the... can do not...'	Clarifying-R
4	Y:	他只...他..., 就说... '就因为他平时训练的运动量比较大, 然后他可能需要很多能量去补充, 但是他并没有...'	Interpreting information-R
		Tr. [He...he only, we can say... 'He may need lots of energy, because he has a large amount of training exercise in daily life. But he cannot...']	
5	S:	吃的多。	Supplementing-R
		Tr. [He eats a lot.]	
6	Y:	对, 他吃的多, 但是荒岛上并没有那么多食物, 所以他容易饿死。	Agreeing+ Interpreting information-R
		Tr. [Yes, he eats a lot, but there isn't enough food on the desert island. He may starve easily.]	
7	S:	诶, 对的。	Agreeing-R
		Tr. [Yes, that's right.]	

		((writing))	
		(From the 17: 43min)	
1	S:	The answer is--the answer we think is...可以吗?	Suggesting
2	Y:	我们的...答案	Clarifying-R
		Tr. [Our ... answer]	
3	S:	答案是...我们认为答案是	Clarifying-R
		Tr. [The answer is ... We think the answer is...]	
4	Y:	嗯	Agreeing-R
		Tr. [Eh.]	
		(From the 19: 23min)	
5	Y:	没了, 就开始列了吧, 我只写了((inaudible))两点, 可以救人, 因为...	Clarifying
		Tr. [No more. Let's start listing the points. I just wrote down ((inaudible)) two points. She can save people, because ...]	
6	S:	cure people, when someone is hurt	Supplementing-R
7	Y:	被野生动物伤了((inaudible))	Supplementing-R
		然后就是她对人的生理结构很熟悉。	
		然后还有什么, 我想不出来了	Eliciting
		Tr. [hurt by a wild animal ((inaudible)). Then she is familiar with the person's physiological structure, and then what else, I can't figure it out.]	
8	S:	她能不能知道, 就是如何, 就是, 更好的, 节, 节省...体力...	Suggesting-R
		Tr. [Can she know, how, that is, better, and sa ... save ... physical strength ...]	
9	Y:	体力, hum... know, know, realise, 了解, 用哪个词好一些?	Agreeing-R

		realise 这是了解认识, know 啊?	Asking Question
		Tr. [Physical strength, hum ... know, know, realise, understand, which word is better? "realise" means understanding and awareness, know?	
10	S:	know	Confirming-R
		(From the 21: 45min)	
11	Y:	这句话行吗? He knows-- he knows how to-- save,	Suggesting
		就 how to save? 可是我觉得是以--how to save--more--	
		Tr. [Is this sentence Okay? He knows... he knows how to... save, so how to save? But I think the sentence with --how to save...more...]	
12	S:	这句话可以	Agreeing-R
		Tr. [This sentence is Okay.]	
13	Y:	嗯?	Asking Question-R
		Tr. [Eh?]	
14	S:	可以。有--有原因有结论, 这句话可以	Acknowledging-R
		Tr. [OK, that ... there are reasons and conclusions, this sentence is acceptable.]	
15	Y:	那这句话怎么写啊?	Asking Question-R
		Tr. [How do you write this sentence?]	
		(after 11 seconds)	
16	Y:	没有, 我觉得这个可以放到这里面,	Suggesting
		因为我感觉这个是这个的大部分。就。因为他很了解人的生理结构,	Interpreting information
		他可以--就是很熟悉的生理结构--	
		Tr. [No, I think this can be put here, because I think this is the most part of it. So, as he is quite familiar with the person's physiological structure, he can ...that is, he knows the person's physiological structure very much ...]	
17	S:	就是简单写然后就可以--	Suggesting-R
		Tr. [Just simply write it and then can ...]	
18	Y:	不会这个((inaudible))啊	Asking Question
		Tr. [Not this ((inaudible))]	
19	S:	加个 and, and how to save--more longer--	Suggesting-R
		longer 啊 more longer? 应该就是 longer	
		Tr. [Add 'and, and how to save... <u>more longer</u> ...'; longer or more longer? It should be longer.]	
20	Y:	Eg longer--	
21	S:	更久	
		Tr. [Longer]	
22	Y:	就--	
		Tr. [So ...]	
23	S:	more-- longer 也是比较级	
		Tr. [more... longer is also the Comparative.]	
		(From the 26: 56min)	

24	S:	他是 she 还是 he 啊 ?	Asking Question
		Tr. [Is it 'she' or 'he'?	
25	Y:	He, he 你一直以为他是个女的啊 ?	Clarifying-R Asking Question-R
		Tr. [He, he, did you think he is a female?]	
26	S:	对啊	Confirming-R
		Tr. [Yes.]	
27	Y:	我简直((inaudible)), 哈哈	
		Tr. [I'm ((inaudible)), ha-ha]	
28	S:	他是男的啊 ?	Asking Question
		Tr. [Is he a male?]	
29	Y:	我就说, 你怎么会说一个男的跟一个男的结婚	Clarifying
		Tr. [That's what I <u>meant</u> , how can you say that a man is married to a man?]	
30	S:	我是听他们(other groups)的	Clarifying-R
		Tr. [I was following theirs (other groups).]	
31	Y:	ha-ha	
32	S:	He	
33	Y:	He had a... 不能只写 a	Clarifying
		Tr. [He had a...It is not allowed to write an "a" only.]	
34	S:	丰富的	Supplementing-R
		Tr. [rich]	
35	Y:	rich	Clarifying-R
36	S:	嗯 rich...	Agreeing-R
		Tr. [Eh, rich ...]	
		(after 8 seconds)	
		...experience	
37	Y:	你就写这个, cli...	Suggesting
		Tr. [You write this, cli...]	
38	S:	这是临床经验(的意思)	Clarifying-R
		Tr. [This is (means) clinic experience.]	
39	Y:	clinic, 也是差不多啊, 临床经验谈, 临床, 临床...	Clarifying-R
		Tr. [clinic, it's pretty much it, clinic experience, clinic, clinic ...]	
40	S:	写 rich experience 吧, 临床, 临床不...	Arguing-R
		Tr. [Just write rich experience, clinic, clinic, no ...]	
41	Y:	那应该要写... 他有什么样的, 什么样的,	Justifying-R
		什么样丰富的经验呀, 他有什么样的丰富的...	
		我已经写了, <u>ex</u> , he have... the experience of, of...((inaudible))	
		Tr. [You should write ... he what kind of rich experience, what kind of rich ... I have already written that, <u>ex</u> , he has... the experience of, of...((inaudible))]	
42	S:	了解人的生理结构应该是另外一个, 就写这个吧, 临床	Concluding-R
		Tr. [Understanding the person's physiological structure should be for the other person, <u>So</u> write this, clinic]	

43	Y:	cli-nic ((inaudible))	
		(From the 28: 49min)	
44	Y:	...experience	Clarifying
45	S:	and skills	Supplementing-R
46	Y:	嗯 and...skills	Agreeing-R
		Tr. [Eh, and...skills]	
47	S:	剩下的交给我。你想一些那农民	Eliciting
		Tr. [Leave the rest to me. You think about that farmer.]	
48	Y:	啊?	Asking Question-R
		Tr. [Ah?]	
49	S:	剩下的交给我来整理。你来想一下农民	Suggesting-R
		Tr. [The rest will be collated by me, and you think about the farmer.]	
		((thinking and writing))	
		(From the 29: 48min)	
50	S:	农民	Clarifying
		Tr. [Farmer]	
51	Y:	吃的东西多	Supplementing-R
		Tr. [He eats a lot.]	
52	S:	体力好。然后...	Supplementing-R
		Tr. [Good physical strength, and then ...]	
53	Y:	为什么农民会体力好?	Criticizing-R
		Tr. [Why does the farmer have good physical strength?]	
54	S:	因为农民干农活呀。那个, ((inaudible))每个人的体力都很好	Justifying-R
		Tr. [Because farmers do farm work, and, (inaudible) everyone has good physical strength.]	
55	Y:	那这个也是体力好。 ((inaudible))he should train...	Arguing-R
		Tr. [Then this one also has a good body, ((inaudible)) he should train ...]	
56	S:	农民对农作物...	Justifying-R
		Tr. [Farmers are ...with crops ...]	
57	Y:	很熟悉	Supplementing-R
		Tr. [quite familiar]	
58	S:	对农作物很熟悉。就是知道怎么种。了解农时怎么去种那个...	Justifying-R
		呃... 什么时, 什么...	
		Tr. [very familiar with the crops, that is, they know how to grow crops, and know when and how to grow that ... Uh...when and what ...]	
		(Y is writing, and after 10 seconds)	
59	S:	然后他对天气的状况也很了解。农民都很了解那个天。天气	Interpreting information
		状况, 根据一些自然现象	
		Tr. [Then he knows the weather conditions well. All the farmers quite know that, weather conditions, according to some natural phenomenon]	

		(From the 31: 28min)	
60	Y:	可是我觉得这个不现实。种食物？种食物要种多久啊？哈哈	Arguing-R
		死都死了，所以不能说种食物吧	
		Tr. [But I don't think this is realistic, to grow food? How long will it take to grow food? Ha-ha. Dead already, so don't talk about food.]	
61	S:	hum... farming...	Clarifying-R
62	Y:	还是种吧，反正也没得写了，毕竟这是一个长期的，	Agreeing-R
		万一是个长期的...	Justifying-R
		Tr. [Grow it anyway, I don't have anything to write anyway, after all, this is a long-term... In case it is a long-term ...]	
		(From the 34: 06min)	
63	S:	查一下那个。查一下那个，草药	
		Tr. [Check that, check that, herbal medicine]	
64	Y:	草药？	
		Tr. [herbal medicine?]	
65	S:	--herbal	
66	Y:	herbal medicine	
		(From the 36: 50min)	
67	Y:	是不是。呃，医生写一段，农民写一段，然后写这个吗？这个...	Asking Question
		Tr. [Right? Uh, one paragraph about the doctor, one paragraph for the farmer, and then write this? This ...]	
68	S:	剩下那些就不用写了	Suggesting-R
		Tr. [It is not necessary to write the rest.]	
69	Y:	啊？	Asking Question-R
		Tr. [Ah?]	
70	S:	那些不写了，这都写了两个了	Clarifying-R
		Tr. [Don't write those. We have written two of them.]	
71	Y:	结尾怎么写啊？	Eliciting
		写一个((inaudible))	
		Tr. [How to write the end? Write a ((inaudible))]	
72	S:	写吗？	Asking Question
		Tr. [Write?]	
		(From the 36: 50min)	
73	Y:	然后还要写吗？So--所以他对自然很了解，然后...	Suggesting
		Tr. [And then do you want to write more? So, So he knows a lot about the nature, and ...]	
74	S:	然后加个...	Supplementing-R
		Tr. [Then add ...]	
75	Y:	因为我是说，这个说...	Clarifying
		Tr. [Because I mean, this is ...]	
76	S:	还要加一句	Suggesting-R
		Tr. [One more sentence]	
77	Y:	对，说他对自然很了解，当然说了这么多的意。意思就，	Agreeing-R
		所以他活的，还是可以活的很久，就不知道该怎么写了	Concluding-R

		Tr. [Right. We say he is quite familiar with the nature. Of course, saying so much mea ... means that, so he is alive, and he lives for a very long time, then I don't know how to write.]	
		(From the 44: 03min)	
78	S:	好了, 对比。是吧?	Asking Question
		Tr. [Okay, comparison, right?]	
79	Y:	嗯...	Criticizing-R
		对比怎么对比啊, 开头都没开到, 开头都((inaudible))	
		Tr. [Hum... How to compare them? We haven't started the beginning, the beginning has ((inaudible))]	
80	S:	就是写一个 to compare the football player	Suggesting-R
		Tr. [Just write a case to compare the football player.]	
81	Y:	compare, compare to, compare to...	Clarifying-R
82	S:	compare with 也可以	Suggesting-R
		Tr. ['compare with' is also acceptable.]	
83	Y:	嗯, 有, 有一个位置是类似于比	Clarifying-R
		Tr. [Hum, yes, there is a point similar to com...]	
84	S:	就...	
		Tr. [So ...]	
85	Y:	以前我们老师讲的, 一个是比较一个是比	Clarifying
		Tr. [Our teacher previously told us that one is comparison and the other is com ...]	
86	S:	等等啊, 和什么, 和什么什么比较	Asking Question-R
		Tr. [Wait, with what, to compare with what?]	
87	Y:	就你把你一个归为, 比, 就是比作为((inaudible)),	Clarifying-R
		compare with 就是... compare to 喽	
		Tr. [You categorize one as comparison, that is, assimilate it with ((inaudible)), 'compare with' is ... 'compare to'.]	
88	S:	comparing to the... 是吧?	Asking Question-R
		Tr. [Is it 'comparing to the...', right?]	
89	Y:	嗯	Confirming-R
		Tr. [Hum]	
		(From the 45: 52min)	
90	Y:	是, 是可以这样写吗?	Asking Question
		Tr. [Yes, can it be written like this?]	
91	S:	是什么意思啊?	Asking Question-R
		Tr. [What does that mean?]	
92	Y:	强壮的体魄	Clarifying-R
		Tr. [Strong body]	
93	S:	He had... he...	Clarifying-R
94	Y:	是这样写的吗? 我不确定	Asking Question
		Tr. [Is it written like this? I'm not sure.]	
95	S:	你就写 He had strong body	Suggesting-R

		Tr. [So you write 'He had strong body'.]	
96	Y:	strong body...	Agreeing-R
		(From the 46: 52min)	
97	S:	Although he had strong body, but, he can,	Clarifying
		he just <u>know</u> how to play bas--how to play--football	
98	Y:	嗯，先写这一句，再写--他需要很多食物去维持体力。	Agreeing-R Supplementing-R
		Tr. [Hum, write this sentence first, then write that ... he needs a lot of food to maintain his strength.]	
		(From the 50: 28min)	
99	S:	就，查，查一下那个，作为参考	
		Tr. [Just, <u>ch</u> ... check that, for reference]	
100	Y:	嗯？	
		Tr. [E <u>g</u> ?]	
101	S:	作为参考	
		Tr. [for reference]	
102	Y:	什么？	
		Tr. [What?]	
103	S:	就，现在下结论，就是，这个足球运动员不作为参考，	
		不作为选择...	
		Tr. [Now, it is concluded that, that, this football player is not used as a reference, not as an option ...]	
104	Y:	就，就不认为，不认为他可以活的很久，不要说不作为参考。	
		因为我们最开始提出的是谁可以活的久嘛。	
		Tr. [So, I don't think, don't think he can live a long time, so don't say it is not used for reference, because what we proposed at the beginning is who can live long.]	
		(From the 51: 18min)	
105	S:	然后，结论了	Suggesting
		Tr. [Then, we come to the conclusion.]	
106	Y:	这个，这怎么结...	Eliciting-R
		Tr. [This, how to conclude ...]	
		(after 4 seconds)	
		就是我们认为他，他跟那个 farmer 可以活的久吗？	Asking Question-R
		Tr. [We think he...he and that farmer can live long?]	
		(after 4 seconds)	
107	S:	可不可以这样写，	Suggesting
		Tr. [Can it be written like this?]	
		Comparing to the advantage, advantages of the, of the, of the...	
		<u>E</u> ...we think the farmer and the doctor can live longer than other	
108	Y:	就，就，那就这样吧	Agreeing-R
		Tr. [So, so, that's it.]	

Episode from Lesson 8: Student C, D and G wrote about which two people can survive in the desert island more successfully; started from 0.35 min to 1.57 min.

1	G:	那个。我觉得医生...可以留吧	Clarifying
		Tr. [Well. I think the doctor ... can be kept.]	
2	C:	废话	Agreeing-R
		Tr. [Nonsense]	
3	G:	因为她比较...	Interpreting information
		Tr. [Because she is ...]	
4	D:	要用英语。用英语交流。	Suggesting
		Tr. [Let's use English, communicate in English.]	
5	C:	用吧。	Agreeing-R
		Tr. [Okay.]	
6	G:	The doctor will live.	Clarifying
7	C:	will live?	Asking Question-R
8	G:	will live, L I V E 生存。	Clarifying-R
		Tr. [will live, L I V E.]	
9	C:	Okay. 然后呢? and?	Agreeing-R Eliciting-R
		Tr. [Okay. And then? and?]	
10	G:	They... hum...	Clarifying-R
11	C:	I think at first, can we talk about our structure of the whole...	Suggesting
12		whole... article?	
13	G:	article? ... article 是指什么?	Asking Question-R
		Tr. [article? ... What does 'article' refer to?]	
14	C:	就是...	
		Tr. [Just ...]	
15	D:	就是说一下文章的结构。	Clarifying-R
		Tr. [Just talk about the structure of the article.]	
16	G:	哦。我以为你说的是... 哈哈	
		Tr. [Oh. I thought what you said is ... ha-ha]	
17	C:	你(D)是在当翻译吗? 哈哈	
		Tr. [Are you (D) acting as a translator? Ha-ha]	
18		(4 sec silence)	
19	C:	就先说选...	Suggesting
		Tr. [Let 's talk about choosing ...]	
20	G:	哪一个。呃... At first, we see... which one should be choose?	Supplementing-R
		Tr. [Which one? Et ...At first, we see... which one should be chosen?	
21		对。 choose	
		Tr. [Yes. Choose]	
22	G:	then give reasons	
23	C:	hum... why can we have an introduction of the whole stories...	Suggesting-R
24		of background? I think we should (do that).	

Started from 2.17 min to 4.35 min

1	G:	I think we should choose the two person first, then to considerate how to write the article.	Suggesting
2	C:	哦。 Tr. [Oh.]	
3	G:	Choose first	
4	D:	不是。她(C)是说先写一个 background, 然后再... Tr. [No, she (C) said we should write a background first, and then ...]	Disagreeing-R
5	C:	嗯。 Tr. [Hum.]	Confirming-R
6	G:	但是我得。要先把人给选出来, 然后再考虑... Tr. [But I think we should choose persons first, and then think about ...]	Arguing-R
7	D:	他说要写个背景, 然后再引出那个话题。 引出那个话题说我们要选两个, 懂吗? Tr. [He said that he would write a background, and then elicit that topic. To elicit that topic, we have to choose two, understand?]	Justifying-R
8	G:	可是我们人都没选出来怎么考虑这篇文章的那个(背景)呀? Tr. [But how can we choose that (background) of the whole article without choosing persons?]	Arguing-R
9	D:	背景... (介绍)原因为什么要选两个人出来 Tr. [Background ... (introduce) the reasons that we choose two persons.]	Justifying-R
10	C:	If you don't have <u>background</u> why we have to choose person?	Criticizing-R
11	D:	我就是觉得(直接选人)很突兀。 Tr. [I just think that it is abrupt (to directly choose persons).]	Supplementing-R
12	G:	We have to... background, but I think to... choose the two <u>person</u>	Arguing-R
13		first, 就是我们先想好要选哪两个人才可以啊。 Tr. [We have to... background, but I think to... choose the two persons first. That is, we should first figure out the two persons to be chosen.]	
14	C:	现在写为什么要选人呀。 Tr. [Now write why we should choose people.]	Justifying-R
15	G:	为什么要选人那是因为我们。我们是... Tr. [The reason that we want to choose people is that we, we are ...]	Arguing-R
16	C:	我们现在讨论的重点是 background。 如果是读者的话他不知道我们讨论的重点是... Tr. [Now what we discussed is focused on the background. As for readers, they don't know the focus of our discussion is ...]	Justifying-R
17	D:	讨论的重点是要先讨论下文章的结构。懂吗? Tr. [The discussion should be first focused on the structure of the article, understand?]	Justifying-R
18	C:	对 Tr. [Right.]	Agreeing-R
19	G:	我知道啊 Tr. [I know it.]	Confirming-R
20	D:	文章的结构。先要写背景然后再写你的观点。观点再... Tr. [Regarding the structure of the article, first write the background and then the point of view, point of view, then ...]	Suggesting-R

21	G:	问题是这是讨论不是写文章吧	Arguing-R
		Tr. [The problem is that it is discussion not writing articles.]	
22	D:	她就是让我们先讨论文章的结构。你懂吗？	Justifying-R
		Tr. [She just let us first discuss the structure of the article, understand?]	
23	C:	structure...	Supplementing-R
24	D:	structure, 然后再讨论下到底选哪一个。懂我的意思了吗？	Suggesting-R
		Tr. [structure, and then discuss which one to choose, do you understand what I mean?]	
25		哈哈，不会还没懂？	Asking Question-R
		Tr. [Haha, don't you understand it?]	
26	G:	我知道。我知道你们什么意思。	Confirming-R
		Tr. [I know, I know what you mean.]	
27	D:	对啊，然后就选了...	Clarifying-R
		Tr. [Yeah, then I choose ...]	
28	G:	我知道你什么意思。就说我觉得吧应该先把两个人选出来， 然后再来考虑怎样写这篇文章。怎样写它的背景它的那些东西。 我知道你们是什么意思。	Arguing-R
		Tr. [I know what you mean. I think, we should choose the two persons first, then consider how to write this article and how to write the description related to the background. I know what you mean.]	
29	C:	两个人... 我们已经选出来了呀。	Justifying-R
		Tr. [Two persons ... We have chosen them.]	
30	G:	哪两个呀？你说了选两个了吗？	Asking Question-R
		Tr. [Which two persons? Did you say that two persons should be chosen?]	
31	D:	没有。	Clarifying-R
		Tr. [No.]	
32	C:	那刚才我们不是选出来了么？	Criticizing-R
		Tr. [Didn't we choose them just now?]	
33	D:	两个人...	Clarifying-R
		Tr. [Two persons ...]	
34	C:	刚刚你们讨论。不是讨论出来了么？	Criticizing-R
		Tr. [You discussed it just now. Didn't you get the result?]	
35	D:	没有，我们只讨论了医生啊。	Clarifying-R
		Tr. [No, we just talked about the doctor.]	
36	G:	所以说的是...	
		Tr. [So the point is ...]	
37	D:	刚刚讨论的时候打断了。	
		Tr. [The discussion was interrupted just now.]	
38	G:	所以我说两个人选... 不是，要选两个人活下来。	Clarifying-R
		Tr. [So I said there are two alternative persons ... No, two persons should be chosen to survive.]	
39	D:	...两个人在这个岛上...	
		Tr. [... two persons are on this island ...]	
40	C:	这是(选两个人)活下来呀？	Asking Question-R
		Tr. [Does this mean (two persons to be chosen) to survive?]	
41	D:	对呀	Confirming-R

		Tr. [Yes.]	
42	C:	不是啊。(应该是选两个人)扔掉啊。	Asking Question-R
		Tr. [No. (Two persons should be chosen) Throw them away.]	
43	G:	活下来	Clarifying-R
		Tr. [Survive.]	
44	D:	老师换(话题)了, 老师换了。change, change the topic 懂吗?	Supplementing-R
		Tr. [The teacher changed (the topic), the teacher changed it. change, change the topic, understand?]	
45	C:	换了?	Asking Question-R
		Tr. [Changed?]	
46	D:	她(老师)说换了, 上课不认真听讲, 搞了半天在这里。	Clarifying-R
		Tr. [She (The teacher) said the topic is changed. You didn't listen carefully in the class, so far we go, and finally we get the point.]	

Started from 4.50 min to 7.53 min

1	G:	生存能力强... 最强。Including the two person we...	Clarifying
		Tr. [strong, the strongest survival capability ... Including the two persons we...]	
2	D:	At the first, we should choose doctor.	Clarifying
3	G:	Yeah.	Agreeing-R
4	D:	and... then...	Clarifying-R
5	G:	为什么直接排除了这个呀?	Eliciting-R
		Tr. [Why did you directly exclude this?]	
6	D:	解释啊... farmer...	Clarifying-R
		Tr. [Explain it ... farmer ...]	
7	G:	... he <u>know</u> how to grow... food...	Justifying-R
8	C:	In he <u>arrive</u> ... desert... desert island..., one month is impossible to grow food.	Arguing-R
9	D:	什么呀?	Asking Question-R
		Tr. [What?]	
10	C:	如果真的, 到了这个荒岛, 一个月就会长出食物来呀?	Arguing-R
		Tr. [If it is true, they arrive at this desert island, will food be harvested in one month?]	
		你试一下。	
		Tr. [Have a try.]	
11	G:	haha 'grow food...' 能不能活到一个月(是个问题)。	Agreeing-R
		Tr. [haha 'grow food...' can they survive a month (it is a problem).]	
12	C:	你看你怎么来弄食物?	Criticizing-R
		Tr. [How can you get food?]	
13	D:	find... (some food)	Justifying-R
14	C:	都说是荒岛了, desert	Arguing-R
		Tr. [We say it is a desert island, desert]	
15	D:	好吧。	Agreeing-R
		Tr. [Well.]	
16	G:	荒岛上也会有... grass 草地呀	Justifying-R
		Tr. [There will also be grass on the desert island ...]	

17	C:	吃草啊？草医生也认识呀。	Criticizing-R
		Tr. [Eat grass? The doctor can also recognize grass?]	
18	G:	哎呀，还有，他(农民)可能知道哪些草可以有毒的，生活经验。	Justifying-R
		Tr. [Ah, and, he (the farmer) probably knows which grass is poisonous, based on life experience.]	
19	C:	那为什么不选这个呢？biology (teacher) ...?	Criticizing-R
		Tr. [So why not choose this? biology (teacher) ...?]	
20	D:	为什么要选她呀？	Eliciting-R
		Tr. [Why choose her?]	
21	C:	...生物学家，生物老师	Clarifying-R
		Tr. [... Biologist, biology teacher]	
22	G:	生物老师，说不定她没有生活经验。哈哈，好吧，我错了。	Clarifying-R
		Tr. [Biology teacher, maybe she has no life experience. Haha, okay, I was wrong.]	
23	D:	我觉得 the teacher maybe pay more attention to the theory, but...	Arguing-R
		Tr. [I think the teacher maybe pay more attention to the theory, but...]	
24	C:	to the...?	
25	D:	...but the practice is...	
26	G:	poor	Supplementing-R
27	D:	对	Confirming-R
		Tr. [Right.]	
28	C:	Maybe it's a university teacher. We had to do the ex...experiment	Justifying-R
29	D:	But...	
30	C:	What do you... compare the <u>two person</u> , what do you think it's more professional?	Eliciting
31	D:	... I think the... farmer	Clarifying-R
32	C:	Basically she (the teacher) know more than the farmer, and she...	Arguing-R
33	D:	But I think it's... His experience is more...	Justifying-R
34	G:	我要 <u>haha</u> ... They are living in the desert island... they have to, they have to have the strong body to... <u>ex</u> 就抵御严寒啊或者是那个之类的。所以我觉得这个... maybe...	Arguing-R
		Tr. [I want <u>haha</u> ... They are living in the desert island... they have to, they have to have the strong body to... <u>ex</u> to protect themselves against the severe cold or something like that. So, I think this ...]	
35	D:	她(老师)的体质不好吧？	Criticizing-R
		Tr. [Does she (the teacher) have weak body?]	
36	G:	对啊，老师...	Agreeing-R
		Tr. [Yes, the teacher ...]	
37	C:	谁说的老师就体质不好了，你们是个...	Disagreeing-R
		Tr. [Who said the teacher has weak body, you are ...]	
38	G:	万一呢？	
		Tr. [In case...?]	
39	C:	...weak debate	Arguing-R

40	G:	老师更懂得...	
		Tr. [The teacher knows better ...]	
41	D:	相对于农民来说嘛。天天风吹日晒然后，肯定能...	Justifying-R
		Tr. [Compared to the farmers who have to expose to the weather every day, they can definitely ...]	
42	G:	在这两个里(比较)啦。	Suggesting-R
		Tr. [(Comparison to be made) between the two.]	
43	C:	那你为什么不说不说这两个... 你觉得农民抵御....	Criticizing-R
		Tr. [Then why don't you say these two ... Do you think farmers can resist ...]	
44	D:	首先她(老师)生活经历没有他(农民)那么多。	Justifying-R
		但是只是。只是重理论...	
		Tr. [First of all, she (the teacher) has less life experience than him (the farmer). But she just, just focuses on the theory ...]	
45	G:	weak body...	Supplementing-R
46	D:	然后生活经验没有那么多。体质也肯定不行。	Interpreting information-R
		农民经常在外面生活...	
		Tr. [Then she doesn't have so much life experience and definitely doesn't have strong body. While farmers live outside most of the time ...]	
47	C:	你说老师。老师是 (cough) 'just theory, cannot practice,'	Arguing-R
		This is a weak debate.	
		Tr. [You said the teacher, the teacher is (cough) 'just theory, cannot practice,' This is a weak debate.]	
48	G:	maybe, maybe!	Justifying-R
		From 7.56 min to 8.42 min	
49	C:	Hum... 那是高中的老师吗? 一看, 一看就觉得是外国人...	Clarifying
		Tr. [Hum ... Is that a high school teacher? At first glance, I think he is a foreigner ...]	
50	G:	不是, 觉得他可能会...	Disagreeing-R
		Tr. [No, I think he may be ...]	
51	C:	外国的, 外国的那种老师他们一般都会做实验和了解,	Justifying-R
		那都是读过大学的人, 肯定就去外面观察过呀	
		Tr. [Foreign, those foreign teachers, they usually do experiments and understand... They are those who have studied in the university and they would definitely go outside for observation.]	
52	D:	你去过?	Criticizing-R
		Tr. [Have you been to ...?]	
53	C:	不是, 我说那种生物学家	Justifying-R
		Tr. [No, I mean that kind of biologist]	
54	G:	baba	
55	D:	但是=	
		Tr. [But =]	
56	C:	=你看我们...实习老师, 做实验的时候...	
		Tr. [=Look at our ... intern teacher, when doing an experiment ...]	

57	G:	你好夸张...(inaudible)	Arguing-R
		但是, 我就觉得, 我就觉得。她(老师)好像体质有点弱。	
		跟这两个比起来	
		Tr. [How exaggerated ... (inaudible) However, I think, I just think, she (the teacher) seems to be a little weak, compared with these two.]	
58	D:	对。快点先写啦。	Agreeing-R
		Tr. [Right, let's write first.]	
59	C:	haha	
60	G:	先选啦, 先选然后再...	Suggesting
		(选)doctor	
		Tr. [Choose first, first choose and then ... (choose) the doctor]	
61	C:	我想选这个	Clarifying-R
		Tr. [I want to choose this.]	
62	D:	我选, 这个和这个	Clarifying-R
		Tr. [I choose, this and this.]	
63	G:	还是这两个都差不多啊?	Asking Question-R
		Tr. [Or the two are more or less equivalent?]	
64	D:	我觉得这个	Clarifying-R
		Tr. [I think this one...]	
65	C:	我觉得这个	Clarifying-R
		Tr. [I think this one...]	
		From 8.49 min to 9.47 min	
66	G:	诶, policeman 和 soldier 是不是一样的啊?	Asking Question
		Tr. [Oh, is a policeman same as a soldier?]	
67	C:	啊?	Asking Question-R
		Tr. [Ah?]	
68	D:	Policeman 和 soldier	Clarifying-R
		Tr. [Policeman and soldier]	
69	C:	Soldier?	Asking Question-R
70	D:	Soldier...	Clarifying-R
71	C:	'soldier' 是 '军人'	Clarifying-R
		Tr. ['soldier' means 'soldier'].	
72	G:	对啊, 他, 'soldier'才是没必要的, 没必要那个...	Agreeing-R Clarifying-R
		Tr. [Yeah, he, the 'soldier' is not necessary, it's not necessary ...]	
73	C:	军人, 军人要抓贼吗? 军人要抓贼吗?	Asking Question-R
		Tr. [Soldiers, soldiers need to catch thieves? Soldiers need to catch thieves?]	
74	D:	每天要 training... 每天要锻炼...	Clarifying
		Tr. [They need training every day... taking exercise every day ...]	
75	C:	警察不一定每天要锻炼啊, 警察要抓贼吗?	Arguing-R Asking Question-R
		Tr. [The policeman doesn't have to exercise every day. Does the policeman catch thieves?]	
76	D:	所以我问他和 soldier 两个人之间的 compare	Concluding-R

		Tr. [So I ask to compare him with the soldier.]	
77	C:	Soldier is stronger?	Suggesting-R
78	D:	Compare...	
79	C:	Soldier is stronger.	
80	G:	所以我说他们两个都标一下，看一下他们。	Clarifying
		如果他是跟那个，soldier 之类的话，那我觉得肯定是选这个了。	Interpreting information
		因为他会有，更多的那种专业知识啊之类的，知道很多...	
		Tr. [So I said that we should mark both of them and think about them. If he is compared with that, that soldier or similar people, then I think I will definitely choose this, because he will have, more professional knowledge of that kind, and know a lot ...]	
81	D:	专业技能	Supplementing-R
		Tr. [Professional skills]	
82	G:	或者是跟，那个，猛兽搏斗，fight	Supplementing-R
		Tr. [or fight against, that beast, fight]	
83	D:	如果他力气不够...	Arguing-R
		Tr. [If he doesn't have enough strength ...]	
84	G:	我说如果他和 soldier 一样的话	Justifying-R
		Tr. [I mean if he is like the soldier]	
85	D:	有枪	Clarifying-R
		Tr. [carry a gun]	
86	G:	但是我不知道他...	
		Tr. [But I don't know if he ...]	
		(3 sec silence)	
87	C:	就算是有枪，都说是荒岛，荒岛有老虎吗？	Criticizing-R
		Tr. [Even though he has a gun, it is a desert island, is there any tiger on the island?]	
88	G:	没老虎也有其他的东西。	Justifying-R
		Tr. [Even though there are no tigers, there will be other things.]	
89	C:	比如？	Eliciting-R
		Tr. [For example?]	
90	G:	比如，鳄鱼	Exemplifying-R
		Tr. [For example, crocodiles]	
91	C:	haha	
		From 10.10 min to 11.43 min	
92	D:	'...energetic'	
93	C:	'...energetic'	
94	G:	...too, 他也是	Clarifying
		Tr. [...too, him too]	
95	D:	我也觉得，而且人家经过，那种专门的训练，special...	Agreeing-R Interpreting information, R
		Tr. [I also think that they have accepted that kind of professional training, special ...]	

96	G:	可是这个，军人和警察到底是一个什么关系？	Asking Question-R
		Tr. [But this, what is the relationship between soldiers and police?]	
		他们到底一样吗？	
		Tr. [Are they the same?]	
97	C:	不一样。	Clarifying-R
		Tr. [No.]	
		警察是有那种专门的警察学校	
		Tr. [The police are from that kind of specialized police college.]	
98	D:	肯定也有专门的，专门的那种训练，不然怎么抓贼啊之类的	Arguing-R
		Tr. [There must be special, that kind of special training, otherwise how to catch thieves and the like.]	
99	C:	可是警察的训练，他主要是那种探案的训练，知道吗。	Justifying-R
		那种作案心理。就算是训练，他肯定，肯定不是那个体格训练。	
		肯定不是放在第一位的	
		Tr. [But regarding the training for the police, it is mainly on the training of detectives, you know, on that kind of criminal psychology. Even if it's training, definitely, it's definitely not physical training. Physical training is definitely not in the first place.]	
100	G:	哦，还有，我，我听说那，那个，就是知道那种日常的。	Interpreting information-R
		不是日常，就是那种专业知识比较多。	
		比如说怎么求救啊之类的，万一...	
		Tr. [Oh, and, I, I heard that, that, he only knows the daily affairs. He should have more knowledge on either daily affairs or professional fields. For example, how to ask for help, in case ...]	
101	D:	对对对对	Agreeing-R
		Tr. [Yes, yes, yes]	
102	G:	万一高空上面有热气球或者是有飞机的话，他会，	Examplifying-R
		他会用一定的那种信号啊，有时还能祈雨啊，求雨啊...	
		Tr. [In case there is a hot-air balloon or an aircraft soaring in the sky, he will, he will use some kind of signal, and sometimes he can pray for rains...]	
103	C:	这是在讨论这个问题吗？	Asking Question-R
		Tr. [Are we discussing this question?]	
104	G:	这，就选这两个嘛	Clarifying-R
		Tr. [So, so we choose these two persons.]	
105	C:	问题是什么？	Asking Question
		Tr. [What's the question?]	
106	G:	选这两个嘛，哪个优点更多嘛	Clarifying-R
		Tr. [Choose these two persons, which one has more advantages?]	
107	D:	我觉得这个...	Clarifying-R
		Tr. [I think this one ...]	
108	G:	哪个更有可能生存嘛	
		Tr. [Which one is more likely to survive?]	
109	D:	我觉得好像，(是)这个	
		我也觉得这个可能会好一点，你觉得呢？	Suggesting-R

		他只是单纯的 (inaudible)	
		Tr. [I think it <u>seems</u> , (it is) this one. I think this one might be better too, what do you think? He is just unsophisticated (inaudible)]	
110	C:	他这是说在热气球上活得最久，还是...？	Asking Question-R
		Tr. [Does he mean that people can live the longest life in a hot-air balloon, or ...?]	
111	D:	荒岛	Clarifying-R
		Tr. [Desert island]	
112	E:	就是，已经下来了 6 个人，死了 4，会死 4 个	Supplementing-R
		Tr. [That is, six persons have left the island, four persons died and another four will die.]	
113	D:	在荒岛上	Supplementing-R
		Tr. [On the desert island.]	
		(11 sec silence)	
114	C:	好吧，我同意。	Agreeing-R
		Tr. [Okay, I agree.]	
		From 13.08 min to 13.22 min	
115	D:	要写(背景)吗？	Asking Question
		Tr. [Is it required to write (the background)?]	
116	C:	写啊	Confirming-R
		Tr. [Of course.]	
117	G:	要说一下他是因为在，热气球上面降落到一个荒岛上吗？	Asking Question
		还是直接写他在荒岛上？	
		Tr. [Is it because he is in a hot-air balloon and the balloon lands on a desert island? Or we directly write that he is on the desert island?]	
118	D:	直接写 6 个人在荒岛上吧。对吧？	Asking Question-R
		Tr. [Directly write six persons on the desert island, right?]	
119	G:	嗯	Confirming-R
		Tr. [Yes.]	
		From 14.40 min to 15.01 min	
120	D:	'In our opinion, we think...'	Clarifying
121	G:	'在，在我们的，在我们看来'	Supplementing-R
		就是这样子	
		Tr. ['In ... in our opinion', that's it.]	
122	D:	嗯	Agreeing-R
		Tr. [Hum.]	
123	G:	谁谁谁和谁，就直接开门见山了	Suggesting-R
		Tr. [Who, who and who, just be frank and straight.]	
124	D:	对	Agreeing-R
		Tr. [Right.]	
125	G:	背景不是有了吗，写了吗？	Asking Question-R
		Tr. [Didn't you have the background? Did you write it?]	
		(5 sec silence)	
126	D:	是这样写吗？	Asking Question

		Tr. [Is it written like this?]	
		(murmuring and reading what they wrote)	
		From 16.01 min to 16.16 min	
127	G:	诶，我们要把，他人的那个，弱点说一下吗？	Asking Question
		Tr. [Oh, do we have to talk about the weaknesses of that person?]	
128	C:	先说他们两个的优点，再说他们两个人的。	Suggesting-R
		或者是，掺杂在一起说。在说他优点同时，可以通过对比...	
		Tr. [First talk about the advantages of the two persons, and then talk about their... Or talk about the person features together. When talking about his advantages, you can also state others by comparing ...]	
129	G:	嗯，对比，对对对	Agreeing-R
		Tr. [Eh, comparison, yes, yes.]	
		(Discuss some grammars and vocabulary during the writing)	
		From 18.51 min to 19.10 min	
130	G:	'so the...' ex 'the person who, want to live longer than others.'	
		'must have, ha, have the...' '能力'怎么说？	
		Tr. ['so the...' ex 'the person who, want to live longer than others.' 'must have, ha, have the...' 'How to express "ability"?	
131	D:	'ability'	
132	C:	'ability'	
133	G:	'have the ability to, protect...'	
134	D:	'themselves' =	
135	C:	= 'themselves'	
136	G:	哦，嗯嗯。	
		Tr. [Oh, Eh-Eh.]	
		From 20.49 min to 20.59 min	
137	G:	'更合适'怎么说？	
		Tr. [How to express "more suitable"?]	
		(2 sec silence)	
		我，我们要比较一下他跟 football player 的那个吗？	Asking Question
		Tr. [Do we, we have to compare him with that football player?]	
138	D:	等一下吧。	Suggesting-R
		Tr. [Leave it for later consideration.]	
		From 22.32 min to 22.55 min	
139	G:	然后呢？还要跟他比较吗？	Asking Question
		Tr. [And then? To compare with him?]	
		(3 seconds)	
140	C:	谁啊？	Asking Question-R
		Tr. [Who?]	
141	D:	他和他	Clarifying-R
		Tr. [He and he]	

142	G:	他和他还要比较吗？	Asking Question-R
		Tr. [Do we have to compare him with him?]	
143	D:	'as for the football player, 至于, 足球运动员嘛'	Clarifying
		'as for'可以吗？	Asking Question
		Tr. 'as for the football player, as for, the football player'. Is 'as for' acceptable?	
144	C:	嗯, 可以	Agreeing-R
		Tr. [Hum, Okay]	
		From 23.05 min to 24.24 min	
1	D:	你给出你的观点	Eliciting
		Tr. [You put forward your point of view.]	
2	C:	谁和谁对比呀？	Asking Question-R
		Tr. [To compare whom with whom?]	
3	D:	就他们两个。警察跟...	Clarifying-R
		'as for... football... player'	
		Tr. [Just they two, the policeman and ... 'as for... football... player']	
4	G:	Er, may... maybe we will see he is...	Suggesting-R
5	D:	strong...	Supplementing-R
6	G:	as strong as the policeman, but 但是...	Supplementing-R
		但是他可能。知道一些急救...	
		Tr. [as strong as the policeman, but ...maybe he, knows some first-aid treatment ...]	
7	C:	but just you use 'maybe' this word to,	Clarifying-R
		may-modify the, their ability	
8	D:	I think, he maybe just have a strong, stronger...	Clarifying-R
9	C:	如果用 '可能'来形容的话, 这个就是不太强烈的...	Arguing-R
		Tr. [If we use the word 'maybe', it is not impressive enough ...]	
10	D:	He just have strong body, but don't have... 专业...	Clarifying-R
		Tr. [He just has strong body, but doesn't have... professional ...]	
11	C:	professional	Supplementing-R
12	D:	...professional skills	Supplementing-R
		(3 seconds)	
		他, 他只有, 强壮的身体, 但是, 没有那种专业的技能	
		Tr. [He, he only has, strong body, but doesn't have that kind of professional skills.]	
13	C:	那就是别人说的四肢发达, 四肢发达头脑简单啊	Concluding-R
		Tr. [That's what others said, well-developed limbs, having the body of a man and the mind of a child.]	
14	D:	相对于警察, 肯定是啦。	Interpreting information-R
		他肯定没有, 技能没有警察那么, 而且经验没有那么...	
		Tr. [Compared with the policeman, he is definitely like this. He is certainly not, his skills are not as good as the policeman, and his experience is not so ...]	
15	C:	丰富	Supplementing-R

		Tr. [rich]	
16	D:	对啊	Agreeing-R
		Tr. [Yeah]	
		(Discuss about sentences and grammars)	
		From 29.40 min to 30.43 min	
1	G:	就是。'他懂很多急救知识'啊，然后接下去怎么说啊？	Eliciting
		Tr. [That is, 'he knows a lot about first aid', and then what to write next?]	
2	D:	Hum... '懂很多急救知识'，'所以如果他遇到什么什么就可以'， '教他自己 ...'	Clarifying-R
		Tr. [Hum ... 'know a lot about first aid', 'so he can ... if he encounters anything', "Save himself ..."]	
3	G:	'当他感到身体不适的时候，就 ...'	Supplementing-R
		Tr. ['When he doesn't feel well, then ...']	
4	C:	可是如果没有药的话？	Criticizing-R
		Tr. [But if there is no medicine?]	
5	G:	Hum?	
6	D:	掐人中 <u>baba</u>	Suggesting-R
		Tr. [Press the philtrum with the fingernail, <u>baba</u>]	
7	G:	没有。老师说可以想象，可以想象他有急救物资， 可以想象他有枪	Arguing-R
		Tr. [No, the teacher said that we can image it, imagine that he has first-aid supplies and a gun]	
8	D:	Hum...	
9	C:	当他或者是其他人...遇到 ...	Clarifying
		Tr. [When he or the others ... encounter ...]	
10	D:	其他人？没有其他人。只有他们两个人	Arguing-R
		Tr. [Others? No other persons. Only they two.]	
11	G:	哦。我知道了，就是说，在荒岛上，由于空气那些原因， 可能会有很多的那种疾病，然后... 对了嘛，就导致他们...	Interpreting <u>information-R</u>
		Tr. [Oh, I see, that is to say, on the desert island, because of factors of the air, there may be a lot of that disease, and then ... yes, it causes them ...]	
12	C:	有可能会受伤和体虚	Supplementing-R
		Tr. [May be injured and physically weak]	
13	G:	Eg. 对。	Agreeing-R
		Tr. [Eg. Yeah.]	
14	D:	'There are many...'读，怎么写？	Asking Question
		Tr. ['There are many...' Eg. how to write?]	
15	C:	'威胁'	Supplementing-R
		Tr. ['Threat']	
16	G:	遇到危险就跑吧	Clarifying-R
		Tr. [Run when encountering danger]	
17	D:	就。就说他们感到不舒服了嘛，就这个嘛	Suggesting-R
		Tr. [So, just say they feel uncomfortable, just this]	

18	G:	<u>haha</u>	
		From 32.54 min to 33 min	
1	G:	可以结尾了吗？	Suggesting
		Tr. [Can we finish the end?]	
2	D:	可以了。结了。	Agreeing-R
		Tr. [Yes, close it.]	
3	G:	还没跟其他的比呢。	Arguing-R
		Tr. [we haven't compared them with others.]	
4	D:	都要下课了。	Justifying-R
		Tr. [The class is almost over.]	
		From 33.20 min to 35.13 min	
1	D:	'总的来说...'	Clarifying
		Tr. ['All in all...']	
2	G:	就是 '就我们而言' '总的来说...'	Supplementing-R
		Tr. [It's 'for us', 'all in all...']	
3	D:	'总的来说...我们认为现在... 'we choose the...'	Supplementing-R
		[2 seconds] 感觉又是我一个人在想啊，你们... 发呆	
		Tr. ['All in all ... we think now ... 'we choose the...' (2 seconds) I feel that only myself is thinking about it, while you stare blankly.]	
4	G:	我。我在想中文。	
		'总的来说...'	
		Tr. [I...I am thinking about how to express in Chinese.]	
5	C:	'生命诚可贵' <u>haha</u>	Clarifying-R
		Tr. ['Life is precious' <u>haha</u>]	
6	G:	'总的来说，他们两...拥有... 更多的生存品质'	Clarifying
		Tr. ['All in all, they two ... have more living quality.']	
7	C:	啊？	Asking Question-R
		Tr. [Ah?]	
8	D:	就说。我们就 '总的来说我们就选择他们两个'	Suggesting
		'从各方面考虑。我们就选择他们两个'	
		Tr. [So let's <u>say</u> , 'all in all, we choose they two' 'Based on all aspects, we choose the two persons']	
9	G:	对对对。'从各方面'	Agreeing-R
		谈。可不可以说 '设身处境的...考虑'	Suggesting
		Tr. [Yes, yes, 'from all aspects', Alas, can we <u>say</u> 'set oneself in one's shoes ... to consider it']?	
10	D:	怎么说？'设身处境'？	Asking Question-R
		Tr. [How to say it? 'set oneself in one's shoes']?	
11	C:	'set oneself in one's shoes'	Clarifying-R
12	G:	'shoes? In this situation...'	Clarifying-R
13	C:	写啊	Suggesting-R
		Tr. [Write it.]	
14	D:	写	
		Tr. [Write.]	

15	C:	这是个谚语啊。俗语的。老师教过的	Clarifying-R
		Tr. [This a proverb, common saying, taught by the teacher.]	
16	G:	我不知道这句话...	Clarifying-R
		那你说嘛。‘设身。设身处地的来说。他们两...’	
		Tr. [I don't know this sentence ...So from the aspect of 'set oneself, set oneself in one's shoes, they two ...']	
17	D:	这些谚语啊。太俗了	Arguing-R
		Tr. [These proverbs, are too vulgar.]	
18	C:	‘生命诚可贵’ <u>haha</u>	Clarifying
		Tr. ['Life is precious' <u>haha</u>]	
19	G:	啊。不。这个的前面一句。它这个前面一句	Clarifying-R
		Tr. [Ah, no, the sentence before this, the previous sentence]	
20	D:	‘生命诚可贵’ 怎么写啊？	Asking Question-R
		Tr. [How can we write 'Life is precious' ?]	
21	G:	什么 ‘价更高’？	Eliciting-R
		Tr. [What is 'more valuable' ?]	
22	C:	‘爱情’	Clarifying-R
		Tr. ['Love']	
23	G:	你看	
		Tr. [You see]	
24	D:	哎呀哎呀。就说嘛。通俗一点	Suggesting-R
		Tr. [Ah, so, let's express it in a more popular way.]	
25	C:	‘生命诚可贵健康价更高’ <u>haha</u>	Clarifying-R
		Tr. ['Life is precious, and health is more valuable.' <u>Uaha</u>]	
26	G:	‘all in all...’	Clarifying
		Hum...哦 ‘总的来说。想要在这个。想要在这荒岛上生存’。	
		‘必须知道如何保。保护。如何保护自己。救援自己’	
		Tr. ['all in all...' Hum ... Oh, 'Generally, one who want to live on this, on this desert island', 'must know how to pro ... protect, how to protect himself, rescue himself'.]	

Appendix P: Sample Interview Transcripts

Students' responses from the Interview

Student A

1. 以前偶尔听说过辩证思考，但是没有具体学习了解过。感觉它是种不一样的学习方式。

Tr. [I have heard the term of critical thinking occasionally previously but have not learned it specifically. I thought it is a different learning method.]

2. 认为自己以前学习中也不会应用这种方式，并且不觉得这是自己需要应用的技能。通过实验课程对辩证思考有了稍微系统的了解，想问题也不会那么简单了。

Tr. [I think I didn't use this method in my study before, and I did not think I need these skills before. I understand the concept of critical thinking more systematically after this training class, and I will not thinking directly or straight forward any more like before.]

3. 觉得辩证思考对英语写作是有帮助的，更加能体现人的思维能力。

Tr. [I think critical thinking is helpful for English writing, because it can show our thinking abilities more.]

4. 如果能在写作中灵活运用这种技能，对以后的英语写作和英语学习中都会有很大帮助。可以锻炼自己，让自己的思维不那么死板闭塞，推动自身发展。

Tr. [It will bring significant benefits for English writing and English learning, if we can use the critical thinking skills flexibly in our writing process. These skills can train us, especially for our mind, to improve the development of ourselves.]

5. 以前不知道什么是协同写作，也没有经历过这种写作方式。

Tr. [I did not know what collaborative writing is before, and I also did not experience this kind of writing method previously.]

6. 通过实验课程，感觉和独自写作比起来协同写作更复杂更难。如果为了自身能力的发展会选择协同写作，但是平时会选择独自写作，因为更轻松一些。

Tr. [Through this training class, I feel collaborative writing is more difficult and complicated than individual writing. I will choose collaborative writing if I want to improve myself, but I will prefer individual writing at ordinary time, as it is more relaxed.]

7. 觉得协同写作复杂是因为有写作搭档，和搭档的磨合过程很重要，如果两个人可以相互促进会比较好。

Tr. [The collaborative writing is more complicated, because it has a partner. The negotiation with your partner is very important. It will better if you and your partner can promote with each other.]

8. 感觉和自己的搭档磨合的一般，还在初级阶段，两个人写作方式和写作习惯不一样。比如，又一次写'As a result'句型，两个人对它的用法就有分歧。双方不能理解。

Tr. [I feel my partner and I did not coordinate very well during the writing, and it seems we were still at the first stage (the beginning) of collaboration. We have different writing styles and writing patterns. For example, we had a disagreement with the use of 'As a result' sentence. We could not understand or persuade each other.]

9. 写作中可以争论的点很多，有点辛苦。感觉两个人一起写压力更大，毕竟每个人长期已经形成了自己的写作习惯，需要很多时间才能两个人合作的更好。

Tr. [There were many arguments during our writing process, which is not relaxed. I felt more pressures when we write collaboratively because of our different writing patterns. We need more time to do the collaboration better.]

10. 过程中, 先两个人一起讨论, 收集信息, 然后看谁的观点比较好就谁执笔。感觉执笔的人负的责任更多。虽然重要的观点和大体结构是一起讨论出来的, 但具体的细节还是执笔的人负责的更多, 比如选词或者句式之类的。

Tr. [During the writing process, we discussed to gather more information and ideas at first, and then compared our ideas. Sometimes the person who had better ideas is responsible for writing. Although the main point of view and the whole structure were discussed from both of us, the more specific details such as the choice of vocabulary and the sentences' pattern were more responsible by the person who wrote.]

11. 两个人意见不一致时, 对比过后最后会妥协更有道理的更严谨的一方。讨论时, 会先分析题目, 然后结合自身的体会。感觉分析能力是应用最多的。

Tr. [When we had disagreements, we would make a concession to the person who sounds more reasonable and logical after we compared and analyzed. During our discussion, we would analyze the topic at first, and combined with our own experience. I think we used a lot of analysis skills.]

12. 感觉不论是协同写作还是辩证思考都很有趣。和平时的课堂相比, 在协同写作的课堂上辩证思考可以更明显的体现出来。

Tr. [I think both collaborative writing and critical thinking are interesting concepts. To compare with normal class, collaborative writing class provides a better environment to show our critical thinking skills.]

13. 如果长期应用协同写作会对辩证思考有提高, 因为它提供了一个思考交换的机会, 但是提高的效果要看合作的程度和磨合。

Tr. [I think our critical thinking skill will be promoted if we can have a long-term practice of the collaborative writing, because it provides a chance for students to exchange their thoughts. The efficiency, however, depends on the level of collaboration.]

Student B

1. 以前只了解过一点点辩证思考, 没有具体的学习应用过。感觉辩证思考就是多方面的思考。

Tr. [I only knew a little about the term of critical thinking, and I didn't learn and use it systematically previously. I felt it means thinking from many aspects.]

2. 因为对它的不了解觉得自己以前不太擅长辩证思考, 现在虽然不能说擅长辩证思考, 但是开始有这种思考倾向了, 因为对它的概念更清晰了所以会用这种思考方式了。

Tr. [I thought I am not good at critical thinking because I didn't know it well much before. I cannot say I am good at critical thinking now, but I begin to have this thinking disposition. I currently know how to use it as I have a clearer understanding of it.]

3. 觉得辩证思考对英语写作是有帮助的, 因为写作文就是要条理清晰。

Tr. [I feel the critical thinking is beneficial for English writing, because writing needs a clear logic.]

4. 以前写作文是把事实写出来但是没有分析, 现在会加上自己的分析。

Tr. [My previous writing format was just to show some facts, but lack of the analysis. Now I will add my own analysis.]

5. 以前不知道什么是协同写作, 也没有经历过这种写作方式。

Tr. [I did not know what collaborative writing is before, and I also did not experience this kind of writing method previously.]

6. 课堂上更倾向独立写作, 因为一个人会比较轻松容易一点, 协同写作如果意见不统一会很难处理。

Tr. [In the class I prefer the individual writing, because it is more relaxed. The disagreements during collaborative writing are very difficult to solve.]

7. 但是对协同写作是认可的, 因为感觉对提高思维和写作是有帮助的。

Tr. [Collaborative writing, however, is very valuable. I think it is helpful for the improvement of critical thinking and English writing.]

8. 和搭档一起讨论过程中, 感觉很多想法都是背道而驰的, 可能是因为男女生看问题也不一样。但是也从搭档身上学习到了很多, 对方的思维很活跃很开拓。

Tr. [My partner and I have many different opinions during our discussion. This is maybe because of the gender difference. But I also learned a lot from my partner, he has a very active thinking.]

9. 写作时, 先收集看法, 然后列大纲。因为搭档不是很喜欢列大纲, 所以会不能很清晰的了解搭档的所有观点, 因此会有争论。

Tr. [During our writing process, we gathered our ideas at first, and then I listed an outline. My partner did not like to list an outline, so sometimes I could not understand my partner's whole thoughts clearly. And this also brings arguments.]

10. 有争论时, 因为考虑到是共同的写作任务, 双方还是会有妥协的。

Tr. [When we had disagreements, we finally would make a concession, because that was a joint writing task. We need to make an agreement to complete our task.]

11. 感觉协同写作时, 会应用到辩证思考, 因为和搭档辩论的时候, 感觉思路会越辩越清晰, 会在不停的的分析。

Tr. [I think we used our critical thinking during the collaborative writing process. When I argued with my partner, I was thinking and analyzing to organize my thoughts.]

12. 所以感觉协同写作是一种很好的锻炼辩证思考的方式, 对英语写作也有帮助。

Tr. [So, I think it is a good way to promote the critical thinking, and it is also helpful for our English writing abilities.]

Student S

1. 高中学习政治的时候听过辩证思考这个概念，学英语的时候老师没有讲过。高中写作文都是按照模板来写的，老师给你一个模板，你就模仿。这不是辩证思考的方式。我觉得辩证思考就是把一个问题一分为二，从不同的方面去解答。经过这些课程的学习，对它的看法改变了一些。比如推断推论这些。之前没有涉及过这方面的知识，现在对它的了解更具体更细化了。

Tr. [I have heard this concept of critical thinking when I studied politics in the high school. The teacher didn't mention this when I studied English. English writing in high school is writing according to the sample essay. The teacher gives you a sample text, then you imitate it. This is not the way of critical thinking. I think critical thinking is to divide a problem into two sides and solve it from different aspects. After the eight-week study and practice, my attitude towards it has changed a little. Like inferences and deductions. I haven't learned this before, but now I know more details about it.]

2. 给自己的辩证思考能力打分，10 分满分，以前 5 分，现在 8 分。以前写英语作文的时候也有过一些那种需要用到辩证的观点，但是没有那么多。就是相当于我们以前写作文就是给出自己的观点，没有例子去证明。就是用 'I think, I believe' 比较主观。觉得自己的辩证思考能力现在还是有提高的。

Tr. [If evaluate my critical thinking ability by myself, if the full score is 10 points, I think myself used to score 5, but now I score 8. There was some critical thinking in English writing in the past, but not so many. It means we used to write to give our own opinions, without examples to prove them. We used the terms of 'I think, I believe', which is subjective. I feel that I have improved my critical thinking ability now.]

3. 现在生活和学习中写的大多是应用型作文，比如考英语四级都是图表型作文。似乎用不到辩证思考。但是对以后写其他的英语作文还是有帮助的。

Tr. [Most of the essays written in our current life and study are practical writing. For example, all of the CET-4 (College English Test- band 4) essays are chart composition. It seems no use for critical thinking. But it is helpful for other types of English writing in the future.]

4. 辩证思考在生活和学习中是有用的，比如在辩论的时候。但是我觉得作为学生来说用到的地方不多。

Tr. [Critical thinking is useful in our life and study, such as in debates. But I don't think I use it much as a student.]

5. 以前没有了解过什么是协同写作，也没有尝试过协同写作。以前只知道在西方国家的课堂上学生会比较放松，就像这些课程一样。

Tr. [I didn't know what the collaborative writing was previously, and I have never experienced this before. I only knew that in western classrooms students would be more relaxed, just like these classes.]

6. 在课堂上我更喜欢现在这种协同写作的方式。因为写的过程中会迸发出很多的不同想法，可以开拓思路。

Tr. [I like the way of collaborative writing in the classroom, because it will promote more ideas during the collaborative process. It makes me become more open-minded.]

7. 我和搭档写作时经常会观点不一致。如果她的观点我觉得还可以，我就会赞同，就会偏向她的观点。有时候写的也很顺利。之前我们写一篇作文的时候，刚开始我们是先确定一个主方向是同意还是不同意。然后我们都决定是不同意。但是就是后来如何构造下文的时候有点分歧。我认为我们写的是不同意，不同意就应该突出高中生谈恋爱的不好，直接写危害。然后她想先写好处再转折。后来没有写作时间了就没先写好的了，是我负责执笔的。有时候我喜欢用 ‘firstly, secondly’ 然后她就不同意，说不要用这个，用的人太多了。但是后来她还是同意了用。但是并不是谁执笔就听谁的，会综合考虑，有时候是因为没有时间了就妥协了。

Tr. [My partner and I often had disagreement with each other. But I would agree with her if I thought her ideas were not bad. So, I think sometimes we also wrote smoothly. Once when we wrote, we agreed the main direction at first, but had disagreement when we constructed the essay. I wanted to show the disadvantages directly, but my partner preferred to say something about the advantages at the beginning then moved to the disadvantages. At last, we wrote the disadvantages directly because of the time limitation. That time was I responsible for the writing. Sometimes I liked to use the linking words like ‘firstly and secondly’, but she disagreed as they were used frequently. Finally, she agreed to use them as a concession. I don’t think the person who responsible to write has more power. We often considered comprehensively. Sometimes we made concession because we did not have enough time.]

8. 我觉得协同写作比其他中国传统的教学模式更加的有趣。而且两个脑袋总比一个强。协同写作这种方式潜在的弊端是有可能有人想偷懒，就都听另外一个的，所以有时候妥协了是想偷懒。我觉得在协同写作的模式下，我的写作压力减少了。两个人一起想一起写更轻松。也可以在英语方面互相帮助。

Tr. [I think the collaborative writing class is more interesting than the Chinese traditional teaching class. And two people think together is better than one thinks alone. The potential weakness of collaborative writing is there may be some lazy students who contribute little to the task. I believe writing collaboratively could reduce my writing pressure. Two people write together made it much easier and more relax. We could help each other in the language aspect.]

9. 写作的时候，我们先统一观点。统一好了观点想文章结构。这个过程在学习和练习的后期会越来越快。

Tr. [When we wrote, we firstly unified our standpoint. Then we discussed the essay’s structure. The process became more efficient with more practices.]

10. 我觉得在我们的写作过程中是有用到辩证思考的。比如说在举例子的時候，会刻意的去加一些实例去论证，增加说服力。再比如我会问我的搭档你为什么有这个观点或者你为什么这样想。

Tr. [I think we have used the critical thinking during our writing process. For instance, when we were talking about examples, we would deliberately add some facts to demonstrate or increase the persuasiveness. Or I would ask my partner why you have this view or why you think so.]

11. 写作过程中用中文比较多，很少用英语，只有在写的时候才用英语。

Tr. [We used Chinese more than English during the CW process, and English is used only when writing.]

12. 我觉得协同写作对思考是有帮助的,自己会渐渐变得有意识在写作的时候形成一些框架。我觉得我的搭档对我很有帮助,帮我想了很多,合作还算愉快。在英语方面我觉得我的语感比她好一些,她词汇比我好一些,可以互补。

Tr. [I think CW is helpful for thinking, and I am gradually become conscious to form some frameworks in writing. I think my partner is very helpful to me. She helped me to think a lot. The collaboration between us was quite pleasant. In English aspect, I think my sense of language is better than hers, and her vocabulary level is better than mine, which we can complement each other.]

13. 我觉得我们两个的写作时间总是不够。然后就是一个礼拜只上一节课容易忘记之前学习的内容,不过老师课前的 review 还是很有帮助的。我不赞同在协同写作的学习中换写作搭档,固定搭档能更好的磨合。

Tr. [I don't think we ever have enough time to write. After that, it is easy to forget what we have learned before because we only had one class per week. However, the teacher's review at the beginning of the class is very helpful. I do not agree with changing writing partners in the study of collaborative writing. Fixed partners can work better with more practice.]

Student Y

1. 以前没有学习过关于辩证思考的定义或者应用,但是有听说过这个概念。只在高中学习政治的时候接触过辩证法。以前觉得它不一定是个确切的答案,不要太绝对。现在对它的理解也差不多,不要太绝对,多角度的思考问题。具体的能力有印象但是记不清了。

Tr. [I have not learned about the definition or application of critical thinking before, but I have heard about this term. I knew this concept of critical thinking when I studied politics in the high school. I used to think it wasn't a sure answer, so didn't be too absolute. Now my understanding of it is similar, don't be too absolute, to think with multi-angle. I have an impression of specific critical thinking abilities but cannot remember them clearly.]

2. 我以前被问到赞同不赞同时,一般不会给一个肯定的答案,会从正反两方面去想。就会想一个问题的优点和缺点,看是优大于劣还是劣大于优。我可以通过线索和分析得出结论,但是我觉得自己的分析可能不是很深入,得出的结论可能不正确。以前在判断一件事是可能正确或者是可能错误时完全没头绪,现在可以区分开这种不同了。

Tr. [When I have been asked in the past whether I agree or disagree with something, I usually don't give an affirmative answer. I would think about both sides. I would think about the advantages and disadvantages of a problem, and to see which side was stronger than the other. I could draw a conclusion through clues and analysis, but I think my analysis may not be very in-depth, and the conclusion may not be correct. I was completely confusing whether something was likely to be right or wrong before, but now it's possible for me to tell the difference.]

3. 我觉得英语写作是个长期积累的过程,考试的时候没有太多时间去思考,应

该在平时学习的时候就形成思考的习惯。辩证思考对英语学习和其它学习都是相通的。

Tr. [In my opinion, to improve English writing is a process of long-term practice. I don't have much time to think in exams, so I should form the habit of thinking in my daily study. The effectiveness of critical thinking for English learning and other learning are the same.]

4. 我觉得辩证思考对我们的生活和学习有用,但不是时时刻刻都用的到。遇到问题需要想办法去解决的时候可以用到辩证思考。

Tr. [I think critical thinking is useful for our life and study, but it is not always used. We can use critical thinking when we encounter problems and then try to solve them.]

5. 以前没有听过也没有尝试过协同写作。个人更喜欢一起讨论但是独立写作的方式。

Tr. [I had never heard or tried CW before. I prefer discussing together but writing individually.]

6. 因为我和搭档经常起冲突。他同意的我不同意,我同意的他不同意。观点不能达成一致,可能是因为性别不同造成的差异。其实有些东西不是说哪一方就必须是正确的,感觉可以这样也可以那样。一开始是有自己的倾向,但是大多数时候也可以接受对方的观点,不是说我的就一定是对的,他的就一定错的。所以虽然经常碰到冲突,但是最后都有一方妥协。我们是轮流负责写,感觉负责写的人更有话语权。随着练习和合作的增多,写作和合作的效率是有提高的。

Tr. [I often had disagreement with my partner. We could not reach agreement sometimes, maybe because my have different gender that we saw things very differently. I did not think there are absolutely right or wrong, and mostly I found one thing could have diverse solutions. Although I had my own preference, I would accept another person's opinion if it sounds reasonable. I never thought my ideas are absolutely right, while others are absolutely wrong. So, we made concessions when we had disagreements. We took turns to responsible for the writing, and I felt the person were more powerful when he or she wrote. With more practices, our efficiency in writing and collaboration were improved.]

7. 我觉得我的搭档英语水平,比如词汇量和句式比我好的多。对我很有帮助。但是我们的写作想法和写作习惯很不一样,所以会带来冲突。但是我不认为这是弊端,比如说今天他想写成写信的模式,我不想写这种模式。可是我也可以学到另一种写作的方式。打开了新的思路。

Tr. [My partner has better English level than me, such as the grammar and the vocabulary. He was really helpful for me in the language aspect. However, our writing styles and writing patterns were quite different, which often bring the disagreements. But I do not think this is a disadvantage for us. We could learn a new writing pattern from each other. This opens our mind to new ideas and new expressions.]

8. 我觉得两个人一起写作压力更大了,因为一个人可以自己想怎么写就怎么写。所以我更喜欢两个人一起讨论但是分开写作的方式。

Tr. [I think it's more stressful for two people to write together, because one person can write what he wants. So, I prefer two people discussing together but

writing individually.]

9. 写作的时候，我们会先讨论结构。列个大纲把观点列一下。经常在列观点的时候有争执。一般听负责写的人的观点。谁拿着笔谁比较敢写。我们会语法呀结构呀可不可以，会这样一起讨论一下句子然后再写上去。比较复杂的句子会这样讨论一下语法和结构。文章写完了有时候会再看一遍，但是时间不够就没办法看了。

Tr. [When we wrote, we would talk about structure first. We would make an outline of our ideas. We often had disagreements when we were listing our ideas. Usually we listened to the person who were responsible for the writing. The person who held the pen was responsible more. We would discuss grammar and structure, and then wrote them down. We would discuss grammar and structure of complex sentences. When the writing was finished, sometimes we would read it again, but sometimes there was no enough time to read it.]

10. 我觉得我们在写作中有用到辩证思考，因为观点经常不一样。

Tr. [I think we used our critical thinking during the process of CW, because we often had different opinions.]

11. 交流的时候用中文比较多，只有在写的时候会用英文。

Tr. [We communicated with each other by using Chinese more, and we only use English when we were writing.]

12. 我觉得协同写作是一种有效的提高辩证思考能力的方式，可以促进我的思考，特别是在我们观点不一样的时候。

Tr. [In my opinion, collaborative writing is an effective way to improve my critical thinking, which can promote me to think, especially when we have different views.]

13. 我觉得可以再给学生多一点表述的机会，但是有时候作为一个学生我不知道要怎么表述，所以需要老师更多的引导。我觉得写作时间可以再长一点，特别是需要时间讨论，尤其是分歧大的时候，但是分歧大更促进思考。

Tr. [I think it can give students more opportunities to express themselves, but sometimes as a student I don't know how to express myself, so I need more guidance from the teacher. The time for writing can be provided longer. It needs time to discuss, especially if we have many disagreements. However, the disagreement can promote thinking.]

Student C

1. 学政治的时候，高中的时候，除此以外几乎不了解辩证思考。学政治的时候，因为那时候学习的是辩证唯物主义，就是从多方面观察吧，从客观或者是主观之类的。（就是多角度的思考的感觉？）嗯。觉得自己平时看一个问题的时候会用到这种多方面（辩证思考）。以前有的时候，小的时候就会觉得错了就是错了，对的就是对的，然后长大后觉得不一定所有东西，错的不一定是错的，然后对的不一定是对的。（就是随着长大了，想问题会多方面的来思考？）嗯。

Tr. [Except the knowledge I obtained when we studied politics in the high school, I hardly knew any critical thinking. When we studied politics, what we learned at that time was critical materialism, based on which we should observe objects from multiple aspects, from either the objective or the subjective aspect. (Do you feel that thinking is generated from multiple angles?) Yes. I feel that I usually judge a problem from multiple angles (critical thinking). Previously sometimes, when I was a child, I felt what is wrong is wrong, and what is right is right. Then when I grew up, I felt not everything wrong is wrong, and not everything right is right. (As you grow up, you will think about a problem from multiple aspects?) Yes.]

2. 在是否擅长辩证思考方面，如果是 100 分，我给自己打 60 分。（就是及格对吗？还可以对吗？）嗯

Tr. [If I am asked for whether I am good at critical thinking, if the full score is 100 points, I give myself 60 points. (Does that mean you've passed, right? Is your score acceptable?) Yes.]

3. 我觉得辩证思考对提高写作还是有帮助的。因为，起码角度多一点，写的字也多一点嘛。

Tr. [I think critical thinking is still helpful for improving writing, because more words can be written out through more angles.]

4. 我觉得语言的学习是涵盖多方面的，（辩证思考对学习语言的帮助）还是有的，比如学习课文的时候，就会从思想方面来做选择，因为有的时候老师。。。就是指做阅读对吗？）嗯，还有对理解文章有帮助。其实我觉得如果学口语的话，帮助还是很少的，几乎没有。

Tr. [I think language learning covers many aspects, (critical thinking is helpful for learning a language). For example, when studying a text, I will make choices based on the aspect of thought, because sometimes the teacher. . . (Does it mean doing readings?) Yes, furthermore, it helps me understand the article. In fact, I feel that there is very little help, almost no help if I learn oral English.]

5. 参加这个兴趣课程之前没有了解过什么是协同写作。只知道是合作。之前也没有过这种经历。以前合作的话，一般就是讨论，不会在一起写。

Tr. [I didn't know what the collaborative writing was before taking this interest course, and I only knew that is cooperation. I have never experienced this before. For the cooperation in the past, we usually discussed only and would not write collaboratively.]

6. 在课堂上，我个人还是比较喜欢个人写作的方式，因为我这个人比较奇葩，和别人的观点总是有冲突之类的，所以协同写作的话，而且，就是，时间耗的比较多，因为讨论，然后语言的组织，然后就是时间比较多。其实我觉得最重要的

就是我们观点不一样。(因为观点不一样,感觉更复杂了?)嗯。(因为这个更喜欢独自写作?)嗯。

Tr. [In class, I personally prefer the way of personal writing, because I am a strange person and my viewpoint is always conflict with other people's. As for collaborative writing, and, that is, it takes more time on discussion and language organization, and then it is that more time is required. In fact, I think the most important thing is that our viewpoints are different. (Because the viewpoints are different, do you feel more complicated?) Yes. (So you prefer writing independently because of this?) Yes.]

7. 总的来说,我感觉,从协同写作当中,有的时候可以看到自己,自己的弱项或者是别人的长项之类的。比如有的时候,我这人比较懒,不愿意背单词,就是词汇量有点少。然后就是,有的时候也可以发现别人的某些优点。比如,别人的词汇量比较多。有的时候就是,还有那种可以发现别人的语言风格。就是,(不同的写作风格?)嗯。当然也不一定全是优点或缺点之类的。有的时候也发现别人的短处。

Tr. [In general, I feel that sometimes I can see my, my own weak points or others' strong points benefiting from collaborative writing. For example, sometimes, I am lazy and unwilling to memorize words, so I master limited vocabulary. Then sometimes, I can find certain advantages of others. For example, other people have more vocabulary. Sometimes, I can also find the language style of others. That is, (different writing style?) Yes. Of course, it is not all about advantages or disadvantages and the like. Sometimes, I can also find the shortcomings of others.]

8. 关于提供新思路,我这个人比较固执,就是别人提供新的思路,我一般还是会坚持自己的观点。所以当这种情况发生在协同写作中,我会用尽全力去说服他们。他们都说我伶牙俐齿。(所以他们也会被你说服?)不是,他们就是那种表面上说‘哎呀,你写吧你写吧’的感觉,可是心里没有真正的诚服。(你觉得他们只是妥协?但不是完全被说服?)嗯。说服别人过程中,比如上次高中生恋爱那个话题,因为我可以从,他们为什么反对,我可以先找他们反对的理由,他们反对的理由大多是因为高中要学习嘛,然后我就反驳。不过说实话,在中国学业更重要,但是因为我毕竟读过来了,所以我觉得有时候学习并不是很重要。我会从这样来反驳他们。有的时候,而且我近期看那个电视剧,我觉得,就是在你的生命中如果,就是在高中遇见一个人的话,我觉得还是可以珍惜的。其实我觉得他们,另一方面是感觉挺接受我的意见,但是他们又过于对,其实他们的,就比如说我旁边的队友就说‘老师说,我妈说’怎样怎样的。我觉得他们也不喜欢这样的。(就比较听家长和老师的?)嗯。

Tr. [As for providing new ideas, I am stubborn, that is, though others will provide new ideas, and usually I will still insist on my own viewpoint. So, when this happens in collaborative writing, I will try my best to convince them. They all say I'm eloquent. (So, will they be convinced by you?) No, on the surface, they will say 'Ah, you write you write', but they are not really convinced. (Do you think they just compromise on it? But not completely convinced?) Yes. In the process of convincing others, for example, for the topic of high school students falling in love that we talked about last time, I can figure it out from..., why they

are opposed. First of all, I can figure out the reason why they are opposed. Most of the reasons for their opposition are because they have to study in high school. Then I refuted them. But to be honest, studying in China is more important, but I have accomplished that anyway, I don't think that studying, sometimes, is very important. I will refute them from this aspect. Sometimes, and I have watched that TV series recently, I think that if you meet someone in high school in your life, I think he/she can be cherished. Actually, I think they, on the other hand, they accept my opinions, but they are too right. In fact, they are, for example, a teammate beside me said that 'the teacher said, or my mother said' ... I think they don't like this too. (Are they prone to listening to parents and teachers?) Yes.]

9. 合作过程中，我们先是讨论一下。不过这个，在我们那个团队，一般那个观点比较相悖，所以，（经常相悖吗？）90%相悖。今天这个话题的处理方式就比较，比较公正的。所以是先讨论，然后就，大家说嘛，然后再写。（算是个草稿？集思广益？）嗯。讨论完后，一般由中间的人执笔。我也有过一次主笔。（这是很随意的决定的吗？）比如遇到一个东西你想写，那你写。或者是，不过大部分是大家一起说的嘛，所以觉得谁主笔没什么多大的关系。我们中间，我很想负责组织，她总是说我独裁，可是如果我不说的话，他们又会说‘你怎么看啊？’然后我说了他们又会说‘你怎么这样看的啊？’（就是要问你的观点但是又不同意你的观点对吗？）对。然后我不说的话，又会说‘你怎么不说话呀？搞得像我一个人写一样。’他们都是这样的。（所以他们不同意你的观点，但是他们也不给原因？）对。他们就说‘老师说，学校怎么怎么样，家长’都是这样说。（所以最后你说服了他们，但是他们只是妥协？）嗯。

Tr. [During the cooperation process, we will discuss it first. But this, the viewpoint is generally contradictory in our team, therefore, (Is it often contradictory?) 90% of them are contradictory. The treatment of this topic today is relatively, relatively fair. So, we shall discuss first, then, let's discuss and then write. (Can it be taken as a draft? Brainstorming?) Yes. After discussion, the information should be usually written by a middleman. I have also written once. (Is this a casual decision?) For example, if you want to write something, you write it. Or, but most of ideas are proposed by all of us, so it doesn't matter who write it. Among us, I really want to take charge of the organization. She always says that I am a dictator, but if I don't say anything, they will ask 'What do you think?' Then if I say something they will say 'how do you think so?' (They ask you for your viewpoint but disagree with you, right?) Yes. Then if I don't say anything, they'll say 'why do you say nothing? It's like writing by my myself.' They are all like this. (So, they disagree with you, but they can't give a reason?) Yes. They will say, 'the teacher said, the school ..., and the parents ...'. They all say like this (So in the end you will convince them, but they just compromise?) Yeah.]

10. 我觉得写作过程中是有用到辩证思考的能力的。毕竟，每个人的观点不一样嘛，就是从很多方面看的嘛。每个人的视角都不一样。（就是在这种争论中可以体现你们的辩证思考？）嗯。讨论句式的时候也有过争论，不过他们一般采取他们的。（是谁写就采取谁的吗？）不是，一般我说了算。因为每个人写作风

格不一样嘛，我写的时候就比较想用那种定语从句呀，不定式啊。他们就想用那种，比较简单一点之类的。最后就有的时候用他们的，有的时候采取我的。

Tr. [I think the ability of critical thinking can be used in my writing process. After all, everyone's viewpoint is different, that is, any topic can be discussed from more than one aspect. Different persons can see one thing from different angles. (Is your critical thinking reflected in this debate?) Yes. There are debates when we discuss the sentence patterns, but they generally use their own. (Are the sentence patterns proposed by the person who write the article will be used?) No, I usually make the decision. Everyone has his own writing style. When I write, I prefer using the attributive clause and the infinitive, while they just want to use that, some simple ones. In the end, sometimes theirs and sometimes mine are used in the writing.]

11. 我觉得协同写作这种方式不是能很有效的提高辩证思考，但是效果还是有的。因为我觉得，我觉得还是我们中国的学生长期的那种学习的方式造成的。就是不太容易改变。（就是原有的观点不容易被改变对吗？）嗯。（所以尽管让你们协同写作，让你们争论，最后还是坚持自己的观点是吗？）嗯。

Tr. [I think collaborative writing is not a very effective way to improve the ability of critical thinking, but there is still some effect. Because I thin...think this is resulted from the long-term learning method of our Chinese students. They are just not easy to get changed. (Is the original viewpoint not easily changed?) Yes. (So, though you are asked to write collaboratively based on your debates, will everyone insist on his own viewpoint in the end?) Yes.]

12. 对于写作方面，协同写作首先在观点上可以多样化，然后在那种词汇呀，语句上可以看一下别人怎么写，别人为什么那样想之类的。所以我觉得可以在 pre-writing 的时候协同一起讨论，然后分开写。如果整个过程都协同一起写作，会把个人那种有特色的观点会抹杀掉。（就是自己的个人特色和风格就会被抹杀？因为为了妥协对吗？）对。

Tr. [As for writing, collaborative writing can firstly contribute to the diversification of the viewpoints. Then we can see how others use the words and sentences and why others think that. Therefore, I think we can discuss together in the pre-writing process and then write separately. If collaboration is conducted throughout the entire process, the viewpoints of personal characteristics will be eliminated. (Will the personal characteristics and style be obliterated? For compromise?) Yes.]

13. 讨论的时候，说英文也说过，但是说中文的时候比较多。因为有时候我们的聊天比较奇葩，不知道用英文怎么说。（为了更清楚的说明你们的观点是吗？）嗯。说的時候吵起来了。（讨论语法词汇的时候用英语比较多？）嗯。

Tr. [During the discussion, we speak English, but most of the time we speak Chinese. Because sometimes we discuss the topic with some strange terms, we don't know how to express them in English. (Is it to make your viewpoint much clearer?) Yes. Quarrel may happen when we discuss. (Is English be used more often when you discuss grammar and vocabulary?) Yes.]

Student D

1. 在参加这个兴趣课程前, 没太了解或者学习过什么是辩证思考。听说过这个词, 觉得它的意思是看待一个事情或者一件东西多角度的去思考, 从不同方面。参加完这个课程有, 感觉对它好像有了更多理解, 但是也说不出。

Tr. [Before taking this interest course, I didn't know much about or learned what the critical thinking is. I've heard this word and I thought it meant thinking should be made from more than one angle, from more aspects when we treat one matter or one thing. After attending this course, I feel that I may have more understanding regarding this word, but I can't figure it out.]

2. 觉得自己以前不擅长辩证思考。不会注重这方面。没有被强调过。觉得现在自己的辩证思考有得到提高, 写作文的时候, 写的东西肯定会比较严谨一点, 思考问题也是。

Tr. [I thought that I was not good at critical thinking before. I never paid attention to this aspect and the critical thinking was never highlighted. I think my critical thinking has been improved now. When I write a composition, what I write is definitely more rigorous, and so is my thinking.]

3. 觉得辩证思考能力的提升对英语写作是有帮助的。写东西会写的比较充分, 不会有很多纰漏。就会想的比较严谨一点。(在论述的时候会更充足一点?) 嗯。

Tr. [I think the improvement of critical thinking ability is helpful for English writing. With the critical thinking, writing will be more complete, will reduce more omissions, and make me think in a more rigorous way. (Will it be more sufficient in expounding the viewpoint?) Yes.]

4. 除了英语写作, 辩证思考还可以应用到英语阅读上。(分析文章?) 对。总的来说, 觉得学习辩证思考肯定是件有价值的事情。对学习是有帮助的。

Tr. [In addition to writing in English, the critical thinking can also be applied to English reading. (to analyze the article?) Yes. All in all, I think learning critical thinking is definitely a valuable thing, and it is helpful for study.]

5. 以前没有过协同写作的经历, 也不了解什么是协同写作。现在知道什么是协同写作了。

Tr. [I have no previous experience in collaborative writing, and I didn't know what the collaborative writing was. Now I know it.]

6. 在英语写作课堂上, 如果是那种议论性比较强的, 需要那种批判性思维的议论文, 需要不同的观点的话, 就可以协同写作。但是如果不是议论文, 没有讨论的说明文或者其他的就, (所以你是要看作文的类型?) 嗯。

Tr. [In an English writing class, collaborative writing can be applied for the argumentative essay which is of strong argumentation and requires that kind of critical thinking and different viewpoints. If it is not an argumentative essay and it is an expository essay without discussion or some others, just ... (so, you will think about the type of the composition?) Yes.]

7. 认为协同写作的好处是: 对写作方面有所提高; 然后同学之间经过交流, 关系可能也变得更融洽了, 比如我和我搭档。但是在协同写作过程中, 有的时候感觉压力更大了。因为我们有的时候观点会不一样, 然后就会总是去争论。(所以争论会让你觉得压力变大吗?) 对, 因为有的时候他们不同意我的观点, 然后有的时候我也会不同意他们的观点, 但是最后还是得出一个共同的结论。应该是

有人妥协，让步了。我的同伴会很尽力去说服别人接受她的观点。有的时候我妥协，有的时候我同伴妥协，少数服从多数，比如今天的写作就是我其中一个同伴（Student C）妥协了。（所以这整个争论的过程增加了你的压力？）嗯。

Tr. [I think the advantages of collaborative writing is that it can improve the level of writing; that the relationship among the classmates may become more harmonious through the communications, for example, my partner and me. However, sometimes I feel more stressful in the process of collaborative writing. Because sometimes we hold different viewpoints, then we will argue with one another. (So, is it the debate that makes you feel more stressful?) Yes. Because sometimes they don't agree with my viewpoint, then sometimes I don't agree with theirs, but finally we have to come to a common conclusion. It should be that someone compromise and make a concession. My partner will try his best to convince others to accept his viewpoint. Sometimes, I will compromise and sometimes my partner compromise, following the rule that the minority is subordinate to the majority. For example, in the writing today, it is one of my partners (Student C) who get compromised. (So, does the entire process of debate add your pressure?) Yes.]

8. 动笔写的时候反而没什么，就是大家一起说怎么写，然后一个人主笔，两个人在旁边想怎么组织语言之类的。组织语言的时候的争论很少，就是有一点用词方面的。争论多数发生在写作开头选择立场的时候，比如选择支持网购还是实体店购物。后面讨论支持理由和证据的时候会好一点，也会有一点点争论。争论过程中的妥协有时候也会看谁更有说服力，不会因为哪个立场更好写就妥协。

Tr. [It is nothing difficult when we start to write, this is, all of us propose ideas on how to write, then one of us write, and two of us stay beside to think how to organize the language and the like. There is little debate when we are organizing the language, which is related to some choice of the words. Most of the time, the debate occurs when we choose the standpoint at the beginning of writing the article. For example, choosing to support online shopping or physical shopping. After that, the situation will be better with a little bit debate when we will discuss the supporting reasons and demonstrating evidence. Compromises in the course of a debate sometimes depend on who is more persuasive, instead of the standpoint which is easily to write.]

9. 写作的时候我们一般先写背景，然后陈述我们的观点，然后再给理由。我们会先讨论完，再开始写背景，然后再给出观点，再陈述理由。讨论时间十几分钟，然后就开始写。写的过程中不会改变观点，但是会讨论下理由。就大家想出那些理由来。（就等于先确定好站这边立场，然后就开始写了？）嗯。写完后不赶时间会看一下语法之类的，如果很赶时间大家都交了，然后就会直接交了。所以我们写的时候也会注意语法等问题。

Tr. [When writing, we usually write the background first, then state our viewpoints, and then elaborate reasons. We will complete the discussion before we start writing the background, then put forward our viewpoints and then state choose his standpoint first, and then start to write?) Yes. If the time is available, we will check grammar and the like. If the time is almost up, we will directly submit it. So, we will also pay attention to such issues as grammar in the writing process.]

10. 协同写作讨论过程中，觉得自己有用到辩证思考。比如给理由的时候，就会从反方向的想。（想尽可能全方面的给理由？把理由说的更有说服力？）嗯。

Tr. [In the discussion process for the collaborative writing, I think I have used the critical thinking. For example, when I elaborate the reasons, I will consider form the opposite side. (Do you want give reasons from a more comprehensive aspect? To make the reasons more persuasive?) Yes.]

11. 觉得协同写作对辩证思考和英语写作都是有幫助的。思维和语言学习都有。

Tr. [I think collaborative writing is helpful for both critical thinking and English writing, covering both thinking and language study.]

12. 觉得协同写作比部分协同写作好，部分协同感觉时间会花费更多，写完后还要交换。

Tr. [I think collaborative writing is better than partial collaborative writing. I feel that it will take more time for partial collaborative writing, and the essays have to be exchanged after they are completed.]

13. 觉得课程上给与的写作时间是足够的，不需要更多时间。

Tr. [I feel that the time given for the writing in class is enough and no more time is required.]

Student C

1. 学政治的时候，高中的时候，除此以外几乎不了解辩证思考。学政治的时候，因为那时候学习的是辩证唯物主义，就是从多方面观察吧，从客观或者是主观之类的。（就是多角度的思考的感觉？）嗯。

Tr. [Except the knowledge I obtained when we studied politics in the high school, I hardly knew any critical thinking. When we studied politics, what we learned at that time was critical materialism, based on which we should observe objects from multiple aspects, from either the objective or the subjective aspect. (Do you feel that thinking is generated from multiple angles?) Yes.]

2. 觉得自己平时看一个问题的时候会用到这种多方面（辩证思考）。以前有的时候，小的时候就会觉得错了就是错了，对的就是对的，然后长大后觉得不一定所有东西，错的_{不一定}是错的，然后对的_{不一定}是对的。（就是随着长大了，想问题会多方面的来思考？）嗯。

Tr. [I feel that I usually judge a problem from multiple angles (critical thinking). Previously sometimes, when I was a child, I felt what is wrong is wrong, and what is right is right. Then when I grew up, I felt not everything wrong is wrong, and not everything right is right. (As you grow up, you will think about a problem from multiple aspects?) Yes.]

3. 在是否擅长辩证思考方面，如果是100分，我给自己打60分。（就是及格对吗？还可以对吗？）嗯

Tr. [If I am asked for whether I am good at critical thinking, if the full score is 100 points, I give myself 60 points. (Does that mean you've passed, right? Is your score acceptable?) Yes.]

4. 我觉得辩证思考对提高写作还是有幫助的。因为，起码角度多一点，写的字也多一点嘛。

Tr. [I think critical thinking is still helpful for improving writing, because more words can be written out through more angles.]

5. 我觉得语言的学习是涵盖多方面的，（辩证思考对学习语言的帮助）还是有的，比如学习课文的时候，就会从思想方面来做选择，因为有的时候老师...（就是指做阅读对吗？）嗯，还有对理解文章有帮助。其实我觉得如果学口语的话，帮助还是很少的，几乎没有。

Tr. [I think language learning covers many aspects, (critical thinking is helpful for learning a language). For example, when studying a text, I will make choices based on the aspect of thought, because sometimes the teacher... (Does it mean doing readings?) Yes, furthermore, it helps me understand the article. In fact, I feel that there is very little help, almost no help if I learn oral English.]

6. 参加这个兴趣课程之前没有了解过什么是协同写作。只知道是合作。之前也没有过这种经历。以前合作的话，一般就是讨论，不会在一起写。

Tr. [I didn't know what the collaborative writing was before taking this interest course, and I only knew that is cooperation. I have never experienced this before. For the cooperation in the past, we usually discussed only and would not write collaboratively.]

7. 在课堂上，我个人还是比较喜欢个人写作的方式，因为我这个人比较奇葩，和别人的观点总是有冲突之类的，所以协同写作的话，而且，就是，时间耗的比较多，因为讨论，然后语言的组织，然后就是时间比较多。其实我觉得最重要的就是我们观点不一样。（因为观点不一样，感觉更复杂了？）嗯。（因为这个更喜欢独自写作？）嗯。

Tr. [In class, I personally prefer the way of personal writing, because I am a strange person and my viewpoint is always conflict with other people's. As for collaborative writing, and, that is, it takes more time on discussion and language organization, and then it is that more time is required. In fact, I think the most important thing is that our viewpoints are different. (Because the viewpoints are different, do you feel more complicated?) Yes. (So you prefer writing independently because of this?)

Yes.]

8. 总的来说,我感觉,从协同写作当中,有的时候可以看到自己,自己的弱项或者是别人的长项之类的。比如有的时候,我这人比较懒,不愿意背单词,就是词汇量有点少。然后就是,有的时候也可以发现别人的某些优点。比如,别人的词汇量比较多。有的时候就是,还有那种可以发现别人的语言风格。就是,(不同的写作风格?)嗯。当然也不一定全是优点或缺点之类的。有的时候也发现别人的短处。

Tr. [In general, I feel that sometimes I can see my, my own weak points or others' strong points benefiting from collaborative writing. For example, sometimes, I am lazy and unwilling to memorize words, so I master limited vocabulary. Then sometimes, I can find certain advantages of others. For example, other people have more vocabulary. Sometimes, I can also find the language style of others. That is, (different writing style?) Yes. Of course, it is not all about advantages or disadvantages and the like. Sometimes, I can also find the shortcomings of others.]

关于提供新思路,我这个人比较固执,就是别人提供新的思路,我一般还是会坚持自己的观点。所以当这种情况发生在协同写作中,我会用尽全力去说服他们。他们都说我伶牙俐齿。(所以他们也会被你说服?)不是,他们就是那种表面上说‘哎呀,你写吧你写吧’的感觉,可是心里没有真正的诚服。(你觉得他们只是妥协?但不是完全被说服?)嗯。

Tr. [As for providing new ideas, I am stubborn, that is, though others will provide new ideas, and usually I will still insist on my own viewpoint. So when this happens in collaborative writing, I will try my best to convince them. They all say I'm eloquent. (So, will they be convinced by you?) No, on the surface, they will say 'Ah, you write you write', but they are not really convinced. (Do you think they just compromise on it? But not completely convinced?) Yes.]

9. 说服别人过程中,比如上次高中生恋爱那个话题,因为我可以从,他们为什么反对,我可以先找他们反对的理由,他们反对的理由大多是因为高中要学习嘛,然后我就反驳。不过说实话,在中国学业更重要,但是因为我毕竟读过来了,所以我觉得有时候学习并不是很重要。我会从这样来反驳他们。有的时候,而且我近期看那个电视剧,我觉得,就是在你的生命中如果,就是在高中遇见一个人的话,我觉得还是可以珍惜的。其实我觉得他们,另一方面是感觉挺接受我的意见,但是他们又过于对,其实他们的,比如说我旁边的队友就说‘老师说,我妈说’怎样怎样的。我觉得他们也不喜欢这样的。(就比较听家长和老师的?)嗯。

Tr. [In the process of convincing others, for example, for the topic of high school students falling in love that we talked about last time, I can figure it out from..., why they are opposed. First of all, I can figure out the reason why they are opposed. Most of the reasons for their opposition are because they have to study in high school. Then I refuted them. But to be honest, studying in China is more important, but I have accomplished that anyway, I don't think that studying, sometimes, is very important. I will refute them from this aspect. Sometimes, and I have watched that TV series recently, I think that if you meet someone in high school in your life, I think he/she can be cherished. Actually, I think they, on the other hand, they accept my opinions, but they are too right. In fact, they are, for example, a teammate beside me said that 'the teacher said or my mother said' ... I think they don't like this too. (Are they prone to listening to parents and teachers?) Yes.]

10. 合作过程中,我们先是讨论一下。不过这个,在我们那个团队,一般那个观点比较相悖,所以,(经常相悖吗?)90%相悖。今天这个话题的处理方式就比较,比较公正的。所以是先讨论,然后就,大家说嘛,然后再写。(算是个草稿?集思广益?)嗯。讨论完后,一般由中间的人执笔。我也有过一次主笔。(这是很随意的决定的吗?)比如遇到一个东西你想写,那你写。或者是,不过大部分是大家一起说的嘛,所以觉得谁主笔没什么多大的关系。

Tr. [During the cooperation process, we will discuss it first. But this, the viewpoint is generally contradictory in our team, therefore, (Is it often contradictory?) 90% of them are contradictory. The treatment of this topic today is relatively, relatively fair. So, we shall discuss first, then, let's discuss and then write. (Can it be taken as a draft? Brainstorming?) Yes. After discussion, the

information should be usually written by a middleman. I have also written once. (Is this a casual decision?) For example, if you want to write something, you write it. Or, but most of ideas are proposed by all of us, so it doesn't matter who write it.]

11. 我们中间, 我很想负责组织, 她总是说我独裁, 可是如果我不说的话, 他们又会说‘你怎么看啊?’ 然后我说了他们又会说‘你怎么这样看的啊?’ (就是要问你的观点但是又不同意你的观点对吗?) 对。然后我不说的话, 又会说‘你怎么不说话呀? 搞得像我一个人写一样。’ 他们都是这样的。(所以他们不同意你的观点, 但是他们也不给原因?) 对。他们就说‘老师说, 学校怎么怎么样, 家长’都是这样说。(所以最后你说服了他们, 但是他们只是妥协?) 嗯。

Tr. [Among us, I really want to take charge of the organization. She always says that I am a dictator, but if I don't say anything, they will ask 'What do you think?' Then if I say something they will say 'how do you think so?' (They ask you for your viewpoint but disagree with you, right?) Yes. Then if I don't say anything, they'll say 'why do you say nothing? It's like writing by my myself.' They are all like this. (So, they disagree with you, but they can't give a reason?) Yes. They will say, 'the teacher said, the school ..., and the parents ...'. They all say like this (So in the end you will convince them, but they just compromise?) Yeah.]

12. 我觉得写作过程中是有用到辩证思考的能力的。毕竟, 每个人的观点不一样嘛, 就是从很多方面看的嘛。每个人的视角都不一样。(就是在这种争论中可以体现你们的辩证思考?) 嗯。讨论句式的时候也有过争论, 不过他们一般采取他们的。(是谁写就采取谁的吗?) 不是, 一般我说了算。因为每个人写作风格不一样嘛, 我写的时候就比较想用那种定语从句呀, 不定式啊。他们就想用那种, 比较简单一点之类的。最后就有的时候用他们的, 有的时候采取我的。

Tr. [I think the ability of critical thinking can be used in my writing process. After all, everyone's viewpoint is different, that is, any topic can be discussed from more than one aspect. Different persons can see one thing from different angles. (Is your critical thinking reflected in this debate?) Yes. There are debates when we discuss the sentence patterns, but they generally use their own. (Are the sentence patterns proposed by the person who write the article will be used?) No, I usually make the decision. Everyone has his own writing style. When I write, I prefer using the attributive clause and the infinitive, while they just want to use that, some simple ones. In the end, sometimes theirs and sometimes mine are used in the writing.]

13. 我觉得协同写作这种方式不是能很有效的提高辩证思考, 但是效果还是有的。 因为我觉得, 我觉得还是我们中国的学生长期的那种学习的方式造成的。就是不太容易改变。(就是原有的观点不容易被改变对吗?) 嗯。(所以尽管让你们协同写作, 让你们争论, 最后还是坚持自己的观点是吗?) 嗯。

Tr. [I think collaborative writing is not a very effective way to improve the ability of critical thinking, but there is still some effect. Because I think...think this is resulted from the long-term learning method of our Chinese students. They are just not easy to get changed. (Is the original viewpoint not easily changed?) Yes. (So, though you are asked to write collaboratively based on your debates, will everyone insist on his own viewpoint in the end?) Yes.]

14. 对于写作方面, 协同写作首先在观点上可以多样化, 然后在那种词汇呀, 语句上可以看一下别人怎么写, 别人为什么那样想之类的。

Tr. [As for writing, collaborative writing can firstly contribute to the diversification of the viewpoints. Then we can see how others use the words and sentences and why others think that.]

15. 所以我觉得可以在 pre-writing 的时候协同一起讨论, 然后分开写。如果整个过程都协同一起写作, 会把个人那种有特色的观点会抹杀掉。(就是自己的个人特色和风格就会被抹杀? 因为为了妥协对吗?) 对。

Tr. [Therefore, I think we can discuss together in the pre-writing process and then write separately.]

If collaboration is conducted throughout the entire process, the viewpoints of personal characteristics will be eliminated. (Will the personal characteristics and style be obliterated? For compromise?) Yes.]

16. 讨论的时候，说英文也说过，但是说中文的时候比较多。因为有时候我们的聊天比较奇葩，不知道用英文怎么说。（为了更清楚的说明你们的观点是吗？）嗯。说的时候吵起来了。（讨论语法词汇的时候用英语比较多？）嗯。

Tr. [During the discussion, we speak English, but most of the time we speak Chinese. Because sometimes we discuss the topic with some strange terms, we don't know how to express them in English. (Is it to make your viewpoint much clearer?) Yes. Quarrel may happen when we discuss. (Is English be used more often when you discuss grammar and vocabulary?) Yes.]

Student D

1. 在参加这个兴趣课程前，没太了解或者学习过什么是辩证思考。听说过这个词，觉得它的意思是看待一个事情或者一件东西多角度的去思考，从不同方面。参加完这个课程有，感觉对它好像有了更多理解，但是也说不出。

Tr. [Before taking this interest course, I didn't know much about or learned what the critical thinking is. I've heard this word and I thought it meant thinking should be made from more than one angle, from more aspects when we treat one matter or one thing. After attending this course, I feel that I may have more understanding regarding this word, but I can't figure it out.]

2. 觉得自己以前不擅长辩证思考。不会注重这方面。没有被强调过。

Tr. [I thought that I was not good at critical thinking before. I never paid attention to this aspect and the critical thinking was never highlighted.]

3. 觉得现在自己的辩证思考有得到提高，写作文的时候，写的东西肯定会比较严谨一点，思考问题也是。

Tr. [I think my critical thinking has been improved now. When I write a composition, what I write is definitely more rigorous, and so is my thinking.]

4. 觉得辩证思考能力的提升对英语写作是有帮助的。写东西会写的比较充分，不会有很多遗漏。就会想的比较严谨一点。（在论述的时候会更充足一点？）嗯。

Tr. [I think the improvement of critical thinking ability is helpful for English writing. With the critical thinking, writing will be more complete, will reduce more omissions, and make me think in a more rigorous way. (Will it be more sufficient in expounding the viewpoint?) Yes.]

5. 除了英语写作，辩证思考还可以应用到英语阅读上。（分析文章？）对。

Tr. [In addition to writing in English, the critical thinking can also be applied to English reading. (to analyze the article?) Yes.]

6. 总的来说，觉得学习辩证思考肯定是件有价值的事情。对学习是有帮助的。

Tr. [All in all, I think learning critical thinking is definitely a valuable thing, and it is helpful for study.]

7. 以前没有过协同写作的经历，也不了解什么是协同写作。现在知道什么是协同写作了。

Tr. [I have no previous experience in collaborative writing and I didn't know what the collaborative writing was. Now I know it.]

8. 在英语写作课堂上，如果是那种议论性比较强的，需要那种批判性思维的议论文，需要不同的观点的话，就可以协同写作。但是如果不是议论文，没有讨论的说明文或者其他的就，（所以你是要看作文的类型？）嗯。

Tr. [In an English writing class, collaborative writing can be applied for the argumentative essay

which is of strong argumentation and requires that kind of critical thinking and different viewpoints. If it is not an argumentative essay and it is an expository essay without discussion or some others, just ... (so, you will think about the type of the composition?) Yes.]

9. 认为协同写作的好处是：对写作方面有所提高；然后同学之间经过交流，关系可能也变得更融洽了，比如我和我搭档。但是在协同写作过程中，有的时候感觉压力更大了。因为我们有的时候观点会不一样，然后就会总是去争论。（所以争论会让你觉得压力变大吗？）对，因为有的时候他们不同意我的观点，然后有的时候我也会不同意他们的观点，但是最后还是会得出一个共同的结论。应该是有人妥协，让步了。我的同伴会很尽力去说服别人接受她的观点。有的时候我妥协，有的时候我同伴妥协，少数服从多数，比如今天的写作就是我其中一个同伴（Student C）妥协了。（所以这整个争论的过程增加了你的压力？）嗯。动笔写的时候反而没什么，就是大家一起说怎么写，然后一个人主笔，两个人在旁边想怎么组织语言之类的。组织语言的时候的争论很少，就是有一点用词方面的。争论多数发生在写作开头选择立场的时候，比如选择支持网购还是实体店购物。后面讨论支持理由和证据的时候会好一点，也会有一点点争论。争论过程中的妥协有时候也会看谁更有说服力，不会因为哪个立场更好写就妥协。

Tr. [I think the advantages of collaborative writing is that it can improve the level of writing; that the relationship among the classmates may become more harmonious through the communications, for example, my partner and me. However, sometimes I feel more stressful in the process of collaborative writing. Because sometimes we hold different viewpoints, then we will argue with one another. (So, is it the debate that makes you feel more stressful?) Yes. Because sometimes they don't agree with my viewpoint, then sometimes I don't agree with theirs, but finally we have to come to a common conclusion. It should be that someone compromise and make a concession. My partner will try his best to convince others to accept his viewpoint. Sometimes, I will compromise and sometimes my partner compromise, following the rule that the minority is subordinate to the majority. For example, in the writing today, it is one of my partners (Student C) who get compromised. (So, does the entire process of debate add your pressure?) Yes. It is nothing difficult when we start to write, this is, all of us propose ideas on how to write, then one of us write, and two of us stay beside to think how to organize the language and the like. There is little debate when we are organizing the language, which is related to some choice of the words. Most of the time, the debate occurs when we choose the standpoint at the beginning of writing the article. For example, choosing to support online shopping or physical shopping. After that, the situation will be better with a little bit debate when we will discuss the supporting reasons and demonstrating evidence. Compromises in the course of a debate sometimes depend on who is more persuasive, instead of the standpoint which is easily to write.]

10. 写作的时候我们一般先写背景，然后陈述我们的观点，然后再给理由。我们会先讨论完，再开始写背景，然后再给出观点，再陈述理由。讨论时间十几分钟，然后就开始写。写的过程中不会改变观点，但是会讨论下理由。就大家想出那些理由来。（就等于先确定好站这边立场，然后就开始写了？）嗯。写完后不赶时间会看一下语法之类的，如果很赶时间大家都交了，然后就会直接交了。所以我们写的时候也会注意语法等问题。

Tr. [When writing, we usually write the background first, then state our viewpoints, and then elaborate reasons. We will complete the discussion before we start writing the background, then put forward our viewpoints and then state the reasons. We will spend more than 10 minutes on discussion and then start to write. The viewpoints will not be changed in the writing process, but the reasons will be discussed, for those proposed by all of us. (Does that mean one should choose his standpoint first, and then start to write?) Yes. If the time is available, we will check grammar and the like. If the time is almost up, we will directly submit it. So, we will also pay attention to such issues as grammar in the writing process.]

11. 协同写作讨论过程中，觉得自己有用到辩证思考。比如给理由的时候，就会从反方向的想。（想尽可能全方位的给理由？把理由说的更有说服力？）嗯。

Tr. [In the discussion process for the collaborative writing, I think I have used the critical thinking. For example, when I elaborate the reasons, I will consider from the opposite side. (Do you want give reasons from a more comprehensive aspect? To make the reasons more persuasive?) Yes.]

12. 觉得协同写作对辩证思考和英语写作都是有辅助的。思维和语言学习都有。

Student S

1. 高中学习政治的时候听过辩证思考这个概念,学英语的时候老师没有讲过。高中写作文都是按照模板来写的,老师给你一个模板,你就模仿。这不是辩证思考的方式。

Tr. [I have heard this concept of critical thinking when I studied politics in the high school. The teacher didn't mention this when I studied English. English writing in high school is writing according to the sample essay. The teacher gives you a sample text, then you imitate it. This is not the way of critical thinking.]

2. 我觉得辩证思考就是把一个问题一分为二,从不同的方面去解答。经过这些课程的学习,对它的看法改变了一些。比如推断推论这些。之前没有涉及过这方面的知识,现在对它的了解更具体更细化了。

Tr. [I think critical thinking is to divide a problem into two sides and solve it from different aspects. After the eight-week study and practice, my attitude towards it has changed a little. Like inferences and deductions. I haven't learned this before, but now I know more details about it.]

3. 给自己的辩证思考能力打分,10分满分,以前5分,现在8分。以前写英语作文的时候也有过一些那种需要用到辩证的观点,但是没有那么多。就是相当于我们以前写作文就是给出自己的观点,没有例子去证明。就是用'I think, I believe'比较主观。觉得自己的辩证思考能力现在还是有提高的。

Tr. [If evaluate my critical thinking ability by myself, if the full score is 10 points, I think myself used to score 5, but now I score 8. There was some critical thinking in English writing in the past, but not so many. It means we used to write is to give our own opinions, without examples to prove them. We used the terms of 'I think, I believe', which is subjective. I feel that I have improved my critical thinking ability now.]

4. 现在生活和学习中写的大多是应用型作文,比如考英语四级都是图表型作文。似乎用不到辩证思考。但是对以后写其他的英语作文还是有帮助的。

Tr. [Most of the essays written in our current life and study are practical writing. For example, all of the CET-4 (College English Test- band 4) essays are chart composition. It seems no use for critical thinking. But it is helpful for other types of English writing in the future.]

5. 辩证思考在生活和学习中是有用的,比如在辩论的时候。但是我觉得作为学生来说用到的地方不多。

Tr. [Critical thinking is useful in our life and study, such as in debates. But I don't think I use it much as a student.]

6. 以前没有了解过什么是协同写作,也没有尝试过协同写作。以前只知道在西方国家的课堂上学生会比较放松,就像这些课程一样。

Tr. [I didn't know what the collaborative writing was previously, and I have never experienced this before. I only knew that in western classrooms students would be more relaxed, just like these classes.]

7. 在课堂上我更喜欢现在这种协同写作的方式。因为写的过程中会迸发出很多不同的想法,可以开拓思路。

Tr. [I like the way of collaborative writing in the classroom, because it will promote more ideas during the collaborative process. It makes me become more

open-minded.]

8. 我和搭档写作时经常会观点不一致。如果她的观点我觉得还可以，我就会赞同，就会偏向她的观点。有时候写的也很顺利。之前我们写一篇作文的时候，刚开始我们是先确定一个主方向是同意还是不同意。然后我们都决定是不同意。但是就是后来如何构造下文的时候有点分歧。我认为我们写的是不同意，不同意就应该突出高中生谈恋爱的不好，直接写危害。然后她想先写好处再转折。后来没有写作时间了就先写好的了，是我负责执笔的。有时候我喜欢用 ‘firstly, secondly’ 然后她就不同意，说不要用这个，用的人太多了。但是后来她还是同意了用。但是并不是谁执笔就听谁的，会综合考虑，有时候是因为没有时间了就妥协了。

Tr. [My partner and I often had disagreement with each other. But I would agree with her if I thought her ideas were not bad. So, I think sometimes we also wrote smoothly. Once when we wrote, we agreed the main direction at first, but had disagreement when we constructed the essay. I wanted to show the disadvantages directly, but my partner preferred to say something about the advantages at the beginning then moved to the disadvantages. At last, we wrote the disadvantages directly because of the time limitation. That time was I responsible for the writing. Sometimes I liked to use the linking words like ‘firstly and secondly’, but she disagreed as they were used frequently. Finally, she agreed to use them as a concession. I don’t think the person who responsible to write has more power. We often considered comprehensively. Sometimes we made concession because we did not have enough time.]

9. 我觉得协同写作比其他中国传统的教学模式更加的有趣。而且两个脑袋总比一个强。协同写作这种方式潜在的弊端是有时候可能有人想偷懒，就都听另外一个的，所以有时候妥协了是想偷懒。

Tr. [I think the collaborative writing class is more interesting than the Chinese traditional teaching class. And two people think together is better than one thinks alone. The potential weakness of collaborative writing is there may be some lazy students who contribute little to the task.]

10. 我觉得在协同写作的模式下，我的写作压力减少了。两个人一起想一起写更轻松。也可以在英语方面互相帮助。

Tr. [I believe writing collaboratively could reduce my writing pressure. Two people write together made it much easier and more relax. We could help each other in the language aspect.]

11. 写作的时候，我们先统一观点。统一好了观点想文章结构。这个过程在学习和练习的后期会越来越快。

Tr. [When we wrote, we firstly unified our standpoint. Then we discussed the essay’s structure. The process became more efficient with more practices.]

12. 我觉得在我们的写作过程中是有用到辩证思考的。比如说在举例子的時候，会刻意的去加一些实例去论证，增加说服力。再比如我会问我的搭档你为什么有这个观点或者你为什么这样想。

Tr. [I think we have used the critical thinking during our writing process. For instance, when we were talking about examples, we would deliberately add some facts to demonstrate or increase the persuasiveness. Or I would ask my partner

why you have this view or why you think so.]

13. 写作过程中用中文比较多, 很少用英语, 只有在写的时候才用英语。

Tr. [We used Chinese more than English during the CW process, and English is used only when writing.]

14. 我觉得协同写作对思考是有帮助的, 自己会渐渐变得有意识在写作的时候形成一些框架。

Tr. [I think CW is helpful for thinking, and I am gradually become conscious to form some frameworks in writing.]

15. 我觉得我们两个的写作时间总是不够。然后就是一个礼拜只上一节课容易忘记之前学习的内容, 不过老师课前的 review 还是很有帮助的。

Tr. [I don't think we ever have enough time to write. After that, it is easy to forget what we have learned before because we only had one class per week. However, the teacher's review at the beginning of the class is very helpful.]

16. 我觉得我的搭档对我很有帮助, 帮我想了很多, 合作还算愉快。在英语方面我觉得我的语感比她好一些, 她词汇比我好一些, 可以互补。

Tr. [I think my partner is very helpful to me. She helped me to think a lot. The collaboration between us was quite pleasant. In English aspect, I think my sense of language is better than hers, and her vocabulary level is better than mine, which we can complement each other.]

17. 我不赞同在协同写作的学习中换写作搭档, 固定搭档能更好的磨合。

Tr. [I do not agree with changing writing partners in the study of collaborative writing. Fixed partners can work better with more practice.]

Student Y

1. 以前没有学习过关于辩证思考的定义或者应用, 但是有听说过这个概念。只在高中学习政治的时候接触过辩证法。以前觉得它不一定是个确切的答案, 不要太绝对。现在对它的理解也差不多, 不要太绝对, 多角度的思考问题。具体的能力有印象但是记不清了。

Tr. [I have not learned about the definition or application of critical thinking before, but I have heard about this term. I knew this concept of critical thinking when I studied politics in the high school. I used to think it wasn't a sure answer, so didn't be too absolute. Now my understanding of it is similar, don't be too absolute, to think with multi-angle. I have an impression of specific critical thinking abilities but cannot remember them clearly.]

2. 我以前被问到赞同不赞同时, 一般不会给一个肯定的答案, 会从正反两方面去想。就会想一个问题的优点和缺点, 看是优大于劣还是劣大于优。我可以通过线索和分析得出结论, 但是我觉得自己的分析可能不是很深入, 得出的结论可能不正确。以前在判断一件事是可能正确或者是可能错误时完全没头绪, 现在可以区分开这种不同了。

Tr. [When I have been asked in the past whether I agree or disagree with something, I usually don't give an affirmative answer. I would think about both sides. I would think about the advantages and disadvantages of a problem, and to see which side was stronger than the other. I could draw a conclusion through clues and analysis, but I think my analysis may not be very in-depth, and the

conclusion may not be correct. I was completely confusing whether something was likely to be right or wrong before, but now it's possible for me to tell the difference.]

3. 我觉得英语写作是个长期积累的过程, 考试的时候没有太多时间去思考, 应该在平时学习的时候就形成思考的习惯。辩证思考对英语学习和其它学习都是相通的。我觉得辩证思考对我们的生活和学习有用, 但不是时时刻刻都用的到。遇到问题需要想办法去解决的时候可以用到辩证思考。

Tr. [In my opinion, to improve English writing is a process of long-term practice. I don't have much time to think in exams, so I should form the habit of thinking in my daily study. The effectiveness of critical thinking for English learning and other learning are the same. I think critical thinking is useful for our life and study, but it is not always used. We can use critical thinking when we encounter problems and then try to solve them.]

4. 以前没有听过也没有尝试过协同写作。个人更喜欢一起讨论但是独立写作的方式。

Tr. [I had never heard or tried CW before. I prefer discussing together but writing individually.]

5. 因为我和搭档经常起冲突。他同意的我不同意, 我同意的他不同意。观点不能达成一致, 可能是因为性别不同造成的差异。其实有些东西不是说哪一方就必须是正确的, 感觉可以这样也可以那样。一开始是有自己的倾向, 但是大多数时候也可以接受对方的观点, 不是说我的就一定是对的, 他的就一定错的。所以虽然经常碰到冲突, 但是最后都有一方妥协。我们是轮流负责写, 感觉负责写的人更有话语权。

Tr. [I often had disagreement with my partner. We could not reach agreement sometimes, maybe because my have different gender that we saw things very differently. I did not think there are absolutely right or wrong, and mostly I found one thing could have diverse solutions. Although I had my own preference, I would accept another person's opinion if it sounds reasonable. I never thought my ideas are absolutely right, while others are absolutely wrong. So, we made concessions when we had disagreements. We took turns to responsible for the writing, and I felt the person were more powerful when he or she wrote.]

6. 随着练习和合作的增多, 写作和合作的效率是有提高的。

Tr. [With more practices, our efficiency in writing and collaboration were improved.]

7. 我觉得我的搭档英语水平, 比如词汇量和句式比我好的多。对我很有帮助。但是我们的写作想法和写作习惯很不一样, 所以会带来冲突。但是我不认为这是弊端, 比如说今天他想写成写信的模式, 我不想写这种模式。可是我也可以学到另一种写作的方式。打开了新的思路。

Tr. [My partner has better English level than me, such as the grammar and the vocabulary. He was really helpful for me in the language aspect. However, our writing styles and writing patterns were quite different, which often bring the disagreements. But I do not think this is a disadvantage for us. We could learn a new writing pattern from each other. This opens our mind to new ideas and new expressions.]

8. 我觉得两个人一起写作压力更大了,因为一个人可以自己想怎么写就怎么写。所以我更喜欢两个人一起讨论但是分开写作的方式。

Tr. [I think it's more stressful for two people to write together, because one person can write what he wants. So, I prefer two people discussing together but writing individually.]

9. 写作的时候,我们会先讨论结构。列个大纲把观点列一下。经常在列观点的时候有争执。一般听负责写的人的观点。谁拿着笔谁比较敢写。我们会语法呀结构呀可不可以,会这样一起讨论一下句子然后再写上去。比较复杂的句子会这样讨论一下语法和结构。文章写完了有时候会再看一遍,但是时间不够就没办法看了。

Tr. [When we wrote, we would talk about structure first. We would make an outline of our ideas. We often had disagreements when we were listing our ideas. Usually we listened to the person who were responsible for the writing. The person who held the pen was responsible more. We would discuss grammar and structure, and then wrote them down. We would discuss grammar and structure of complex sentences. When the writing was finished, sometimes we would read it again, but sometimes there was no enough time to read it.]

10. 我觉得我们在写作中有用到辩证思考,因为观点经常不一样。

Tr. [I think we used our critical thinking during the process of CW, because we often had different opinions.]

11. 交流的时候用中文比较多,只有在写的时候会用英文。

Tr. [We communicated with each other by using Chinese more, and we only use English when we were writing.]

12. 我觉得协同写作是一种有效的提高辩证思考能力的方式,可以促进我的思考,特别是在我们观点不一样的时候。

Tr. [In my opinion, collaborative writing is an effective way to improve my critical thinking, which can promote me to think, especially when we have different views.]

13. 我觉得可以再给学生多一点表述的机会,但是有时候作为一个学生我不知道要怎么表述,所以需要老师更多的引导。

Tr. [I think it can give students more opportunities to express themselves, but sometimes as a student I don't know how to express myself, so I need more guidance from the teacher.]

14. 我觉得写作时间可以再长一点,特别是需要时间讨论,尤其是分歧大的时候,但是分歧大更促进思考。

Tr. [The time for writing can be provided longer. It needs time to discuss, especially if we have many disagreements. However, the disagreement can promote thinking.]

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