A Longitudinal Study on the Formation of Chinese Students' Translation Competence: with a particular focus on metacognitive reflection and web searching

By

LI-YOU CHANG

A thesis submitted for the degree of

Doctorate of Philosophy

Centre for Translation Studies (CenTraS)

University College London (UCL)

2018

Abstract

The present study aims to explore the formation of ten Chinese students' translation competence (TC) focusing on web searching skills as instrumental competence and their metacognitive reflection during a one-year postgraduate translation course in the UK. This study adopts a multi-method approach, including thinking-aloud (TA), screen recording and a cue-based retrospective interview. The TA and screen-recording methods were used to record the students' concurrent verbalisations of thoughts and their on-screen behaviours while they were translating three tourism texts from English into Chinese on three separate tasks. Shortly after each task, cue-based retrospective interviews were carried out to prompt the students to reflect on their metacognitive translation behaviours by reviewing their verbalisations and on-screen behaviours.

The key findings of the present study are as follows. Firstly, the combination of the students' TA, screen-recording and reflection data shows that their misjudgements of translation problems as perceived during problem solving were a contributing factor of unsuccessful solutions. The students' reflection data also indicates that they were unaware of their misjudgements of actual problems.

Secondly, my data suggests that the students gradually moved away from dictionary-based (web) resources and learned to cross-check and adopt more diversified web resources such as online images and online maps to solve their translation problems. Meanwhile, it was also found that the students spent more time looking for background knowledge on the web rather than focusing on finding simplistic target-text (TT) equivalents.

Thirdly, based on the students' metacognitive reflection, it was found that their increasing utilisation of web searching was gradually developed. The students' understanding and awareness of the importance of web resources also enhanced their self-concept as translators, which lays the solid foundation for confidence building in becoming a professional translator.

Finally, this study demonstrates potential pedagogical value of using translation process research methods as a set of metacognitive reflection tools to hone students' web searching skills. This finding significantly goes beyond cognitive behaviours in aiding TC development of metacognitive behaviours.

Keywords: Instrumental competence, metacognitive reflection, thinking-aloud, screen recording, cue-based retrospective interview

Impact Statement

The present study explores translation students' competence development focusing on web searching over a one-year postgraduate programme, which is a rarely addressed issue in current cognitive translation research. The present study can be replicated by future translation process research that investigates different groups of subjects for their development of TC or translation expertise in a longitudinal way. The methodology of the present study can also be adapted into other kinds of teaching methods that make students do self-reflection on their translation behaviours. The impact of the present study could occur to translator training at the undergraduate or postgraduate level with different language combinations.

Table of Contents

CHAPTER 5 CUE-BASED RETROSPECTIVE INTERVIEW RESULTS 140

Acknowledgements

Firstly, I would like to express my sincere gratitude to my principal supervisor, **Dr Claire Yi-Yi, Shih**, for the continuous support of my PhD study over the past four years at University of Leicester and University College London, for her meticulousness, patience, dedication and immense knowledge of translation process research. Her guidance helped me in all the time of research and writing of this thesis, and this becomes an example to me in future academic career. My gratitude is also extended to my secondary supervisor, **Prof Kirsten Malmkjær**, for her careful proofreading and insightful comments on this thesis.

Secondly, my sincere thanks also go to **the ten Chinese postgraduate students** as my subjects from CenTraS. Their cooperation and dedication make this thesis possible. I am also pleased to see that these students truly learned something useful from my research project during a one-year postgraduate translation degree.

Thirdly, I would like to offer special thanks to my cousins, **Dr Eric Jen-Hsiang, Yang** and **Dr Yi-Chung, Chien**, for their suggestions of statistical analysis. I also thank Dr Yang for his encouragements when I felt frustrated in thesis writing. Besides, I thank my fellow colleagues, **Dr Albert Feng-Shuo, Pai** and **Miss Joyce Yu-Hua, Chou**, for doing inter-coder reliability tests and marking the ten subjects' translations.

Last but not least, I would like to thank my family, relatives and friends in both London and Taiwan for supporting me, physically and spiritually, throughout writing this thesis and my PhD journey in general.

List of Figures

List of Tables

Abbreviations

ST: Source Text

TT: Target Text

SL: Source Language

TL: Target Language

L1: First Language

L2: Second Language

TA: Thinking-aloud

TAP(s): Think-aloud Protocol(s)

TC: Translation Competence

ATC: Acquisition of Translation Competence

SD: Standard Deviation

CHAPTER 1
INTRODUCTION

1.1 Research Motivation

In this section, I will illustrate my motivation for conducting this research project. Firstly, it is an exploration of Chinese translation students' competence development. As a Chinese-speaking student of a British postgraduate translation programme myself, I was intrigued to find out how translation competence (TC) is formed, given that the duration of most British postgraduate translation programmes is only one year. To the best of my knowledge, no studies have been published on TC development using Chinese students following a British postgraduate translation programme. My research project sheds light on whether it is possible to observe noticeable TC progression in a group of postgraduate translation students (constituted by a collection of novice and semi-professional translators) within a relatively short period of time, i.e. one year.

The acquisition of TC (ATC) has long been a hot topic in translation process research (Saldanha and O'Brien 2013: 112). Some researchers have attempted to model TC or expertise as demonstrated by professional translators and to contrast this with that of bilinguals with no translator training (e.g. PACTE's early studies in 2000; see further Section 2.4.2.1, Chapter 2). Others focus on novice and semi-professional translators who receive rigorous translator training at the undergraduate or postgraduate level (e.g. Göpferich 2007; see further Section 2.4.2.3, Chapter 2). However, Göpferich et al. (2011: 58) point out that most contrastive studies on the ATC between groups of participants do not actually address the continuous development of TC, so more longitudinal studies on *the same participants'* translation processes at *regular intervals* are required.

Secondly, it is an in-depth investigation of translation students'
metacognitive behaviours in translation. Although previous
researchers (e.g. Angelone and Shreve 2011) used think-aloud
protocols (TAPs) and screen recording to examine professional
translators' and translation students' metacognitive activities in their
problem-solving processes, they discussed professional translators'
metacognitive behaviours more than those of translation students.
My research project uses TAPs and screen recording to look into not
only translation students' cognitive behaviours but also more
specifically their metacognitive reflection on their own behaviours in
the translation process.

1.2 Aims and Objectives

The main aim of this research project is to explore the formation
of Chinese students' TC. It also particularly focuses on an aspect of
instrumental competence, i.e. **web searching**, through students' self-
reflection via three separate translation tasks over the course of a
one-year postgraduate translation degree in the UK. The reason for
this is that details of web searching have largely been overlooked
although TC has been investigated and defined by many scholars in
Translation Studies. Therefore, the present study aims to shed light
on web searching as a process of problem solving from students'
point of view. It is also important to point out that in the present study,
translation process research methods are not just research
instruments to investigate students' behaviours but also **act as tools
that assist students to self-reflect with respect to their TC
formation**. In other words, students' formation of TC is viewed not
just from the researcher's point of view but also from that of students.

I adopted a multi-method approach in my data collection. Three separate translation process research methods, **thinking-aloud (TA)**, **screen recording** and **a cue-based retrospective interview**, were employed to collect students' concurrent verbalisations of thoughts, their problem-solving and decision-making behaviours in translation and most of all, their metacognitive reflection on and evaluation of their own translation behaviours and translation performance. In order to test the **reliability** of the proposed methodology, in the first year of my PhD study, I conducted a pilot study whose design followed that planned for the main research project. The pilot study suggests that it was feasible to combine TA, screen recording and a cue-based retrospective interview as self-reflection tools for exploring translation students' TC development. The aims and objectives of this research project are as follows:

Aim 1: To examine students' translation problems as well as their problem-solving and decision-making behaviours in three separate tasks throughout a one-year postgraduate translation degree

The following three questions encapsulate Aim 1:

(1) What did students perceive as their translation problems?

(2) How did students solve their problems?

(3) How did students' perceptions of their problems affect their
  problem solving and decision making?

Aim 2: To investigate students' (metacognitive) self-reflection as assisted by translation process research methods

The following two questions encapsulate Aim 2:

(1) What did students learn via their reflection on their problem-solving and decision-making behaviours?

(2) How did students evaluate their translation performance and why did such evaluation occur?

Aim 3: To explore students' competence formation related to web searching

The following two questions encapsulate Aim 3:

(1) How had students developed instrumental competence through their improvement in web searching skills?

(2) In what aspects had students developed instrumental competence?

Aim 1 is linked to the data collected partly by TA and screen recording (see Chapter 4) and partly by cue-based retrospective interviews (see Chapter 5). Aim 2 and Aim 3 are largely based on the data collected by cue-based retrospective interviews.

Figure 1-1 presents the methodological procedures of this research project. As this figure shows, the subjects' problem-solving and decision-making process while translating the source text (ST) to the target text (TT) is recorded by the TA and screen-recording methods. Then, the TA and screen-recording data are utilised in a cue-based retrospective interview as self-reflection tools by students.

```
┌──────────┐                              ┌──────────┐
│    ST    │ ───────────────────────────▶ │    TT    │
└──────────┘          │                   └──────────┘
                      │
                      ▼
              ┌──────────────────────┐
              │ TA + Screen Recording │
              └──────────────────────┘
                      │
                      │
                      ▼
       ┌──────────────────────────────────┐
       │  Cue-based Retrospective Interview │
       │  (Metacognitive Self-reflection)   │
       └──────────────────────────────────┘
```
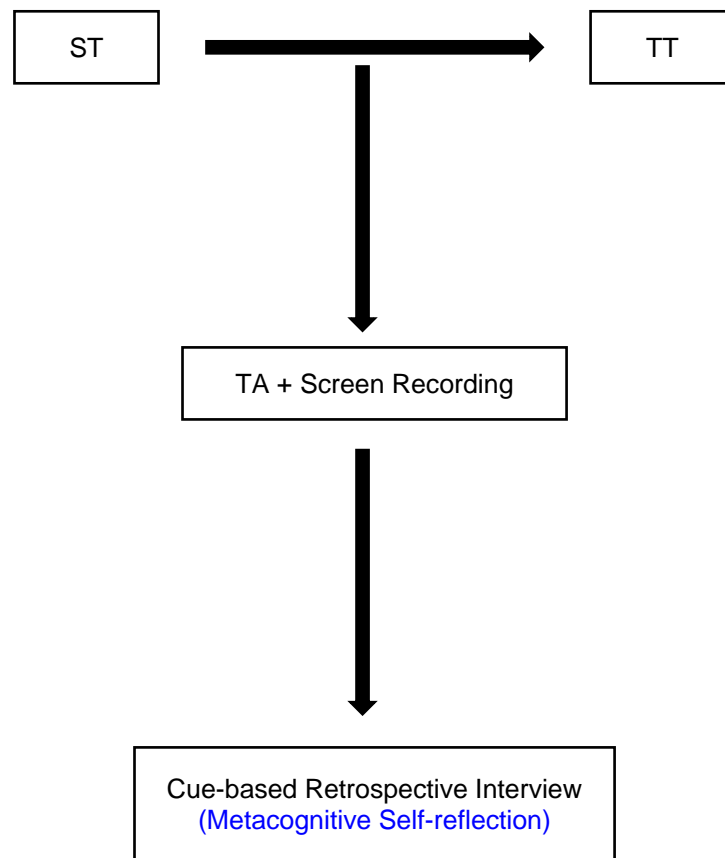
Figure 1-1 Methodological Procedures

1.3 Structure of this Thesis

The rest of this thesis is structured as follows:

- Chapter 2 Literature Review: reviews the notions, concepts and models of cognitive behaviours and translation process research, as well as summarises the definitions, types and models of TC. All of these formulate solid theoretical foundations for the present study.

- Chapter 3 Research Methods: discusses the methodological issues of TA, screen recording and a cue-based retrospective interview. The data-collection procedures are also described.

- Chapter 4 TAP and Screen-recording Results: presents students' TAP and screen-recording data quantitatively and analyses the varieties of students' translation problems and their use of external resources.

- Chapter 5 Cue-based Retrospective Interview Results: presents students' interview answers following the order of the three tasks, summarising the main points from students' reflection data.

- Chapter 6 Discussion: provides an overall and in-depth discussion of students' TAP, screen-recording and cue-based retrospective interview results.

- Chapter 7 Conclusion: highlights the significance of the present study, summarises the key findings and pedagogical implications for translation process research and provides recommendations for future research.

CHAPTER 2
LITERATURE REVIEW

2.0 Preamble

This chapter begins by discussing notions and models of cognitive behaviours. **Section 2.1** first defines the notion of cognitive problem-solving behaviours. Newell and Simon's problem-solving model (1972) is illustrated (Section 2.1.1), and the notion of cognitive decision-making behaviours is defined (Section 2.1.2). Two decision-making models developed by Montgomery (1989) and Svenson (1992) are discussed and compared because decision making is often intertwined with problem-solving behaviours. **Section 2.2** first defines the notion of the translation process (Section 2.2.1). Previous translation process research on problem-solving and decision-making behaviours is reviewed and a research gap in metacognition is identified and related to the present study (Section 2.2.2). **Section 2.3** discusses the notions and concepts of translation process research in the context of data analysis adopted in the present study, including the notion of the translation problem (Section 2.3.1), the notion of the translation strategy (Section 2.3.2) and the application of translation process research in translator training (Section 2.3.3). **Section 2.4** reviews the definitions of translation competence (TC) (Section 2.4.1) and four representative TC models (Section 2.4.2). The types of TC used in the present study are discussed and related to those four TC models (Section 2.4.3).

2.1 Notions and Models of Cognitive Behaviours

2.1.1 Cognitive Problem-solving Behaviours

In this section, the notion of (cognitive) problem-solving behaviours is defined. The problem-solving model proposed by Newell and Simon (1972) is illustrated and on the basis of this model, the concept of metacognition in the context of problem solving is defined.

Problem solving has been defined in different disciplines such as psychology and education, and these definitions share a goal-reaching perspective. Before I define problem solving, what constitutes a problem should be explained. According to one of the oldest problem-solving theories, proposed by Duncker (1945), a problem appears when the problem solver has a goal but does not know how to achieve it. Specifically, a problem occurs when a situation is in a given or initial state, and the problem solver wants the situation to be in a goal state but may be unaware of an obvious way to transform the situation from the given state to the goal state, and hence problem solving is required.

Duncker's definition of problem solving can be related to Newell and Simon's problem-solving model (1972) shown in Figure 2-1.
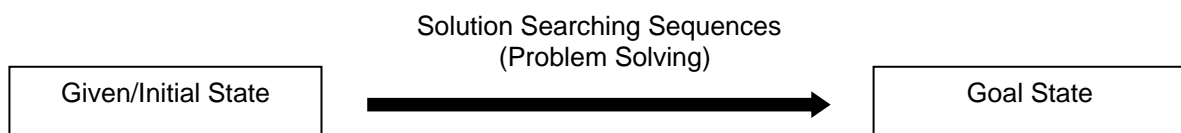
Figure 2-1 Newell and Simon's Problem-solving Model (1972)

Newell and Simon (1972) propose their problem-solving model within the constraints of human information-processing capacities. They conceptualise a 'problem space' and think that problem solving consists of two aspects. One aspect is **the construction or understanding of a problem space**, i.e. the identification of what the given or initial state is, what the goal state is and how the passage between the two states is blocked. The other aspect is **solution searching sequences**, i.e. problem solving. According to Newell and Simon (ibid), both aspects interact with each other constantly in the problem-solving process. The moment a problem space is fully constructed or understood, the problem is often half solved. In fact, the construction or understanding of a problem space is also important for examining students' mistranslations caused by their misconceptions of translation problems discussed in the present study (see further Section 6.1.1, Chapter 6). In the present study, I will look into students' unsuccessful problem solving related to their translation errors.

In Newell and Simon's model, a problem space is constructed continuously rather than initially because a problem can change as a result of the problem solver's external actions or internal inferences during the problem-solving activity. The construction of a problem space interacts with solution searching sequences and once the problem space is fully constructed, a solution is often found. In the present study, I assume that students' translation problems vary from superficial lexical problems to comprehension or expression problems, and that they need to adopt or evaluate different solutions to reach that goal state; this is related to another important concept in the present study, i.e. **metacognition**.

Shreve (2009: 257) defines metacognition as 'the conscious and strategic control over complex cognitive tasks'. He argues that metacognition occurring in translation is almost exclusively activated by cognitive problems in the translation situation. Holton and Clarke (2006: 132) define metacognition differently as any thinking act assisting the learning process when cognition is problematic. Romainville (1994: 360) supposes that students develop metacognitive knowledge as a result of their reflection through describing and justifying their cognitive (problem-solving) strategies. Briefly speaking, metacognition is a process where an individual perceives cognitive problems and evaluates his or her solutions, and this process could potentially enhance learning outcomes. This is a fundamental theoretical basis for my second research aim (see Section 1.2) to investigate self-reflection as assisted by translation process research methods.

In terms of problem solving in the translation process, however, translation problems are often ill-defined with the lack of a clear solution path, and the goal of a well-produced translation remains difficult to define. As a result, ill-defined problems can "lead to more than one 'correct' solution" (Davidson and Sternberg 2003: 4). Given such an ill-defined goal in translation, translators seem to identify other sub-problems (Shih 2006) and expect that solving these will take them a step further towards an acceptable solution. During the process of sub-problem solving, translators appear to monitor or evaluate these 'correct' solutions, searching for an optimal one, and this monitoring process also belongs to the metacognitive behaviours which the present study aims to gain an insight into.

In summary, the problem-solving process can be described as a cycle (Bransford and Stein 1993). This problem-solving cycle consists of the following stages where the problem solver has to:

(1) Recognise or identify a problem

(2) Define and represent the problem mentally

(3) Develop a solution or strategy

(4) Organise his or her knowledge about the problem

(5) Allocate mental and physical resources for solving the problem

(6) Monitor his or her progress towards the goal

(7) Evaluate the solution for accuracy

It should be born in mind that not all problem-solving procedures should follow the seven stages in this order, as also evidenced in translators' behaviours. Among all the stages, the monitoring or evaluating behaviours related to decision making play a significant role for successful problem solving, and this is part of the reason why the present study aims to explore students' self-evaluation of their translation and their decision making via reflection. This will be discussed in the following section.

2.1.2 Cognitive Decision-making Behaviours

In this section, the notion of (cognitive) decision-making behaviours is defined. Regarding metacognitive decision making, two important decision-making models proposed by Montgomery (1989) and Svenson (1992) are discussed and compared.

Harris (1998) defines decision making as 'identifying and choosing alternatives based on the values and preferences of the decision maker'. In this definition, making a decision implies that 'there are alternative choices to be considered, and in such a case we want not only to identify as many of these alternatives as possible but to choose the one that has the highest probability of success or effectiveness'.

In addition, Harris (ibid) also sees decision making as 'the process of sufficiently reducing uncertainty and doubt about alternatives to allow a reasonable choice to be made among them'. He notes that 'uncertainty is *reduced* rather than eliminated. Very few decisions, particularly those related to ill-defined problems, are made with absolute certainty because complete knowledge about all the alternatives is seldom possible. Thus, every decision involves a certain amount of risk'.

Based on Harris's definition of decision making, in the present study, I will look into how students facing ST proper nouns that do not have generally accepted translations make choices among different translated versions on the web. In addition, I will look at how students reduce their uncertainty while they are choosing the ideal translations. The concept of uncertainty reduction will be introduced and related to the dominance search model developed by Montgomery (1989).

2.1.2.1 Montgomery's Dominance Search Model

The dominance search model shown in Figure 2-2 regards decision making as a process of searching for dominant alternatives. This model involves four stages: 'pre-editing', 'finding a promising alternative', 'dominance testing of a promising alternative' and 'dominance structuring'.
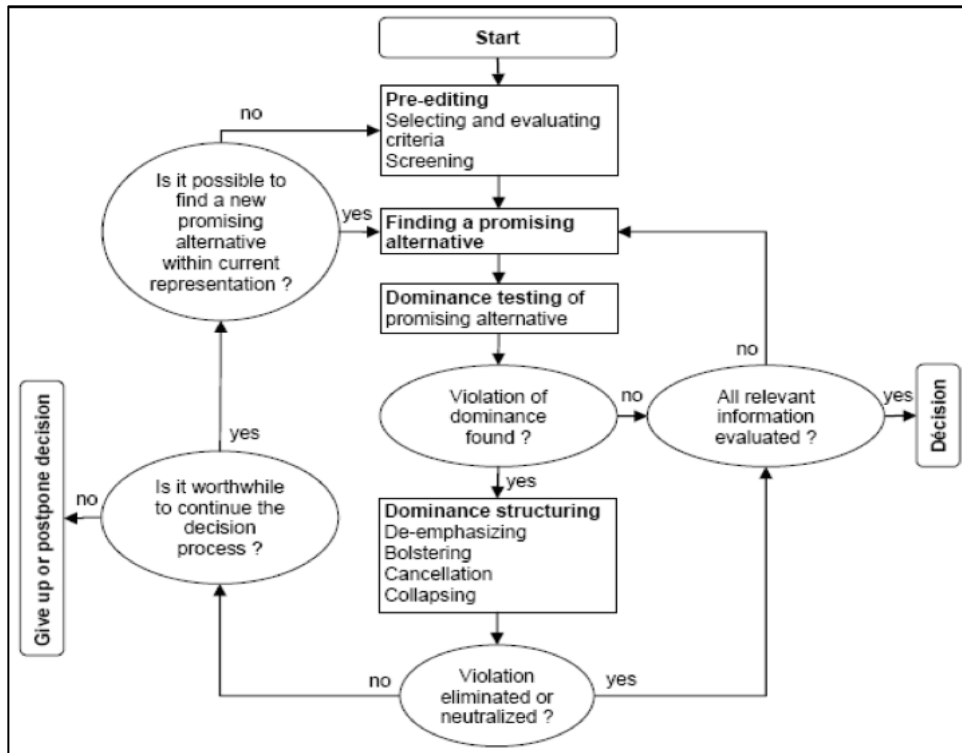
Figure 2-2 Montgomery's Dominance Search Model (1989)

At the 'pre-editing' stage, various attributes and alternatives are selected and evaluated on an equal ground in the screening process. Then, at the 'finding a promising alternative' stage, a preferable or dominant choice has to be made during the screening process. After a dominant choice is found, the 'dominance testing of a promising alternative' stage shows that the advantages and disadvantages of the dominant choice are evaluated against other alternatives. If the decision maker feels that the alternative is truly dominant, a decision is made and the whole process is completed.

On the other hand, if the decision maker faces some problems with or arguments against the dominant choice, he or she proceeds to the 'dominance structuring' stage as a sub-routine of the 'dominance testing of a promising alternative' stage to 'restructure the given information in such a way that a dominance structure is obtained' (Montgomery 1989: 25). The 'dominance structuring' stage includes 'de-emphasizing', 'bolstering', 'cancellation' and 'collapsing' strategies. 'De-emphasizing' means that the disadvantages of a dominant choice are de-emphasized by the decision maker, while 'bolstering' refers to making the advantages of that dominant choice stronger and more attractive. 'Cancellation' indicates that one disadvantage of a dominant choice is cancelled or compensated for by one of its advantages. 'Collapsing' suggests that 'two or more attributes are collapsed into a new [and] more comprehensive attribute' (Montgomery ibid: 26). The above four strategies can be related to uncertainty reduction as discussed by Angelone and Shreve (2011).

Angelone and Shreve (2011: 108) define uncertainty as 'a cognitive state of indecision marked by a distinct class of behaviours potentially occurring during the translation process'. In order to reduce such uncertainty, translators apply conscious strategies by solving the problems of comprehension, transfer and production to bring the translation activity to a successful conclusion (Tirkkonen-Condit 2000). According to Angelone and Shreve (ibid: 109), the reduction of uncertainty is termed *uncertainty management (UCM)*. The process of UCM includes three phases: problem recognition (PR), solution proposal (SP) and solution evaluation (SE). Angelone and Shreve examined the metacognitive problem-solving processes of one professional translator, one bilingual and two translation students. They found that the uninterrupted metacognitive sequence (PR-SP-SE) performed by the professional translator correlated with more successful UCM and fewer translation errors. In the present

study, however, it is worth examining whether students could also perform UCM well in their metacognitive problem-solving behaviours.

Angelone and Shreve's study of UCM still focuses on problem solving more than on decision making in the subjects' metacognitive behaviours. Since decision making in the translation process cannot be isolated from problem solving, translators appear not only to evaluate their solutions but also to justify their choices during the metacognitive decision-making process. Again, this is what the present study will tap into.

Finally, if all the four strategies at the 'dominance structuring' stage fail, the decision maker has to return to the 'pre-editing' stage or the 'finding a promising alternative' stage. Otherwise, he or she may give up or postpone the whole decision-making process.

2.1.2.2 Svenson's Differentiation and Consolidation Theory

The justification of translators' decision-making behaviours can be connected to Svenson's differentiation and consolidation theory (1992), which is seen as an improved version of Montgomery's dominance search model. Based on the assumption that it is insufficient to choose the best alternative, the theory indicates that the human decision-making process comprises two sub-processes. One is **the differentiation process** where 'a decision involves the selection and creation of a candidate that is sufficiently superior for a decision' (ibid: 143). This process, including 'detecting the decision problem', 'processing of differentiation of an initially chosen alternative from others' and 'the decision stage', works in parallel with the 'pre-editing', 'finding a promising alternative' and 'dominance testing of a promising alternative' stages in Montgomery's model.

The other is **the consolidation process** which is also known as **the post-decisional process**. In this process, the decision maker appears to defend the chosen alternative by 'unconsciously increasing his or her attractiveness appraisal of the chosen alternative on an important attribute' (ibid: 145). In addition, the decision maker also learns to prepare for threats against the chosen alternative. The post-decisional process is similar to the 'dominance structuring' stage in Montgomery's model. However, the distinction between the two models is that Svenson's differentiation and consolidation theory puts more emphasis on the post-decisional process, i.e. what happens after a decision is made.

The differentiation and consolidation theory has significant implications for translators' metacognitive decision-making behaviours because it 'explicitly links pre- and post-decision processes and considers pre-decision processes as a preparation for the post-decision future' (ibid: 144). Hence, the present study applies this theory to investigate students' metacognitive reflection (i.e. post-decision behaviours) on their justification of useful translation choices and resources.

2.2 Cognitive Translation Behaviours

2.2.1 Definition of the Translation Process

The notion of the translation process is first defined because it is central to the present study. Hansen (2003: 26) defines translators' general actions in the translation process as extending 'from every pencil movement, dictionary use, to problem-solving and correction-making'. As can be seen, Hansen's definition encompasses a very comprehensive picture of the translation process.

Muñoz Martín (2010) specifically stresses the mental aspect of the translation process by arguing that such a process should be understood on three levels. The first level is the fundamental level involving sets of mental states and operations at play during the act of translating. The second level, related to the first level, encompasses the sub-tasks and observable operations during the mental act of translating such as reading, writing, using information resources, research, and revising. The third level refers to the situated workplace in the translation process understood as the period from the moment a client contacts a translator until the addressee receives the final translation product.

Since the present study focuses on students' cognitive behaviours, the third level pertaining to translators' social working context will not be investigated. In the present study, I will mainly pay attention to the first and second levels because they provide cognitive information about translators' problem-solving and decision-making behaviours in the translation process.

2.2.2 Cognitive Translation Process Research

In this section, I will review previous TAP-based studies of translators' problem-solving and decision-making behaviours and identify a gap in research into these phenomena. In addition, I will discuss translators' metacognition in both kinds of behaviours as another focus of the present study.

Problem solving and decision making are two inseparable concepts that are vital to the translation process. Two pioneering TAP-based studies (Krings 1986; Jääskeläinen 1987) investigated different kinds of subjects' problem solving in translation, and they provide a framework for the present study to further examine metacognitive problem-solving behaviours during translation. Krings (1986) was the first scholar to use TAPs to analyse translation problems and problem-solving strategies during translation. His subjects were eight language learners, and Krings examined their use of time and reference books, developing a tentative translation process model based on the problem-solving concept (see further Section 2.3.2.2).

Jääskeläinen (1987) studied the non-professional and professional-like performance of four translation students (two first-years and two fifth-years). She analysed these subjects' external processing (time spent and the use of dictionaries) and internal processing (mainly problem solving) and drew tentative profiles of non-professional and professional-like translation behaviours.

Although previous TAP-based studies of decision making are fewer than studies of problem solving, two studies are worth noting. Tirkkonen-Condit (1989) and Zheng (2008) specifically touch upon different subjects' cognitive decision-making behaviours in translation.

Tirkkonen-Condit (1989) classified and analysed the decisions made by three translation students (two beginners and one advanced student) who translated a text from English into their native Finnish. She found that the advanced student's translation process contained the highest number of verbalised decisions, and this finding was in contrast to the hypothesis that professional translators' decision-making processes have become automatic, and so would not be verbalised during TAP-based studies (e.g. Séguinot 1989; see further Section 2.3.3.1).

Zheng (2008) studied the choice-making processes during English-Chinese translating by six novice translators, six semi-professional translators and six professional translators, using TAPs, questionnaires and interviews. He found that the semi-professionals' choice-making behaviours resembled those of the professionals in terms of referring to translation theories and principles, and the semi-professionals' choice-making behaviours were more similar to those of the novices regarding the translation units applied and the translation problems considered.

Unlike these two previous studies, I will mainly focus on 'metacognitive' decision-making behaviours in detail in addition to cognitive decision-making behaviours in the present study.

2.3 Notions and Concepts of Translation Process Research

For nearly three decades, there has been a growing body of TAP-based translation process research addressing subjects' problem-solving behaviours or the application of their professional practice in translator training (e.g. Krings 1986, 1987; Jääskeläinen 1987; Gerloff 1988; Lörscher 1992; Fraser 1994, 1996). In recent years, translation process research has gained more attention because of the emergence of new research tools such as keyboard logging, screen recording and the retrospection method (see Hansen 2006, 2008) that help the researchers to unveil more information about the 'black box' of translators' thoughts. In the following section, notions and concepts central to data analysis in studies of translation behaviours are discussed.

2.3.1 The Notion of the Translation Problem

In the translation process, translation problems mostly originate from the way translators segment or analyse the ST units. From a linguistic viewpoint, Barkhudarov (1993: 40) defines a translation unit as 'the smallest unit of source language (SL) which has an equivalent in target language (TL)'. He points out that a translation unit has a complex structure itself no matter how long it is. According to Barkhudarov (ibid), phonemes, morphemes, words, phrases, sentences and even entire texts are probable translation units. The classification of translation units in linguistics is rather static.

On the other hand, in terms of TAP-based research, a translation unit is defined as "those instances in the translation process in which the translator's 'unmarked processing' is interrupted by shifting the focus of attention onto particular task-relevant aspects" (Jääskeläinen 1993: 102). 'Unmarked processing' refers to sections of the protocols in which a subject verbalises fluently while reading or writing, whereas 'marked processing' begins with a problem indicator

and ends with a solution to the problem or an indication that the problem is temporarily abandoned.

Gerloff (1986) identifies a unit of analysis going from morpheme or syllabic unit to discourse and stresses the mobility of translation units. In fact, most translation process researchers believe that the length of translation units is an indication of proficiency, with professional translators working with larger units at the syntactic or discourse level and moving more comfortably between different unit levels. Certainly, professional translators also tackle local (lexical) problems while processing a sentence (see Séguinot 1996). In other words, translation units in TAP-based research are dynamic and changeable.

Section 2.1.1 mentioned that translation problems are often ill-defined without a clear solution path, and this also shows their varieties as translation units. Nord (1991: 151) defines a translation problem as 'an objective problem which every translator […] has to solve during a particular translation task'. In light of this, a translation problem is observable and translators demonstrate their ability by using translation strategies to solve the problem, and this constitutes a basic component of TC.

Martínez Melis and Hurtado Albir (2001: 281) further emphasise the importance of problem-solving (strategic) competence and categorise translation problems into the following types:

(1) Linguistic problems (lexical, syntactic and textual)
(2) Extra-linguistic problems (cultural, thematic and encyclopedic)
(3) Transfer problems (difficulty in finding dynamic equivalence)
(4) Psycho-physiological problems (relating to creativity and logical thought)
(5) Professional or instrumental problems (deriving from documentation difficulties)

The relationship between the above problem categories and different types of TC (see further Section 2.4) will be discussed in the present study, and the working definitions of linguistic and extra-linguistic problems used in the present study will be illustrated in Section 4.2.1, Chapter 4.

2.3.2 The Notion of the Translation Strategy

The notions of translation strategies used in the prescriptive and descriptive traditions need to be distinguished from each other. The traditional concept of the translation strategy employing terms such as method and procedure, as used in the theories presented by Newmark (1988) and Nida (1964), belongs to the *prescriptive* tradition where models of the translation process are developed on the basis of textual analysis. On the other hand, the notion of the cognitive translation strategy defined by Krings (1986), Lörscher (1991), Jääskeläinen (1993) and Wilss (1996) belongs to the *descriptive* tradition where the translation process and problems are viewed from a cognitive and empirical perspective, and definitions of the translation strategy are also derived from empirical process research data. The present study essentially belongs to the descriptive tradition, i.e. a cognitive approach rather than a theoretical approach to translation.

The concept of the cognitive translation strategy central to problem solving generally refers to the methods, plans, rules and tactics used by an individual to solve a problem in a goal-oriented view (Jääskeläinen 2009). Lörscher (1996: 27) gives a basic definition of translation strategies as 'procedures which the subjects employ in order to solve translation problems'. Therefore, in the problem-solving process of translation, a translation strategy actually involves a sequence of procedures or plans to solve a translation problem. In the following, the definitions and types of the cognitive translation strategy will be elaborated.

2.3.2.1 Definitions of Cognitive Translation Strategy

Previous scholars (e.g. Krings 1986; Lörscher 1991; Jääskeläinen 1993, 1999) have defined the concept of the cognitive translation strategy from different perspectives. Krings (1986: 175) was the first to use this term and defined it as 'a translator's conscious plans for solving concrete translation problems in the framework of a concrete translation task'. Similarly, Lörscher (1991: 76) considers a translation strategy to be 'a potentially conscious procedure for the solution of a problem which an individual is faced with when translating a text segment from one language to another'. Based on the above definitions, the element of consciousness is significant in distinguishing strategies used by translators.

However, as Jääskeläinen (1993: 116) points out, Lörscher's definition of the translation strategy is restricted to conscious problem solving; she suggests a broader definition: 'a set of (loosely formulated) rules or principles which a translator uses to reach the goals determined by the translation situation in the most effective way'. Moreover, she defines the translation strategy from a competence-based viewpoint as adopted in the present study as 'a series of competencies, a set of steps or processes that favour the acquisition, storage, and/or utilisation of information' (Jääskeläinen 1999: 71). This competence-based definition is also connected to web searching strategies (see further Section 2.3.2.3). In addition, Jääskeläinen (ibid) argues that translation strategies are flexible in nature and their adoption implies a decision influenced by amendments of translators' objectives.

Jääskeläinen (2009: 380) further classifies translation strategies into two types: **global strategies** and **local strategies**. Global strategies include 'general guidelines, plans and principles' at the macro-textual level. Local strategies refer to specific activities in relation to translators' problem solving and decision making about the ST segments at the micro-textual level, including the use of translation techniques to solve TT-production problems such as the reformulation technique (Molina and Hurtado Albir 2002: 508) that will be discussed in the present study (see further Section 6.1.1, Chapter 6). In the following, I will review some local strategies based on Krings's translation process model (1986).

2.3.2.2 Krings's Translation Process Model

Section 2.2.2 mentioned that Krings (1986) not only analysed eight subjects' translation problems and strategies but also was the first to construct a tentative translation process model using the concept of problem solving as shown in Figure 2-3. Krings's tentative model incorporates translators' problem-solving and decision-making behaviours, and this characteristic has implications for the present study into students' reflection on their metacognition during both kinds of behaviours.
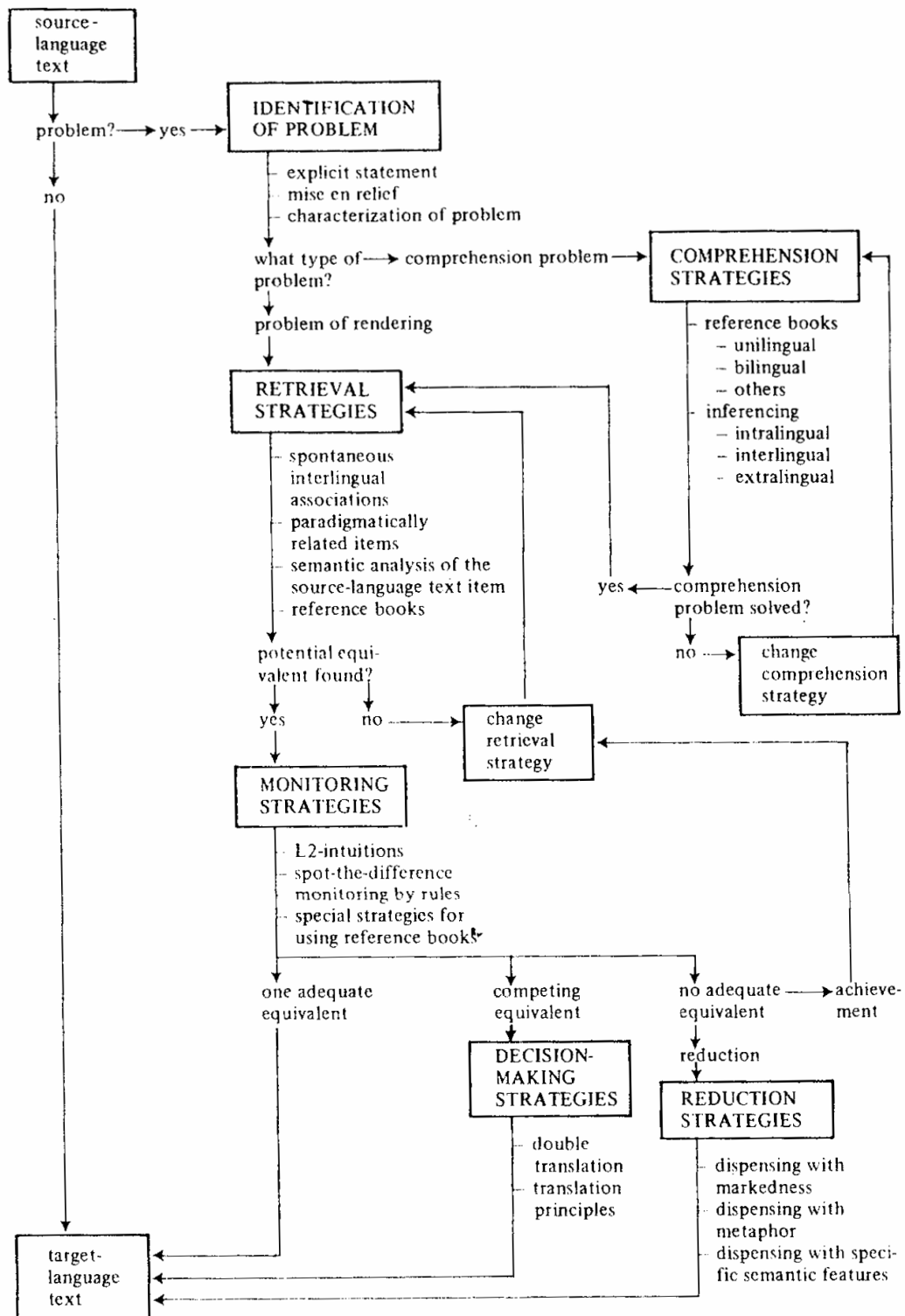
Figure 2-3 Krings's Tentative Translation Process Model (1986)

In this model, Krings points out that the absence of translation problems coincides with the absence of translation strategies as shown in the vertical line on the left-hand side. In other words, the ST item can be directly transformed into a TL item, which could possibly occur in the present study where students use sight translation or a 'mental dictionary' without checking substantial resources (Shih 2006). In this case, the translation process takes place quickly and automatically at an unconscious level.

On the other hand, translation strategies appear as soon as translation cannot be automatically generated. Krings (ibid: 268) identifies five sets of translation strategies for tackling **comprehension** and **production problems**. They are 'comprehension strategies', 'retrieval strategies', 'monitoring strategies', 'decision-making strategies' and 'reduction strategies'.

'Comprehension strategies' used to deal with comprehension problems include the use of reference books (e.g. monolingual, bilingual and other reference materials) and inferencing strategies (e.g. intralingual, interlingual or extralingual inferencing). Krings observed that his subjects immediately used dictionaries when they encountered unknown lexical items. Particularly, a frequent strategy for checking unknown lexical items was that the subjects looked them up in bilingual dictionaries and subsequently checked the appropriateness of the given equivalents in monolingual dictionaries. In the present study, it is interesting to observe students' use of monolingual dictionaries if they do not gain satisfactory results from bilingual dictionaries.

If reference books failed to provide helpful information, Krings found that his subjects adopted the inferencing strategies by applying intralingual, interlingual and extralingual knowledge to fill the gaps in understanding the ST segments. In addition, contextual inferencing sometimes yielded successful guesses. In the present study, I also expect that students would refer to inferential resources such as their personal experience (see further Section 2.4.3.4).

Four strategies are identified to solve production problems (ibid: 271-73). 'Retrieval strategies' refer to the subjects' conscious attempt to recall interlingual associations as TL equivalents. Immediately after the subjects retrieved potential TL equivalents, they normally employed 'monitoring strategies' to evaluate the correctness or appropriateness of those equivalents. As soon as the TL equivalents are monitored and confirmed to be correct, the translation problems are solved. Otherwise, 'decision-making strategies' have to be used to evaluate competing TL equivalents. In Krings's study, when there were more than two competing equivalents, his subjects tended to choose the one that appeared in the dictionary first. In the present study, however, I will explore students' TA and reflection with regard to their reason of selecting a TL equivalent from different translation results on the web.

If the subjects could not find adequate TL equivalents, they either used 'retrieval strategies' again to produce a new equivalent or turned to 'reduction strategies' by dispensing with specific semantic features of the ST items until an acceptable equivalent was found. In the present study, it is assumed that students may use literal translation as a reduction strategy to render some ST items, though reduction strategies may sometimes result in translation shifts (Catford 1965: 73). This point will be discussed in the present study (see further Sections 6.1.2 and 6.1.3, Chapter 6).

2.3.2.3 Web Searching Strategies

Students' web searching strategies are another focus of the present study. Enríquez Raído (2011, 2014) is one of the few researchers who have conducted a multiple-case study on translation students' web searching behaviours. She defines web searching or web-based information searches as 'all kinds of online actions carried out to seek and retrieve information on the web, and it is not limited to the use of search engines only' (2011: 59). Enríquez Raído (ibid) combined pre-task questionnaires, screen recording, online search reports and post-task interviews to collect data. The subjects were mainly four postgraduate translation students from her scientific and technical translation course, and these students were required to complete two translation tasks in two separate weeks of this course.

Enríquez Raído's study presents three main findings that have implications for the present study. Firstly, it highlights the important role of web searching skills in translation. This is understood as a cognitive activity requiring the exploration of information and constant decision making among other cognitive activities. Secondly, translator training needs to shift from the acquisition of specialised knowledge in different domains to the development of web searching skills for problem solving. Thirdly, it emphasises the requirement for empirical studies focusing on real users and learning contexts given that the need to seek and use translation information depends on the type of users and translation tasks performed.

There is no denying that with the advancement of online tools and resources, it has become more convenient for translators to solve their translation problems by consulting various types of web resources. Alcina et al. (2007: 230) also stress the importance of technological skills for translator training. They think that the process of learning about technology requires students to be familiar with computer-aided tools and resources that can provide support for their translation tasks. They propose two main objectives of training in technological skills: **cognitive** and **procedural** (ibid: 231). Firstly, the cognitive objective aims to develop students' intellectual abilities to recall information, to apply existing knowledge to understand new concepts and to solve problems. Secondly, the procedural objective aims to develop students' abilities to control and automate processes of using technology. Both the objectives will also be discussed in the present study in relation to the formation of instrumental competence (see further Section 6.3.2, Chapter 6).

Despite the two objectives discussed above, Enríquez Raído (ibid: 58) points out that the ubiquitous and dynamic nature of web content poses challenges for translators in terms of 'the critical evaluation, selection and use of credible sources of information'. Although the need to teach translation students to use the web critically is widely known, relatively few studies (e.g. Shih 2017) have been carried out to investigate how students actually search for web-based information. Shih (ibid) used TAPs and the screen-recording method to investigate six Chinese trainee translators' web searching behaviours in translating a scientific text. Although the subjects' idiosyncratic behaviours in web searching were identified in terms of their use of a variety of web resources, Shih did not conduct post-task interviews to examine what her subjects thought about their web searching behaviours. To fill this research gap, the present study will carry out cue-based retrospective interviews to explore students' reflection on their use of external (web and electronic) resources,

which is linked to instrumental competence (see further Section 2.4.3.3).

When it comes to information processing in web searching, translators generally apply two types of knowledge for problem solving in the translation process (Mondahl and Jensen 1996: 99). One is **declarative knowledge** referring to factual knowledge which translators can consciously access. The application of declarative knowledge can be connected to extra-linguistic competence (see further Section 2.4.3.2). The other is **procedural knowledge** of which translators are unconscious. The application of procedural knowledge can be linked to strategic competence (see further Section 2.4.3.4). Therefore, the applications of both declarative and procedural knowledge are important indicators of different kinds of translation competence proposed by PACTE (see further Section 2.4.2.1).

2.3.3 The Application of Translation Process Research in Translator Training

The pedagogical implications of translation process research have been discussed by many previous scholars, such as Tirkkonen-Condit (1989), Lörscher (1992), Fraser (1994) and Göpferich (2010). Tirkkonen-Condit (ibid) concludes that TAPs can inform translation teachers of how students approach their translation task, particularly their decision-making criteria. Lörscher (ibid) summarises some useful implications for translator training. Fraser (ibid) identifies elements of professional practice that can be applied to translation teaching by exploring experienced translators' translation processes.

Comparing novice and professional translators' translation performance, Göpferich (ibid) underscores that translation students should be taught how to develop an awareness of the criteria that must be met by a translation product before they search for potential equivalents. Göpferich found that novice translators made the most lexical errors, and translation teachers should pay more attention to improving their awareness of semantic differences. However, Göpferich does not suggest how students' awareness of semantic differences might be developed.

When it comes to the lack of empirical research for translator training, Pym (2009: 135) writes that 'one of the justifications for research on translation processes is that it will be of use in the training of translators. Very little work, however, has been done on the actual ways in which research can be used in training'. Pym (ibid) let his postgraduate translation students participate in three 'lousy' process-oriented experiments carried out in the classroom (one on the use of online machine translation, another on translator styles and a third on the effects of time pressure). He found that the pedagogical value of translation process research deserves more positive assessment because his students not only made direct

observations of their own translating but also used process research 'as a set of signposts for their own individual journeys of discovery' (ibid: 153).

In summary, Pym's research contains significant implications for the present study where I will use translation process research methods for **pedagogical purposes** to explore students' translation competence development. In the following, I will continue to introduce the concept of translation competence and review its relevant models.

2.4 Translation Competence

2.4.1 Definitions of Translation Competence

The concept of translation competence (TC) has been referred to by scholars in Translation Studies in many different terms. It has been referred to as 'translation performance' (Wilss 1989), 'translation ability' (Pym 1993), 'translator competence' (Kiraly 1995) and 'translational competence' (Toury 1995; Hansen 1997). In the present study, 'translation competence' is used in the sense of 'expert knowledge in a specific area' (Orozco and Hurtado Albir 2002: 376).

Traditionally, TC was considered to be a type of bilingual competence or bilingualism without professional translator training. However, Sykes (1989: 35-39) points out that a competent translator possesses 'a prominent command of the SL and TL' and a clear grasp of the subject in the ST. Bell (1991: 43) conceptualises TC as 'the knowledge and skills the translator must possess in order to carry out a translation' and believes that TC includes TL competence, text-type knowledge, SL knowledge, subject and real world knowledge, contrastive knowledge and communicative competence (e.g. grammar, sociolinguistics and discourse). Pym (2003: 481) summarises TC as a 'multicomponent competence' including sets of linguistic, cultural, technological and professional skills.

In summary, TC includes not only bilingual competence but also other competence such as the use of (linguistic and extra-linguistic) knowledge and technological or web searching skills. The present study will particularly focus on web searching skills related to the formation of other types of competence.

2.4.2 Translation Competence Models

As Section 2.4.1 pointed out, TC has been defined and categorised by a number of scholars. Although these scholars agree that TC is composed of different sub-competencies, disagreements still remain over the number and kinds of these sub-competencies (Montafej and Nemati 2014: 9). In the following, I will review a selection of representative TC models and summarise their TC components related to the present study.

2.4.2.1 PACTE's Model

The PACTE research group (Process in the Acquisition of Translation Competence and Evaluation) aims to investigate the acquisition of TC in written translation. With different theoretical and methodological backgrounds, the research members consider the need for more information about trainee translators' learning of translation in order to create better teaching, improve evaluation methods and unify pedagogical criteria (PACTE 2003: 43).

The main aim of the PACTE group is to develop a model of the defining characteristics of TC and a model of how TC is acquired by means of empirical research, which compares the behaviours and knowledge of professional translators with those of foreign language teachers without translating experience. The language combinations examined in both 'direct' (L2 to L1) and 'inverse' (L1 to L2) translation include English, French and German as well as Spanish and Catalan. Their research focused on two perspectives. One is **the translation process**, i.e. the mental processes involved in translating and the competence and abilities required. The other is **the translation product**, the results of the translation process, i.e. translated texts (PACTE 2011: 318).

PACTE presented its first holistic TC model in 1998 (see PACTE 2000). PACTE (2000: 100) defines TC as 'the underlying system of knowledge and skills needed to be able to translate'. In this model, PACTE incorporates some basic TC components such as linguistic competence, transfer competence, world or subject knowledge and use of different tools identified in previous studies (e.g. Bell 1991; Fraser 1994; Beeby Lonsdale 1996; Shreve 1997). However, PACTE includes two further types of TC components. One is **problem-solving strategic competence** identified in Krings (1986) and Lörscher (1991); the other is **psycho-physiological competence** such as creativity identified in Kussmaul (1995). Figure 2-4 shows PACTE's first holistic TC model.
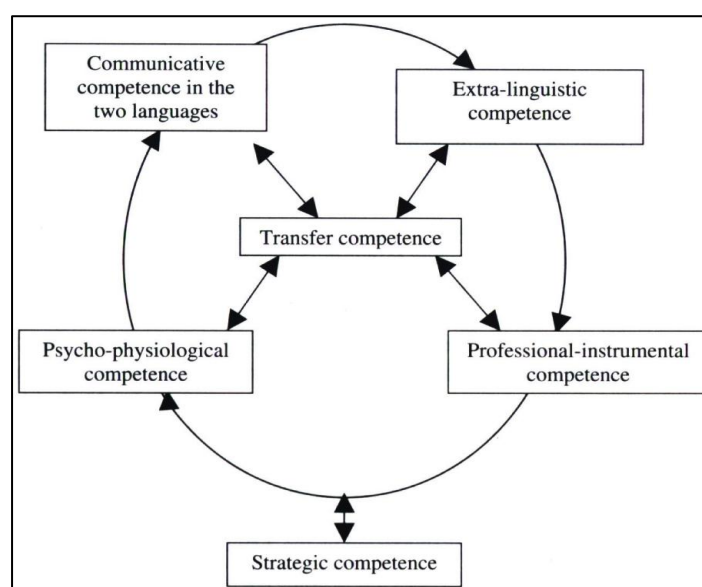
Figure 2-4 PACTE's First Holistic TC Model (2000)

'Communicative competence in the two languages' is the knowledge and abilities necessary for linguistic communication in both languages. 'Extra-linguistic competence' is the knowledge about general and specific areas such as bicultural, encyclopedic and subject knowledge as well as knowledge about translation. 'Professional-instrumental competence' is the knowledge and use of all kinds of documentation sources and technologies. 'Psycho-physiological competence' is the ability to use cognitive and attitudinal resources (PACTE ibid: 101).

'Transfer competence' integrates all the other components as the central competence. It is defined as the ability to complete the transfer process from understanding the ST to re-expressing the TT allowing for the TT purpose and TT readers. 'Strategic competence' includes all the individual procedures used to solve translation problems. Strategic competence plays an essential role in relation to all the other components because it is used to detect translation problems, make decisions and compensate for weakness in the other sub-competencies (PACTE ibid: 102).

PACTE (2003) carried out an exploratory test in 2000 and modified its first holistic TC model according to the test results. The modifications are the following (PACTE ibid: 56).

Firstly, because all bilinguals possess fundamental transfer competence, and because the difference between this competence and expert TC is its combination with the other sub-competencies, PACTE redefined transfer competence by modifying the characteristics of linguistic competence and strategic competence. Secondly, PACTE redefined strategic competence because its importance became clearer as they found that this competence not only detects translation problems and applies translation strategies, but also monitors and evaluates both the translation process and partial results obtained in relation to the TT. Thirdly, knowledge about

translation was included in extra-linguistic competence in the first holistic model, but PACTE made it a specific competence for facilitating data collection in the second model. Finally, because psycho-physiological competence forms an integral part of all expert knowledge and differs from the other sub-competencies, PACTE replaced the term 'competence' with 'components'. Figure 2-5 shows PACTE's modified TC model.
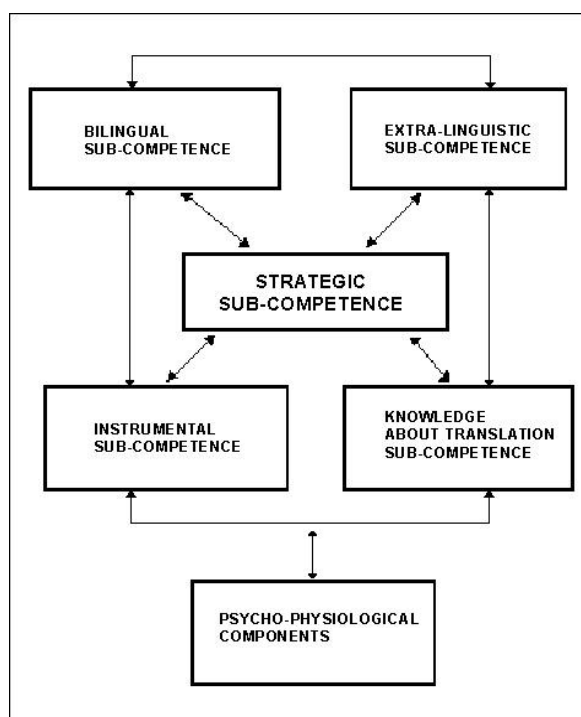
Figure 2-5 PACTE's Modified TC Model (2003)

The redefinitions of each sub-competence are the following. 'Bilingual sub-competence' is predominantly procedural knowledge needed to communicate in two languages. It involves, firstly, pragmatic knowledge of the conventions of acceptable language acts in a given context; secondly, sociolinguistic knowledge of the conventions of acceptable language acts (i.e. registers); thirdly, textual knowledge of texture (i.e. coherence and cohesion) and different genres; fourthly, grammatical and lexical knowledge of vocabulary, syntax and morphology.

'Extra-linguistic sub-competence' is predominantly declarative knowledge about the world in general and specific areas. It involves bicultural knowledge (about the source and target cultures), encyclopedic knowledge (about the world in general) and subject knowledge (about special areas).

'Knowledge about translation sub-competence' is predominantly declarative knowledge about what translation is and aspects of the profession. It includes translation functions, types of translation units, process required, methods and procedures used, different types of briefs and TT readers.

'Instrumental sub-competence' is predominantly procedural knowledge related to the use of documentation sources and information technologies applied to translation. They include all types of dictionaries, encyclopedias, parallel texts, corpora, searchers, etc.

'Strategic sub-competence' is procedural knowledge to guarantee the efficiency of the translation process and solve translation problems. 'Psycho-physiological components' are different types of cognitive and attitudinal components. Cognitive components include memory, perception and emotion. Attitudinal components include self-confidence in one's own abilities, the ability to measure one's own abilities, logical reasoning and creativity.

Based on the modified TC model, PACTE (2005: 610) lists the following characteristics of TC. Firstly, TC is **expert knowledge** and not possessed by all bilinguals. Secondly, TC is basically **procedural knowledge** rather than declarative knowledge. Thirdly, TC is composed of various **interrelated sub-competencies**. Fourthly, **strategic sub-competence** in all procedural knowledge plays the most important role.

The definitions of the sub-competencies and components having been reviewed, I will now focus on the acquisition of TC (ATC). PACTE (2003: 48-49) points out that although some empirical studies have compared translation students' performance with that of professional translators (e.g. Jääskeläinen 1987; Tirkkonen-Condit 1989; Séguinot 1991), no empirical-experimental research has been conducted to examine the ATC process as a whole. Therefore, it is claimed that PACTE's group work is the first empirical and longitudinal study to investigate the ATC process through its TC model.

According to its first holistic TC model (see Figure 2-4), PACTE (2003: 49) supposes that the ATC is **a process of restructuring and developing translation sub-competencies** and defines the ATC in terms of the following points. Firstly, the ATC is a dynamic and spiral process that evolves from novice knowledge (pre-translation competence) to expert knowledge (translation competence). Secondly, like other learning processes, the ATC requires learning strategies (i.e. learning competence). Thirdly, the translation sub-competencies are developed and restructured in the ATC process. Fourthly, both declarative and procedural knowledge are integrated, developed and restructured in the ATC process. The development of strategic sub-competence is the most important. Figure 2-6 shows PACTE's dynamic ATC model.
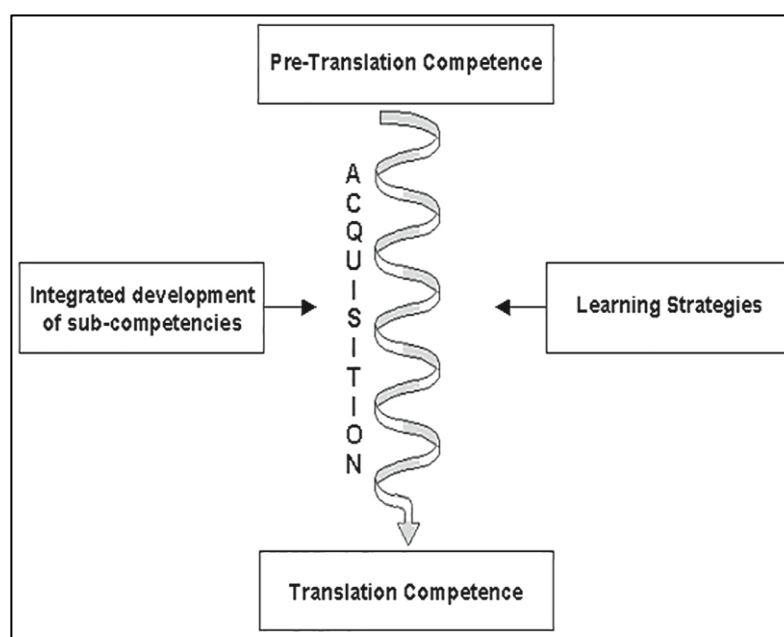
Figure 2-6 PACTE's Dynamic ATC Model (2003)

In addition, PACTE postulates that the ATC process evolves at different speeds and the translation sub-competencies compensate for each other. Depending on the methodology used by the researchers, the learning context (formal training or self-learning) influences the ATC process (ibid). In the present study, based on PACTE's hypotheses, I will look into how students developed TC through their self-reflection learning during a one-year postgraduate translation degree. In other words, I will investigate not only the ATC but also how the ATC is obtained via metacognitive reflection.

For the present study, I adopt PACTE's TC model as a main basis for discussing students' TC formation for the following reasons (Montafej and Nemati 2014: 23-24). Firstly, PACTE's TC model incorporates a **process- and product-oriented approach**, and they modified and refined the definitions of translation sub-competencies on the basis of new study results over an extended period of time. Therefore, PACTE presents a very comprehensive understanding of translation sub-competencies for my research project. Although later models proposed by EMT (2009) and Göpferich (2009) include the same number of translation sub-competencies, most of their concepts overlap with those of PACTE. Secondly, PACTE's TC model stresses the importance of strategic sub-competence, which is the focus of the present study that examines students' problem-solving strategies in the translation process. Thirdly, PACTE measures the ATC in terms of the subjects' translation problems, translation errors and notions about translation, which are useful for my data analysis. More importantly, PACTE's TC model includes psycho-physiological components which I also consider to be part of TC, particularly strategic sub-competence.

2.4.2.2 EMT's Model

The EMT expert group (European Master's in Translation) purports to 'make specific proposals with a view to implementing a European reference framework for a Master's in translation throughout the European Union' (EMT 2009: 1). The main aim of EMT's project is to improve the quality standards of university translation programmes at Master's level and related professions through a common framework of professional competencies (ibid: 1). Figure 2-7 shows EMT's model for competencies applied to translation.
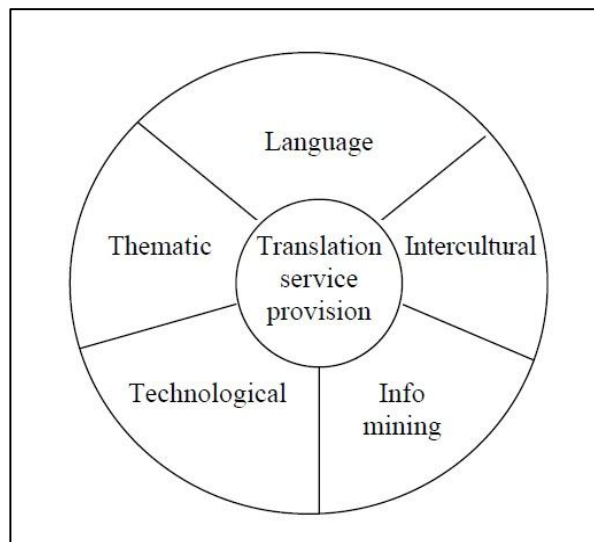
Figure 2-7 EMT's TC Model (2009)

EMT's model includes six competencies with nearly fifty definitions or components. In the following, I will summarise the definitions of each competence related to the present study and compare them with those of PACTE.

'Translation service provision competence' is defined as 'knowing how to define and evaluate translation problems and find appropriate solutions' and 'knowing how to justify one's translation choices and decisions' at the production dimension (EMT ibid: 5). These two definitions are similar to PACTE's strategic sub-competence. This competence also refers to 'knowing how to create and offer a translation appropriate to the aim and to the translation situation' (ibid: 5), and this definition is similar to PACTE's knowledge about translation sub-competence.

'Language competence' is defined as 'knowing how to understand grammatical, lexical and idiomatic structures of language A and one's other working languages B, C' (ibid: 5). 'Intercultural competence' is defined as 'knowing how to recognise function and meaning in language variations' at the sociolinguistic dimension (EMT ibid: 6). This competence also refers to 'knowing how to understand and analyse the macrostructure of a document and its overall coherence' and 'knowing how to compose a document in accordance with the conventions of the genre' at the textual dimension (ibid: 6). Both language and intercultural competencies are similar to PACTE's bilingual sub-competence.

'Information mining competence' is defined as 'knowing how to identify one's information and documentation requirements' and 'developing strategies for documentary and terminological research' (EMT ibid: 6). This competence also refers to 'knowing how to use tools and search engines effectively (e.g. terminology software, electronic corpora and electronic dictionaries)' (ibid: 6). In addition, 'technological competence' is defined as 'knowing how to use effectively a range of software to assist in translation and documentary research' and 'knowing the possibilities and limits of machine translation' (EMT ibid: 7). Both information mining and technological competencies are similar to PACTE's instrumental sub-competence.

'Thematic competence' is defined as 'knowing how to search for appropriate information to gain a better grasp of the thematic aspects of a document' (ibid: 7). This competence is similar to PACTE's extra-linguistic sub-competence.

In EMT's TC model, competence is defined as 'the combination of aptitudes, knowledge, behaviour and know-how necessary to carry out a given task' (EMT ibid: 3). The EMT group believes that the six competencies are interdependent and transversal, which means that they may apply to a number of areas of competence. The six competencies comprise the minimum requirement to which other specific competencies may be added. In addition, EMT's TC model should be understood within the overall context of university translator education, and it sets out what is to be achieved, acquired and mastered for the requirements of a given (translation) activity (ibid: 3). However, EMT does not develop a model of how TC is acquired, and this is a research gap for the present study to fill.

In the present study, I will particularly pay attention to EMT's **information mining competence** and **thematic competence** because they add further definitions to PACTE's instrumental sub-competence. From my viewpoint, the two competencies proposed by EMT also suggest the importance of procedural knowledge (know-how) and can be indicators of students' instrumental competence formation (see further Section 2.4.3.3). This is what the present study aims to tap into.

2.4.2.3 Göpferich's Model

Göpferich (2007) carried out a longitudinal research project, *TransComp*, to investigate TC and its acquisition in English-German written translation. The research project aims to explore the TC development of twelve translation students over a period of three years and compare it with that of ten professional translators. During the experiment, the subjects translated ten English texts (eight extracts from scientific texts and two extracts from operative instructions for household appliances) into German. These texts were translated in Translog, which recorded all keystrokes, mouse clicks and time intervals. In addition, the subjects were required to verbalise their thoughts in their translation processes. The subjects' verbalisations were transcribed and included their searches of the Internet, electronic and conventional resources (Göpferich 2009: 27-28).

After the experiment, retrospective interviews were conducted with all the subjects. The results were triangulated, set in relation to the quality of the subjects' translations and used to adapt and optimise PACTE's modified TC model (Göpferich ibid: 29). Figure 2-8 shows the TC model developed by Göpferich.
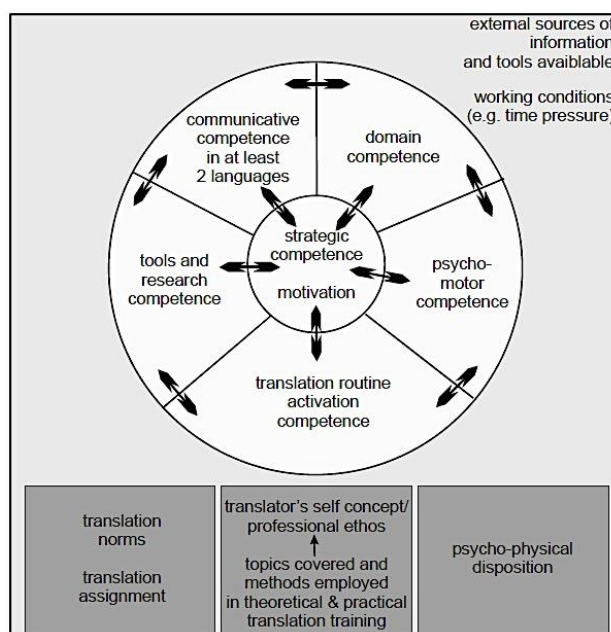
Figure 2-8 Göpferich's TC Model (2009)

'Communicative competence in at least two languages' corresponds to PACTE's bilingual sub-competence. It comprises lexical, grammatical and pragmatic knowledge in both languages. Göpferich (ibid: 21) believes that TL receptive competence must not be neglected because it is needed for monitoring processes where SL and TL units are compared for semantic equivalence.

'Domain competence' corresponds to PACTE's extra-linguistic sub-competence and comprises the general and domain-specific knowledge. Göpferich (ibid: 21) particularly stresses the sensitivity of recognising what additional knowledge is needed from external information to fill one's knowledge gaps. This sensitivity is similar to EMT's thematic competence about knowing how to search for appropriate information to grasp thematic knowledge in a text.

'Tools and research competence' corresponds to PACTE's instrumental sub-competence and comprises the ability to use translation-specific conventional and electronic tools, from reference works such as dictionaries, encyclopedias, term banks, parallel texts, search engines and corpora to the use of terminology and machine translation systems.

'Translation routine activation competence' comprises the knowledge and abilities to recall and apply certain standard transfer operations which lead to acceptable TL equivalents. This competence is similar to PACTE's knowledge about translation sub-competence.

In addition, 'psychomotor competence' indicates the psychomotor abilities required for reading and writing (with electronic tools). This competence is similar to PACTE's psycho-physiological components. Göpferich (ibid: 21) thinks that the more this competence is developed, the less cognitive capacity will be required, resulting in more capacity left for other cognitive tasks. Psychomotor skills may have an impact on the cognitive capacity that will be available for solving translation problems.

'Strategic competence' corresponds to PACTE's strategic sub-competence and controls the employment of the above competencies. Göpferich (ibid: 22) particularly considers strategic competence to be a type of **metacognitive competence** (see further Section 2.4.3.4) that 'defines hierarchies between individual sub-competencies, leads to the development of a [translation] macro-strategy and ideally subjects all decisions to this macro-strategy'. According to Hönig (1995), a translation macro-strategy includes both the decisive characteristics for the TT (such as its function and audience) and the options that translators have for searching information and improving their domain knowledge. From Hönig's viewpoint, translators should not only possess transfer competence

that fulfils the TT function (see PACTE 2000) but also consistently employ a translation macro-strategy that contributes to real TC. The strictness of translators' adherence to employing this translation macro-strategy depends on their strategic competence and situation-specific motivation (both intrinsic and extrinsic).

Göpferich also includes three factors determining the employment of the above competencies. Firstly, 'translation norms and translation assignment (translation brief)'. Secondly, 'translator's self-concept or professional ethos' impacted by the topics covered and methods employed in theoretical and practical translation training. Thirdly, 'translator's psycho-physical disposition' such as intelligence, ambition, perseverance and self-confidence. Göpferich (ibid: 22) explains that psycho-physical disposition may influence how quickly translators' TC develops. For example, a critical spirit and perseverance in solving translation problems may speed up TC development. Like EMT, however, Göpferich does not propose a model of how TC is acquired, which is a research gap for the present study to fill.

Göpferich (ibid: 32) makes the assumption about the development of tools and research competence that if translators increase communicative competence, they will have a potential desire to understand the ST in more depth. This desire may become visible in the subjects' TAP data on information search problems. Based on the above assumption, the present study will explore how students' instrumental competence formation interrelates with their ST-analytic and communicative competence development (see further Section 2.4.3.1).

2.4.2.4 Kiraly's Model

Kiraly (2015: 24-26) discusses the TC models proposed by PACTE, EMT and Göpferich. He claims that these models consist of 'static, box-like representations of a vague set of relationships between dispositions, abilities, skills and expertise that professional translators can be expected to possess'. Although PACTE indicates the operationalisation of the sub-competencies in their longitudinal study where the students were taught using a teaching method developed by the research group, Kiraly questions how these sub-competencies are acquired in an educational setting. He proposes to find the most effective teaching approach by the emergentist view, which suggests knowledge self-construction and instruction occasioning, orienting, scaffolding and facilitating the teacher's role in emergent learning processes (ibid: 26).

Kiraly (2000: 49) defines TC as a 'creative, largely-intuitive, socially-constructed and multi-faceted complex of skills and abilities'. From his viewpoint, individuals learn to communicate, share and contrast their ideas by a social-constructive approach. In this sense, during translator training, it is critical to raise students' awareness of their learning and thinking processes and help them to develop a professional self-concept (see Kiraly 1997). Kiraly applies this social-constructivist approach to build an emergent TC model. This model aims to describe 'both the tremendously complex interplay of translational sub-competences and their non-parallel emergence over time' (Kiraly 2015: 27). Like PACTE's dynamic ATC model (see Figure 2-6), Kiraly's emergent TC model presents how TC evolves from the novice level to the expert level but includes different components from those of the three TC models. Figure 2-9 shows Kiraly's emergent TC model.
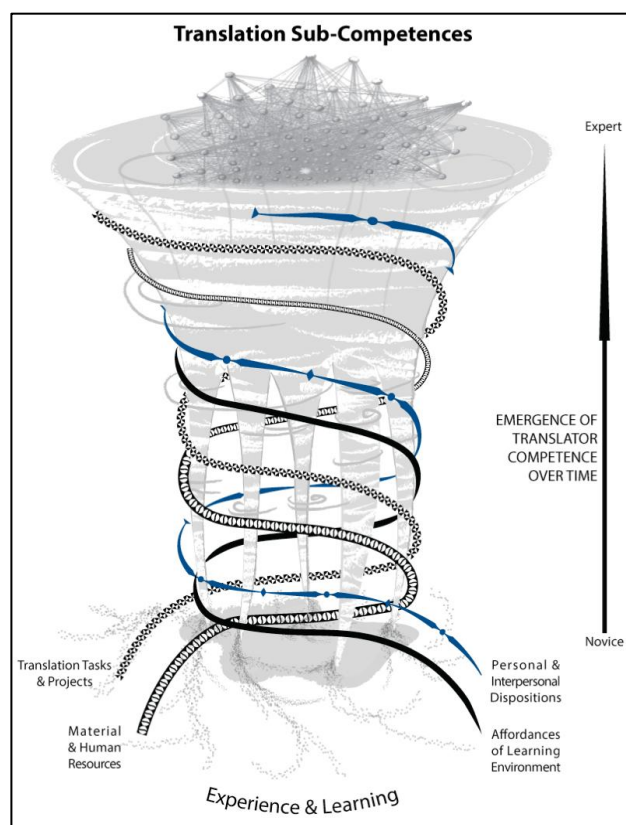
Figure 2-9 Kiraly's Emergent TC Model (2015)

In this model, the vortices are an emergent system that incorporates experience and learning into various emerging sub-systems. The separate vortices, as each sub-competence, evolve from the novice level to the expert level as the result of experience and learning, and each sub-competence will merge into a highly integrated **super-competence** (i.e. professional translator competence). The winding bands around the vortices indicate that translators' TC is co-determined by translation tasks and projects they learn from, their personal and interpersonal dispositions for translating, material and human resources available to use and affordances (perceptual properties) of their learning environment (ibid: 27-28).

Actually, Kiraly's model focuses on the emergence of **translation expertise**, and it is the ultimate gold-standard that students are expected to acquire ideally before they enter the translation profession. Jarvella et al. (2002: 192) define translation expertise as 'a highly skilled, complex problem-solving ability involving various kinds of knowledge'. They discuss the development of translation skills and knowledge through some TAP-based studies using professional translators, young professionals, semi-professionals and bilingual non-professionals. The findings from TAPs and other experimental methods show the possibility of charting different translators' behaviours at different levels of skills. Thus, the present study will also discuss students' development of translation expertise (see further Section 2.4.3.4) related to web searching through their self-evaluation of translation performance across three separate translation tasks.

2.4.3 Types of Translation Competence

In the present study, I decided to use *competence* instead of sub-competence to avoid potential confusion. I assume that each type of TC mentioned in the above four models is not inferior to the others because one competence could potentially complement deficiency in another. Considering the similarities of those competencies in those models proposed by PACTE, EMT, Göpferich and Kiraly, I intend to merge their TC components and summarise some TC types to be used in the present study. Table 2-1 shows these TC types and identifies what components the previous four models cover, partly cover and do not cover[1]. I define each TC type in detail after the following table.

---

[1] ✓: components all covered; Δ: one component covered but the other excluded; x: components not covered.

Table 2-1 Summary of TC Types

TC Models	ST-analytic and Communicative Competence	Extra-linguistic Competence	Instrumental Competence	Strategic Competence
PACTE's Model (2003)	Δ Bilingual Sub-competence (covering communicative competence but not covering ST-analytic competence)	✓ Extra-linguistic Sub-competence	✓ Instrumental Sub-competence	✓ Strategic Sub-competence and Psycho-physiological Components
EMT's Model (2009)	Δ Language and Intercultural Competencies (covering communicative competence but not covering ST-analytic competence)	✓ Thematic Competence (focusing on procedural knowledge)	✓ Information Mining and Technological Competencies (focusing on procedural knowledge)	Δ Translation Service Provision Competence (covering problem-solving strategic competence but not covering inferential resources such as PACTE's psycho-physiological components)
Göpferich's Model (2009)	Δ Communicative Competence in at Least Two Languages (covering communicative competence but not covering ST-analytic competence)	✓ Domain Competence (focusing on recognising additional knowledge to fill one's knowledge gaps)	✓ Tools and Research Competence	✓ Strategic Competence and Psychomotor Competence (along with psycho-physical disposition factor)
Kiraly's Model (2015)	x	x	✓ Material and Human Resources	Δ Personal and Interpersonal Dispositions (not covering problem-solving strategic competence)
ATC Models	Among the four models, only PACTE (2003) and Kiraly (2015) propose their ATC models where TC is developed and acquired from the novice level to the expert level. The present study will attempt to chart instrumental competence formation (web searching in particular) through the combination of TA, screen recording and a cue-based retrospective interview as self-reflection tools.			

2.4.3.1 ST-analytic and Communicative Competence

Although PACTE, EMT and Göpferich indicate bilingual or language competence focusing on communicative competence in both SL and TL, they exclude ST-analytic competence. Since an accurate TT cannot be produced without a correct understanding of the ST meaning, it is important that translation students possess ST-analytic competence related to successful ST comprehension.

Some scholars (e.g. Nord 1992; Adab 2000) point to the significance of ST analysis in translation. Nord (ibid: 42) proposes a model of ST analysis including 'functionality plus loyalty'. In her model, ST analysis provides the decision on which ST elements are relevant to a functional and loyal TT. ST analysis makes translators think about whether ST elements should be preserved or adapted for producing a functional TT in the translation process. Moreover, ST analysis prepares translators to use their translation strategies and procedures to produce a functional TT. Adab (ibid: 220) believes that it is necessary to help translation students to critically analyse the ST before they produce the TT. Students should also be given a translation brief (Fraser 2000) and be able to identify text types, explain inter-linguistic, pragmatic and text-specific problems and justify possible solutions to these problems. Their problem identification and solution justification become the preliminary evaluative criteria for TT production connected with TC.

In terms of ST comprehension, Kussmaul (1995: 13) proposes two models of comprehension processes. The first is a 'top-down model' where translators focus more on the ST context and TT function with more pragmatic problems in their ST comprehension. The second is a 'bottom-up model' where translators pay attention to more semantic problems in their ST comprehension. Translators' self-awareness of both comprehension processes can be examined by their ST-analytic knowledge (ibid: 149). Therefore, ST analysis is

central to translators' TC development through their self-awareness of ST comprehension.

Similarly, in many TAP-based studies, ST comprehension is a re-occurring area of investigation. For example, in her TAP-based study, Wakabayashi (2003: 67) found that the students managed to comprehend the SL meaning in the translation process, but lexical and grammatical difficulties in the ST interfered with their ability to segment phrases or clauses in order to understand the gist of the sentence. Kussmaul (1997: 239) points out that TAP data can be analysed to identify the roots of translators' ST-comprehension problems, so the present study will use students' TAPs to explore their development of **ST-analytic competence** through their reflection on ST-comprehension problems and solutions.

Hymes (1967: 639-40) was the first to define communicative competence as 'a system of language use including all components of communicative events, together with attitudes and beliefs related to them'. Instead of a pure linguistic concept, the use of 'communicative competence' was responsible for the introduction of pragmatics as the basis for translation theories. As House (1981: 3) points out, 'translation may begin to play a truly useful role in developing students' communicative competence'.

PACTE (2003) and Göpferich (2009) include communicative competence in both SL and TL where translators should possess lexical, grammatical, textual and pragmatic knowledge. PACTE (2011: 324) even refers to 'translation acceptability' which has to do with whether the translation solution effectively communicates the ST meaning and TT function (within the context of a translation brief, the readers' expectations and genre conventions in the target culture) and makes use of appropriate language (grammar and syntax). Hence, translators should not only comprehend the ST but also express the TT in a communicative way. In other words, a natural

sequence exists between ST-analytic competence and communicative competence, and ST-analytic competence is partly reflected in communicative competence. Thus, the present study will investigate students' development of **communicative competence** through their reflection on TT-expression problems and solutions.

2.4.3.2 Extra-linguistic Competence

Translators often face extra-linguistic problems such as deficiency of background knowledge in the ST, and extra-linguistic knowledge is important resource for them to solve this type of knowledge problem. Kim (2006: 285) believes that extra-linguistic knowledge could determine a successful translation. In addition, translators' ST-comprehension problems originate from not only linguistic but also extra-linguistic problems. Dancette (1997: 77) studied five translation students' TAPs about their ST conceptualisation. She points out that these students showed differences in ST analysis and concludes that ST comprehension should be achieved at both linguistic and extra-linguistic levels. Although PACTE (2003: 57) defines extra-linguistic sub-competence as 'predominantly declarative knowledge about the world in general and specific areas', they do not specifically explain how extra-linguistic knowledge can be applied to solve ST-comprehension and TT-expression problems. For this reason, the present study will look at how students adopt instrumental competence to help to solve their lack of extra-linguistic knowledge. In other words, the present study partly attempts to provide the missing link of how different TC types related to instrumental competence (i.e. web searching) may be interrelated to each other.

2.4.3.3 Instrumental Competence

PACTE (2003: 58) defines instrumental sub-competence as 'procedural knowledge related to the use of documentation sources and information and communication technologies applied to translation'. In addition, EMT (2009) specifies **thematic competence** in translators' search for appropriate information to acquire thematic knowledge, which is similar to Göpferich's domain competence (2009). Neubert (2000: 9) also notes that translators do not have to know every field of subject knowledge but have to know where and how to access such knowledge if they need it. To the best of my knowledge, thematic competence as an indicator of instrumental competence has rarely been discussed in previous studies, so this is a research gap that the present study aims to fill. In the present study, I devise a working definition of **instrumental competence** as students' use of different types of external (web and electronic) resources (see further Table 4-23, Chapter 4) to solve their translation problems.

In the present study, I will also discuss another indicator of instrumental competence. This is directly linked to EMT's **information mining competence** (ibid) in identifying one's information requirements and developing strategies for documentary research. The present study will explore students' development of information mining competence specifically through their improvement in web searching skills throughout three translation tasks in their one-year postgraduate degree. In addition, Galán-Mañas and Hurtado Albir (2015: 78) designed pedagogical tasks to assess students' instrumental competence in terms of their identification of the most useful documentary resources for translation, their description of each resource and their reasons for choosing these resources. Since the present study requires students to reflect on the success of using external resources, I will discuss

their justification of specific useful resources to solve translation problems.

2.4.3.4 Strategic Competence

PACTE (2003: 58) defines strategic sub-competence as 'procedural knowledge responsible for solving translation problems and the efficiency of the translation process', which corresponds to EMT's translation service provision competence (2009) in defining translation problems, finding proper solutions and justifying one's translation decisions. PACTE (ibid: 58) also believes that strategic sub-competence outweighs the other sub-competencies because it activates them and compensates for deficiencies in them. The present study will concentrate on students' use of both external and inferential resources as their problem-solving strategies under the concept of **strategic competence**.

Like PACTE's psycho-physiological components, inferential resources such as translators' personal experience and self-concept (or self-image) are used to not only solve translation problems but also evaluate the TT. Ehrensberger-Dow and Massey (2013: 105) used screen recording and cue-based retrospection to examine the self-concepts of undergraduate and postgraduate translation students as well as professional translators in translating newspaper abstracts into their L1 (German) or L2 (English). They point out that strategic competence can be measured by translators' reflection on their actions and decisions, which gives rise to their self-concept including their self-evaluation of their capacity to evaluate the TT appropriateness and to fulfil the translation task (Kiraly 1995: 100, cited in Ehrensberger-Dow and Massey ibid: 106). Translators' self-concept can be linked to Kiraly's model (2015) of professional translator competence development, i.e. translation expertise.

The present study will also particularly focus on students' strategic competence as exemplified by their metacognitive reflection, largely based on their cue-based retrospective interview data. Lesznyák (2007: 183) regards PACTE's strategic sub-competence as a type of **metacognitive competence** that monitors and coordinates the whole translation process (see Göpferich 2009 in Section 2.4.2.3), and this type of metacognitive competence can also assist the acquisition of new competencies and effective use of available competencies (e.g. instrumental competence as discussed in the present study). However, Göpferich (ibid) does not illustrate how instrumental competence and strategic (metacognitive) competence could be mutually developed. Again, this is a research gap that the present study will attempt to fill.

Angelone and Shreve (2011: 110) define metacognition as translators' ability to 'self-reflect and provide internal feedback on their problem-solving sequence'. Alves (2005) concludes that with the growth of meta-reflective knowledge from problem solving and decision making, translator training becomes more reflexive through gradual input of meta-reflective knowledge and changes in individuals' cognitive systems. Therefore, the present study will explore students' strategic (metacognitive) competence development through their metacognitive reflection on their problem-solving and decision-making behaviours in three separate translation tasks.

CHAPTER 3
RESEARCH METHODS

3.0 Preamble

This chapter discusses the three research methods used in the present study: thinking-aloud (TA), screen recording and a cue-based retrospective interview. The data-collection procedures are also illustrated. **Section 3.1** addresses the strengths and weaknesses of the three research methods (from Section 3.1.1 to 3.1.3), and the reasons for using these methods are justified. **Section 3.2** explains the reasons for selecting three tourism texts for the present study (Section 3.2.1). The procedures of participant recruitment will be described, from training a group of Chinese postgraduate students for TA, through recruiting potential participants for the study, to conducting formal tasks (from Section 3.2.2 to 3.2.4). BB Flashback, used to collect the students' TAP and screen-recording data, will be introduced (Section 3.2.5). The TA and screen-recording methods will also be evaluated (Section 3.2.6). **Section 3.3** explains how the retrospective interview data were collected from defining the themes for designing the interview questions, presenting the interview questions of the three tasks, to collecting the ten students' interview answers. The procedures of assessing the students' translation products will also be illustrated.

3.1 Methodological Issues

As mentioned at the beginning of Section 2.3 (see Chapter 2), previous translation process research (e.g. Krings 1986; Lörscher 1992; Fraser 1996; Hansen 2008) used TAPs and other instruments such as screen recording to study subjects' problem-solving behaviours and professional translators' practice. However, little consensus has been reached as to what methods are the most effective for training translation students. Although the abilities that should be mastered by translation students are much discussed, our knowledge about TC formation (particularly web searching skills in the present study) still remains unclear (Englund Dimitrova 2002: 81). For this reason, future translation process research needs to collect more data on what optimal ways students should take to produce the best translations, and these data can be used to further develop new training methods (Lee-Jahnke 2005: 361).

In terms of translation process research, it is believed that the use of different research methods could minimise the limitations and decrease the researcher's subjective interpretation of collected data to some extent. Hansen (2008: 7) also points to the importance of **methodological triangulation** for achieving inter-subjectivity between first person and third person observations of collected data. In fact, the latest TAP-based research tends to adopt a multi-method approach such as combining TAPs and screen recording to compare the metacognitive activities of professional translators and translation students (e.g. Angelone 2010; Massey and Ehrensberger-Dow 2011). Like Angelone's study, the present study also adopts a multi-method approach by asking students in-depth interview questions about their metacognitive reflection on their TAPs and on-screen behaviours. In the following, the strengths and weaknesses of the three research methods used in the present study are discussed.

3.1.1 Thinking-aloud (TA)

3.1.1.1 The Theory of TA

The thinking-aloud (TA) method of introspection was originally developed in cognitive psychology in the 1980s. The TA method, generally meaning *concurrent self-reporting*, requires participants to voice aloud their thoughts while doing cognitive tasks such as writing. The oral report produced by participants' concurrent verbalisations is known as a 'think-aloud protocol' (TAP). As early proponents of the TA method, Ericsson and Simon (1980) hypothesised that human cognition is information processing and tested the effects of the TA method on the basis of a model of how their participants verbalised information. They drew the following conclusions about the strengths of this method.

Firstly, **the TA method does not change the structure of the task process but might slow down the process**. The slowing-down effect has been confirmed by Krings (2001) and Jakobsen (2003). However, Angelone (2010) argues that the slowing-down effect might be beneficial for studying solutions to translation problems because it forces participants to stop and think carefully. In addition, Ericsson and Simon (1993) think that **the TA method does not affect the sequence of thoughts but will prolong solution time due to the time used for verbalising**. For this reason, the present study uses the TA method because it is more appropriate for a research context where task time is not an important variable.

Secondly, the tests of the TA method were based on cognitive tasks with **socially agreed performance characteristics**, and there is general agreement between the researcher and the subject on the criteria of successful task completion. However, the effect of researcher-subject interaction may influence what is verbalised and bias TAP data. In other words, subjects may refrain from verbalising what they think is incompatible with the researcher's expectations (Englund Dimitrova 2005: 72). In order to reduce the risk of researcher-subject interaction in the present study, no specific information about the purpose of the research project was given to students. Although students were given opportunities to practice TA in the warm-up exercise (see further Section 3.2.4), they were not allowed to ask any questions once the translation tasks began.

Moreover, Ericsson and Simon (1998: 182) believe that 'when participants are asked to describe and explain their thinking, their performance is often changed – mostly it is improved'. Although Jääskeläinen (2002: 108) supposes that 'thinking aloud as a research tool is not a mode of reflection', the present study intends to use the TA method as a pedagogical tool to externalise students' awareness of any inefficient problem-solving strategies they might engage in (Wakabayashi 2003: 61), and this kind of awareness arising from the TA process will presumably lead to enhanced TC formation.

3.1.1.2 The Validity of TA

Since the mid-1980s, the TA method has been applied to collect information about the translation processes of translators with different levels of experience and expertise (Tirkkonen-Condit and Jääskeläinen 2000). However, this method has not been without its critics firstly for **its validity**. Jääskeläinen (2011: 21) questions the validity of the TA method and indicates that TAP-based translation research fails to tackle questions such as whether the TA method imposes potential interference effects (e.g. the time necessary to complete a given task, the sequencing of the cognitive processes or the attention divided between task processing and verbalising) on a translation product.

However, later studies have suggested that interference effects do not change the cognitive process in translating (Sun 2011: 931). According to previous studies (e.g. Ransdell 1995; Bowles and Leow 2005; Wang 2005), the TA method affects neither reading comprehension nor written production, though the validity of TAPs depends on several variables such as text difficulty, work routineness and availability of a warm-up exercise. Hence, the present study has taken these factors into consideration and maximise the validity of TAP data through careful selection of the STs, student subjects and data-elicitation procedures (see further Section 3.2).

The second weakness of the TA method is **the incompleteness of TAP data** due to the fact that participants' habitual or automatic behaviours happen without reportable thoughts. This concept is often referred to as *automaticity* and has been considered in translation process research on professional translators' behaviours (e.g. Jääskeläinen and Tirkkonen-Condit 1991). Séguinot (1989) conducted a case study of a Canadian government translator who performed a routine translation task from English into French. She found that this subject verbalised little and the processing had to be inferred from her external behaviours recorded on videotape, which supported the hypothesis of professional translators' automatic processing.

Although Séguinot identifies the connection between her subject's expertise and fewer verbalisations, not every study can conclude that professional translators verbalise less in their routine and automatised process than novice translators because no translator is an expert in all subject areas. Sun (2011: 943) feels that although many researchers complain about the incompleteness of TAP data, 'we can have participants explain their decisions when they think aloud in order to see how much they know and to what degree their performance can be improved'. In that way, slight changes in cognitive processing during the TA process become less important for some research questions. Considering the incompleteness of students' verbalisations in the present study, I will conduct a cue-based retrospective interview (see further Section 3.1.3) to recover information about their thoughts which may potentially be lost in the TA process.

The third weakness of the TA method is **the inconsistency between participants' TAPs and their observed behaviours**. Ericsson and Simon (1993) also spotted the potential existence of the inconsistency between verbalisations and actual cognitive process. Nevertheless, they claim that such an inconsistency would result from improper administration of the TA method and diverse use of definitions rather than the validity of TAP data. Therefore, the need of arranging a warm-up exercise for participants to understand the TA procedure before formal tasks is stressed. Concerning the potential inconsistency between students' verbalisations and their actual behaviours in the present study, I will use the screen-recording method (see further Section 3.1.2) to minimise this weakness.

In summary, despite the above weaknesses, translation process researchers still choose the TA method as a valid tool of data elicitation. The TA method has also been considered 'a useful tool for learning about translation competence and for building models of the translation process that could be used in translator training' (Saldanha and O'Brien 2013: 124). This is what the present study using the TA method purports to achieve.

3.1.2 Screen Recording

The screen-recording method, which is also called video recording or continuous screenshot recording, enables the researchers to access participants' actions, their faces and what happens on the computer screen. Some screen-recording software (e.g. BB Flashback[2]), downloadable onto any computer, records AVI files of all on-screen activities during a translation task. In other words, everything translators do is recorded by 'an unobtrusive application running in the background' (Angelone 2012: 46-47). Ehrensberger-Dow and Perrin (2009) compare the strengths and weaknesses of the screen-recording method and keystroke logging. They point out that although keystroke logging can also record the writing process in translation and monitor the changes occurring on the computer screen, it provides little or no information about what resources translators are checking during the pause intervals. Therefore, the screen-recording method may mitigate the weakness of keystroke logging to some extent, and that is part of the reason why the present study uses the screen-recording method since it aims to focus on web searching.

The screen-recording method can be used in conjunction with verbal reports. According to Göpferich and Jääskeläinen (2009: 173), screen recordings are 'particularly useful for analysing the research activities which form an integral part of translation processes, as they provide a detailed account of which electronic sources or web-sites the subjects are using during translation'. More recent studies (e.g. Ehrensberger-Dow and Massey 2013; Angelone 2013) combined the screen-recording method with other instruments to study different subjects' translation processes. Ehrensberger-Dow and Massey (ibid) combined the screen-recording method with cue-based retrospection to examine self-concepts and practices among BA students, MA students and professional translators. The data

---

[2] See further Section 3.2.5

shows these subjects' enhanced awareness of problems in translating newspaper abstracts (see Section 2.4.3.4, Chapter 2). In contrast, Angelone (ibid) combined the screen-recording method with TAPs to investigate the students' recognition of translation problems and mitigation of translation errors. The findings show that the students' use of screen recording as a retrospective self-reflection tool is particularly efficacious for error mitigation. Hence, the two studies discussed above have implications for the present study to explore students' self-reflection on their translation behaviours by triangulating the TA, screen-recording and cue-based retrospection methods.

In summary, because of the characteristics of **unobtrusiveness**, **user-friendliness** and **ecological validity**, the screen-recording method also serves as a pedagogical tool for process-oriented translator training and more importantly, it makes students more autonomous in learning translation.

3.1.3 Cue-based Retrospective Interview

The cue-based retrospection method is able to provide participants with powerful reminders by recalling their memory about their engagement in a translation task. Ericsson and Simon (1987: 41) point out that using cueing stimuli and giving the participants general instructions to report their thoughts, during the immediately preceding cognitive activity, should produce (retrospective) verbal reports which to a large extent mirror the actual mental processes. According to Ehrensberger-Dow and Künzli (2010: 116), the strength of the cue-based retrospection method is that the researchers can collect cue-based retrospective data 'that are less susceptible to memory decay' by replaying the recordings of participants' translation processes and requiring them to comment on what they have done.

However, Englund Dimitrova and Tiselius (2009: 110) identify a weakness of the retrospection method: total recall of information cannot be generated and the accuracy of the information recalled may be reduced due to participants' inadequate memory. Hence, retrospection has to be *cued* to facilitate recall, and a cueing stimulus is preferably 'encoded in the same way at recall as it was at the original presentation' (Ericsson and Simon 1993: 119).

Napier (2004) watched a videotaped interpreting task with the participants and asked them pre-set focus questions about their perceptions of the task, focusing on the instances of omissions during interpreting. Compared with interpreting process studies using the retrospective interview method (e.g. Napier 2004; Chang and Schallert 2007), relatively fewer studies on the translation process have used the cue-based retrospective interview method to examine the same participants' translation behaviours in a longitudinal way. For this reason, the present study is designed to use students' TAP and screen-recording files as cues for reflection during the

retrospective interviews *shortly after* they complete the translation tasks (see further Section 3.3).

3.2 Collection of TAP and Screen-recording Data

3.2.1 Selection of Tourism Texts

The three tourism texts selected for my research project are from an online travel website, *Traveler's Digest*, which to the best of my knowledge, does not have existing corresponding Chinese translations at the time of data collection. The ST content and non-verbal information such as images and maps are available online. The text 'Visiting the Ancient City of Luxor' for Task 1 (see Appendix 1) is a 418-word article that contains geographical, architectural and historical information about an Egyptian city, Luxor. The text 'Visiting the Sights and Souks of Marrakech' for Task 2 (see Appendix 2) is a 422-word article that introduces Marrakech, a city in Morocco, focusing on its urban views and historical buildings. The text 'Visiting Myrtle Beach and the Grand Strand' for Task 3 (see Appendix 3) is a 421-word article providing travel information about a coastal city, Myrtle Beach, in South Carolina in the United States.

The selection of STs is of great importance for TAP-based research (Sun 2011: 942). In the present study, the reasons for selecting the three tourism texts are the following. Firstly, although the three tourism texts require translators to have some general background knowledge about relevant cultures, tourism texts are considered to be a type of general text that does not involve any specialised or technical knowledge. Hence, they provide a level playing field for every student participant. My basic assumption is that these postgraduate translation students, who have regularly worked on medical, scientific and technical (specialised) texts [3], should possess the capacity to deal with and translate a more

---

[3] The students have regularly worked on specialised texts in various modules of their MSc in Scientific, Technical and Medical Translation at UCL.

general text type such as tourism texts, and to potentially learn from translating such texts. This is important considering that I intend to document their processes of translating and of learning to translate.

Secondly, the three tourism texts were chosen because of their levels of difficulty. Initially in the pilot study, I assessed the difficulty levels in terms of the variety and number of potential translation problems related to word choices, proper nouns, long sentences and general background knowledge about culture, history and geography. Similar numbers and varieties of potential difficulties in translating these STs were identified by the researcher and a PhD colleague. Two (more objective) measurements were conducted to establish their comparability. First of all, I used a classic readability test, the Flesch reading ease test, which largely measures sentence length and word length (Pavlović and Jensen 2009: 96). According to the Flesch reading ease test, the mean readability score of the three STs is approximately 50 (the overall range of scores is 0-100), with individual scores showing 46.4 (the Task 1 text), 50.6 (the Task 2 text) and 59.6 (the Task 3 text).

Furthermore, another measurement I used is called NASA-Task Load Index (TLX) subscales (Sun and Shreve 2014: 101-2; see Appendix 4). Two MSc students from the Centre for Translation Studies (CenTraS), UCL, were asked to independently rate the NASA-TLX based on six workload-related scores after they translated the three tourism texts. The students' average ratings on mental demand show 6.3 and 6.7. Their average rating on physical demand shows 4.7. Their average rating on temporal demand is 7.3. Their average ratings on effort are 5.3 and 6.3. Their average ratings on performance show 6.7 and 7.7 and on frustration level show 5 and 5.7. Generally, the whole range of the students' ratings on the six subscales (0-10) is therefore relatively narrow. Hence, the scores of the Flesch readability test and the students' average ratings of the NASA-TLX demonstrate the comparability of the three tourism texts

in terms of their levels of difficulty.

In particular, the three tourism texts consist of some terms and proper nouns that lack universally accepted Chinese equivalents. This means that the student participants are likely to need to resort to online resources. In summary, the three tourism texts are expected to pose some problems or difficulties for the students to solve or to find solutions to, irrespective of their specialised knowledge.

3.2.2 Group Training

Considering that most students did not have any experience of TA, a group training session was arranged. During the training session, I introduced the TA method to the students and then asked them to verbalise their thoughts in Mandarin Chinese (mother tongue) while they were translating a short passage about teeth whitening (see Appendix 5) from English into Chinese. During the exercise, the students were asked to work in pairs and allowed to use any types of dictionaries or reference materials. After the exercise, the students discussed their experience of TA. Finally, I explained my research project for recruiting potential participants.

3.2.3 Participant Recruitment

After the group training session, ten Chinese students on the MSc in Scientific, Technical and Medical Translation, from the Centre for Translation Studies (CenTraS), UCL, agreed to participate in my research project. They were given a pre-task demographic questionnaire (see Appendix 6) asking about their gender, age, educational background, English proficiency level, type(s) of text they had experience of translating and number of year(s) of translating experience during their undergraduate study. Table 3-1 presents the ten students' demographic profile.

Table 3-1 Student Participants' Demographic Profile

Code-name	Gender	Age	Background of Undergraduate Study	IELTS Score	Type(s) of Text and Number of Year(s) of Translating Experience (Undergraduate Study)
Alexandra	F	21	BA in Advertising	7	None
Nicole	F	22	BA in Language and Culture	7.5	None
Summer	F	23	BA in Translation	7.5	Journalism; Business and Finance; Law; Tourism; Manuals or Handbooks (2 Years)
Hanna	F	22	BA in Translation and Interpreting	8	Journalism; Business and Finance; Literature; Tourism; Manuals or Handbooks; Subtitles (4 Years)
Una	F	23	BA in Translation	7	Journalism; Business and Finance; Literature; Manuals or Handbooks (4 Years)
Rebecca	F	23	BA in Culture and Communication	8	None
Isaac	M	28	BEng in Precise Instruments	7.5	None
Bonnie	F	23	BA in English	7	Literature (1 Year)
Joy	F	22	BA in Communication	7.5	None
Jessie	F	24	BA in Scientific English	7	None

The ten students were code-named *Alexandra*, *Nicole*, *Summer*, *Hanna*, *Una*, *Rebecca*, *Isaac*, *Bonnie*, *Joy* and *Jessie* (mean age: 23.1; SD: 1.91). They had a number of different undergraduate backgrounds and had all achieved high scores in IELTS (mean score: 7.4; SD: 0.39), but only two students, who majored in translation (Summer and Hanna), claimed to have experience of translating tourism texts at the undergraduate level, and their translating experience was of in-class and take-home translation assignments. These assignments were mostly short Chinese tourism articles with some culture-specific terms that had to be translated into English.

One student (Una) claimed to have experience of translating texts in the following domains: journalism, business and finance, literature and manuals or handbooks. Another student (Bonnie) claimed to have experience of translating literary texts only. Their translating experience was also of in-class translation assignments at the undergraduate level. The other six students (Alexandra, Nicole, Rebecca, Isaac, Joy and Jessie) had had no translating experience during their undergraduate study. The students' demographic information shows that despite their relatively high English proficiency, they had little or no experience of translating tourism texts prior to my research project. For this reason, it is interesting to observe their behaviours when solving translation problems in tourism texts.

3.2.4 Warm-up Exercise and Formal Tasks

Before Task 1, a warm-up exercise was arranged for the ten students to make them more familiar with TA. A 263-word tourism text 'Mongolia Travel Guide' (see Appendix 7) was chosen as the warm-up exercise. In the subsequent Task 2 and Task 3, no warm-up exercises were given because by then the students were more familiar with TA. During the three tasks, translation briefs (see Appendices 1, 2 and 3) were provided as guidance for the students before they began translating. There was **no time limit** for the students to complete the translation tasks, and they were allowed to use any types of dictionaries (online or electronic) and web resources. Although the instrument, BB Flashback (see further Section 3.2.5), is unable to record the process of the students' use of portable electronic dictionaries, I minimised the limitation of the screen-recording method by requiring the students to verbalise all the words and search results from their electronic dictionaries as well as all their other online searches.

The students were required to verbalise their thoughts in Mandarin Chinese while translating. The direction of translation was from English into Chinese because translating into the students' L1 would avoid imposing an extra cognitive load on the students and enhance the efficiency of monitoring their own translation processes (Bernardini 2001: 248), and since the language they were translating into was the same as the language they were using to verbalise their thoughts. Data were collected in November 2014, March 2015 and May 2015 respectively.

3.2.5 Instrument: BB Flashback

BB Flashback is a piece of software with timing and audiovisual functions. This software enables one to record and replay one's voice, keyboard movements and on-screen behaviours. The ten students were asked to use BB Flashback to verbalise their thoughts aloud while translating the three tourism texts, and their TT production in MS Word and their search for web resources were all recorded by BB Flashback.

3.2.6 Methodological Evaluation

The methodology of the present study shall be evaluated in the following aspects. Firstly, it is the incompleteness of my TAP data. Although I arranged a group training session and a warm-up exercise for the ten students to practice TA, two of them still seemed to verbalise much less of their processes of searching for solutions and evaluating their solutions. When the two students faced difficulties in understanding or expressing some ST segments, what they said was just '*it is weird*' or '*it is really hard to translate*'. As a ramification, cue-based retrospective interviews were used (see further Chapter 5) to let the two students review part of their translation processes and further probe into their actual thinking of what had happened in translating the most difficult segments. During the interviews, the students could detail the causes of their translation problems and solutions due to their fresh memories, and this compensated for some lost information in their TAP data.

Secondly, the unobtrusive nature of screen-recording function (via BB Flashback) appears to work effectively in the present study because the students did not report that they felt uncomfortable of being recorded on the screen during the interviews. Moreover, largely in the post-task cue-based interviews, the students claimed that the combination of their verbalisations and on-screen behaviours for their reflection was beneficial for their learning of translation. Therefore, the students' comments not only demonstrate the ecological validity of their TAP and screen-recording data but also highlight the advantage of the screen-recording method for translation process research.

3.3 Collection of Cue-based Retrospective Interview and Translation Assessment Data

Section 3.2.4 described how the ten students translated the three tourism texts from English into Chinese while verbalising their thoughts in Mandarin Chinese. Once the students completed each of the three translation tasks, their TAPs, screen-recording data and Chinese translations of the three tourism texts were all saved. After a short break of 10-15 minutes, I carried out cue-based retrospective interviews with a list of open-ended questions in a semi-structured fashion (Edwards and Holland 2013) for the individual students. The interview questions were designed according to the following themes: '**students' reflection on their translation problems and solutions**', '**students' evaluation of their translation performance and improvement in solving translation problems**' and '**students' personal comments on or reasons for their self-evaluated translation performance in the translation tasks**'. The definitions of each theme are explained in the following.

Firstly, '**students' reflection on their translation problems and solutions**' is defined as the students' identification of difficult translation problems which they spent significant time in solving. The students may potentially refer to the triggers of these problems. In addition, the students reported on their solutions such as consultation of external (web and electronic) resources and use of translation techniques and inferential resources. In order to investigate the students' consultation of web resources to solve their translation problems in more detail, I required them to reflect on their difficulty in searching for web-based resources. The students were required to reflect on the success of their overall solutions to these translation problems.

Secondly, '**students' evaluation of their translation performance and improvement in solving translation problems**' is defined as the students' ratings of their translation performance on a 1-10 scale. They were required to explain the reasons for giving these ratings. In addition, I showed the students their TTs and asked them to point out the words, terms, proper nouns, phrases, sentences or paragraphs they believed that they had translated most successfully. The students also reflected on their improvement in solving translation problems subsequently in Task 2 and Task 3, and they were asked to report on what they may have learned in solving translation problems in translating tourism texts.

The importance of a combined process- and product-oriented approach in translation process research is emphasised by some scholars (e.g. Muñoz Martín 2010; Saldanha and O'Brien 2013) for a richer analysis and understanding of translation. In the present study, it has to be stressed that **the quality of the students' translation products does not form part of the research questions**, as it focuses on the students' problem solving, web searching behaviours and their reflection on such behaviours. Yet, in order to increase the objectivity of the students' self-ratings of their translation performance, I asked two professional translators[4] to mark all the students' translations of the three tourism texts based on the English-Chinese translation marking guidelines of the English-band Test for English Majors (TEM-8) (Li 2001: 43; see Appendix 8). In order to reduce the discrepancies between the two professional translators' marks, I specifically asked them to assess the students' translations following the chronological order of the three tasks and more importantly, to adhere to the same marking guidelines provided. The results of this translation product assessment and the question of inter-rater reliability will be reported on in Section 5.2.2, Chapter 5.

Thirdly, '**students' personal comments on or reasons for their self-evaluated translation performance in the translation tasks**' is defined as the students' comments on their overall translation performance, including their comments on how to improve their TTs and translation skills for tourism texts, etc. In addition, some students were asked to explain the reasons for changing or not changing their overall translation approach to Task 3. The students were also asked to comment on the translation tasks, including the influences of the TA method on their TT production.

---

[4] The two professional translators have over ten years' experience in translating tourism, art and literary texts.

Based on these themes, the interview questions of Task 1 are designed as follows:

(1) In translating this text, have you found any particular parts of the text difficult to translate? If yes, please identify these difficult parts.

(2) Why are these parts difficult for you? How did you solve these problems?

(3) How did you use the Internet to solve other translation problems? Did you have any difficulty in searching for web information?

(4) To what extent do you think your solutions to these problems or difficulties are successful? Are you satisfied with your solutions? Please explain.

(5) Given a scale of 1 to 10, how will you rate your own translation performance? Which part(s) do you believe you have done well? Please explain.

(6) Is there anything else you would like to comment on concerning your translation performance or the translation task?

The interview questions of Task 2 are mostly the same as those of Task 1. However, I added an extra probing question to the Question (6) to explore the improvement of the students' potential performance in solving the translation problems in Task 2. The interview questions of Task 3 are mostly the same as those of Task 2. However, I also adapted the Question (5) slightly so that the students were cued to compare their own ratings of translation performance throughout the three tasks. In addition, I kept the Question (6) to explore the potential improvement of the students' performance in solving the translation problems in Task 3.

Moreover, I added another Question (7) for four students (Summer, Hanna, Isaac and Joy) to investigate the reasons why they changed or did not change their overall translation approach to Task 3 because I noticed some students change the sequence of their use of external resources in Task 1 and Task 2 and wanted to find out why they did so. In the Question (8), I looked at the students' reflection on what they had learned about translating from the three tasks. Table 3-2 shows the interview questions of the three tasks and will be used to summarise the individual students' key answers.

Table 3-2 Cue-based Retrospective Interview Questions (3 Tasks)

Cue-based Retrospective Interview Questions	Task 1	Task 2	Task 3
(1) In translating this text, have you found any particular parts of the text difficult to translate? If yes, please identify these difficult parts.	✓	✓	✓
(2) Why are these parts difficult for you? How did you solve these problems?	✓	✓	✓
(3) How did you use the Internet to solve other translation problems? Did you have any difficulty in searching for web information?	✓	✓	✓
(4) To what extent do you think your solutions to these problems or difficulties are successful? Are you satisfied with your solutions? Please explain.	✓	✓	✓
(5) Given a scale of 1 to 10, how will you rate your own translation performance this time? For the first time, you rated yourself ____; for the second time you rated ____, but why do you rate yourself ____ for the third time? Which part(s) do you believe you have done well? Please explain.	✓	✓ (with slight variation)	✓ (with slight variation)
(6) Compared with your first and second task performances, to what extent do you believe you have improved in solving difficult problems in the last text? In what way do you think you have learned how to solve translation problems in a tourism text?	N/A	✓	✓
(7) I noticed that in the first task you looked up unknown words and terms while translating the text; in the second task you read the source text and checked unknown words and terms first before translating the text. Why did or didn't you change the way you approached the third task as you did in the second task?	N/A	✓ (Summer, Hanna, Isaac and Joy)	✓ (Summer, Hanna, Isaac and Joy)
(8) Is there anything else you would like to comment on concerning your translation performance or the translation task? What do you think you have learned about translating throughout the course of the year?	✓	✓	✓

The students' interview answers were recorded by a digital audio-recorder. The students' TAP, screen-recording and interview results show that they spent significant time in solving some translation problems in the three tasks and expressed their difficulties in the interviews. During the interviews, I replayed those difficult translation problems as cues in an attempt to prompt the students to comment on their problem-solving behaviours. While interviewing the individual students, I took notes using keywords and symbols from their answers. Wherever necessary, I also asked the students to clarify their comments accordingly. The ten students' interview data were collected in November 2014, March 2015 and May 2015 respectively along with their TAP and screen-recording data.

CHAPTER 4

TAP AND SCREEN-RECORDING RESULTS

4.0 Preamble

This chapter presents TAP and screen-recording results from the three translation tasks in order to outline the patterns in the varieties of the ten students' translation problems and their use of external resources. **Section 4.1** details how the students' TAP and screen-recording data were transcribed and coded. **Section 4.2** shows the coded TAP and screen-recording data. The types of translation problems faced by the students will be defined and illustrated by concrete examples (Section 4.2.1). The overall number of translation problems experienced by the individual students in the three tasks will be reported, and the different kinds of translation problems encountered by the students will be presented quantitatively (from Section 4.2.2 to 4.2.3). The types of external resources used by the students will be shown, the overall number of use of external resources by the individual students in the three tasks will be reported (Section 4.2.4), and the different ways in which the students used external resources will be presented quantitatively (Section 4.2.5). Finally, the different types of cross-checks of external resources made by the students will be briefly explained for further discussion in Chapter 6 (Section 4.2.6).

4.1 Data Analysis

4.1.1 Transcription and Coding

The TAP and screen-recording data collected by BB Flashback were transcribed on individual spreadsheets. Previous translation process researchers (e.g. Krings 1986; Jääskeläinen 1999; Englund Dimitrova 2005) developed their own transcription conventions for TAP data based on different research purposes such as discourse analysis. However, their transcription conventions only record subjects' voices and the intervals during their verbalisations without screen-recording information.

My transcription convention was largely adapted from Enríquez Raído's transcription table (2014: 103-5) because her convention includes not only subjects' TAPs but also on-screen behaviours, and this meets the needs of the present study for observing students' web searching behaviours. Enríquez Raído's transcription convention lists timeframe, on-screen windows or tabs (with URLs), TAP and consultation of external resources. Table 4-1 shows an example of TAP and screen-recording transcription records (provided with English gloss of TAP and consultation of external resources).

Table 4-1 Example of TAP and Screen-recording Transcription Records

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
02:12.50 02:20.50 02:30.70 03:09.00	*Bing Dictionary* (cn.bing.com/dict/search) *Bing Translator* (www.bing.com/translator) *Google* (www.google.com) *Wikipedia* (zh.wikipedia.org)	walled medina是什麼意思？walled medina…用必應詞典搜, 中文是麥地那, 但是我又不知道麥地那是不是, 它可能是一個…register也不一定, 先用谷歌搜一下…好像是一個地方的名字, 用中文搜一下…麥地那它在阿拉伯語裡面是一個城市的意思, 是一個內陸高原城市…伊斯蘭教三大聖地, 那它放在整個句子裡邊是有圍牆的一個城市嗎？這個地方有點不太能理解, 我就先標註一下。	查[必應詞典]: 麥地那 查[必應翻譯]: 壁麥地那 查[谷歌]: walled medina 查[中文維基百科 – 麥地那]

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

What does <walled medina> mean? <walled medina>…use *Bing Dictionary* to check [*Bing Dictionary*, 02:12.50], and its Chinese is ○maidina○ (the Chinese transliteration of <medina>), but I don't know whether ○maidina○ is [*Bing Translator*, 02:20.50], it may be a…register is hard to say, first use *Google* to search [*Google*, 02:30.70]…it's like a place name, use Chinese (*Wikipedia*) to search [*Wikipedia* – Medina, 03:09.00]…○maidina in Arabic means a city, it's an inland plateau city…Islamic three holy places○. Then, does it mean a city with surrounding walls in the whole sentence? I somewhat don't understand this part and then first highlight it.

In Table 4-1, 'timeframe' provides approximate recorded time in BB Flashback. 'On-screen windows or tabs' indicate windows or tabs opened by the students when they were reading the ST, the translation brief or checking external resources, with 'URLs' referring to on-screen links to websites or webpages. 'TAP' indicates the students' TA verbalisations. 'Consultation of external resources' indicates the students' consultation of online or electronic dictionaries (e.g. *Bing Dictionary*), machine translators (e.g. *Bing Translator*), search engines (e.g. *Google*) and other web resources (e.g. *Wikipedia*) together with the ensuing results.

In order to analyse the ten students' translation behaviours in their TAP and screen-recording data, I propose four main coding categories: '**ST analysis**', '**translation problems**', '**problem-solving strategies**' and '**TT evaluation**', and use them to classify the students' TAP and on-screen behaviours. These four categories are based on previous literature (as explained below). Nevertheless, the sub-categories of translation problems are mostly data-driven (see further Section 4.2.1). The definitions of each coding category are explained as follows (see Sections 2.3.1, 2.3.2, 2.4.3.1 and 2.4.3.4, Chapter 2 for cross-reference).

Firstly, '**ST analysis**', which tends to happen at the beginning or in the middle of the translation task, is defined as the students' reading, re-reading or analysis of the ST words, sentences or paragraphs or analysis of the ST context where translation problems occur (Nord 1992: 46) without checking external resources. Some students even attempt to grasp the ST context by literally or freely translating the ST segments without checking any external resources. 'ST analysis' is often accompanied by pausing or slowing down the reading pace and by identifying or repeating incomprehensible ST segments without checking external resources. 'ST analysis' also happens when the students ask minor questions about the ST content. At the beginning of the translation task, some students tend

to read the translation brief for a rough idea of the ST content, text type, translation requirement and the TT purpose for the target readers (Adab 2000: 220).

Secondly, it is '**translation problems**'. According to Martínez Melis and Hurtado Albir (2001: 281), 'the [translation] problems encountered by the translator are varied […] A working classification of these problems can be made in relation to the particular competence that the translator needs to mobilise'. On the basis of PACTE's TC model (2000), Martínez Melis and Hurtado Albir (ibid: 281) classified translation problems into the following types. The first type is linguistic problems including lexical and syntactic problems at the textual level, and both kinds of problems are related to PACTE's communicative competence in ST comprehension and TT expressions. The second type is extra-linguistic problems involving cultural, encyclopedic and thematic problems related to PACTE's extra-linguistic competence in bicultural, encyclopedic and thematic knowledge as well as knowledge of translation theory.

Since the present study aims to investigate the students' TC formation on the basis of their translation problems and problem-solving strategies, I adapt Martínez Melis and Hurtado Albir's classification of 'translation problems' into the following categories: '**superficial lexis**', '**superficial syntax**' and '**knowledge gaps**'. Each of these problem categories will be further defined in Section 4.2.1.

Thirdly, it is '**problem-solving strategies**'. Krings (1986: 175) defines a cognitive translation strategy as 'a translator's conscious plans for solving concrete translation problems in the framework of a concrete translation task'. Similarly, Lörscher (1991: 76) defines a cognitive translation strategy as 'a potentially conscious procedure for the solution of a problem which an individual is faced with when translating a text segment from one language to another'.

According to the above definitions, 'problem-solving strategies' in the translation process refer to a series of conscious actions carried out or plans made by translators to solve their translation problems. In the present study, the students' TAP and on-screen results show that the most common problem-solving strategy was largely related to consultation of web and electronic resources, despite some students' reporting on using inferential resources (e.g. based on personal experience) occasionally in their TAPs or cue-based retrospective interviews. Thus, I define 'problem-solving strategies' mainly in terms of the students' use of external resources to solve their translation problems, though the students' use of inferential resources will not be overlooked in data analysis.

Fourthly, '**TT evaluation**' relates to translators' awareness of the TT purpose and their evaluation of the adequacy and appropriateness of the TT (Kiraly 1995: 100). In fact, 'TT evaluation' is often associated with translators' self-concept or self-image. Hence, I define 'TT evaluation' as the students' own evaluation of their translation performance, and this includes their evaluation of translated words, sentences, proper nouns and TT expressions derived as a result of consulting external resources, ST-analytic results or the translation brief. While evaluating the TT, the students may also refer to their personal experience. Under these circumstances, the students either refine their translations or leave them unrevised where translation problems remain unsolved.

4.1.2 Inter-coder Reliability

A fellow PhD student with data-coding experience was asked to assess the reliability of the abovementioned four coding categories in a TAP and screen-recording transcript after he read an instruction for a reliability check explaining the definitions of these coding categories and of translation problems and sub-problems. Based on the inter-coder's comments, I further refined and clarified my initial coding definitions.

4.2 Results

4.2.1 Definitions of Translation Problems

The students' TAP and screen-recording results show that they mostly faced translation problems at the lexical and syntactic levels, and their problems sometimes varied as they had or claimed to have difficulties in **comprehension**, **expressions** or **knowledge** at the lexical or syntactic level. Table 4-2 shows the categorisations of translation problems accompanied by their operational definitions and examples in relevant literature.

Table 4-2 Categorisations of Translation Problems

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Operational Definitions and Examples in Relevant Literature
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	Definition: relating to the vocabulary of a language including lexical (or content) words and grammatical (or function) words (Leech 2006)
	Lexis-induced ST-comprehension Problems	Definition: relating to comprehension problems with exact lexical meanings in the ST context
		Example (of a variant idiom): *go against the grain* meaning 'be contrary to' (Szczepaniak 2007)
	Lexis-induced TT-expression Problems	Definition: relating to expression problems with appropriate lexical meanings in the TT
		Example (of polysemy): *drug* expressed as either 'medicine' or 'pills' (Kussmaul 1995)
	Lexis-induced Knowledge Problems	Definition: relating to knowledge problems with the meanings of terms or proper nouns
		Example (of a term with cultural knowledge): *baguette* referring to a kind of French bread (Nida 2001)
Syntax	Superficial Syntactic Problems	Definition: relating to long sentences or paragraphs with a complicated grammatical structure (Leech 2006)
	Syntax-induced ST-comprehension Problems	Definition: relating to comprehension problems with respect to a complicated syntactic structure (Ou 2005)
	Syntax-induced TT-expression Problems	Definition: relating to expression problems for communicative syntactic meanings in the TT (Ou 2005)
Knowledge Gaps	N/A	Definition: relating to translators' background knowledge gaps in the ST (e.g. the geography, history and culture of a location)
		Example (of a location with geographical knowledge):

			the City of London referring to the financial centre of London, not to the capital city (Cozma 2012)

In the following, each category of translation problems will be defined and illustrated by concrete examples (provided with English gloss of TAP and consultation of external resources).

Firstly, '**superficial lexis**' is defined as a single word, term and proper noun or a group of words (phrases and short clauses) and proper nouns. If the students find the meanings or translations of an ST segment in dictionaries, machine translators or other web resources, they quickly solve their superficial lexical problems by simply refining the meanings or directly choosing the translations provided in dictionaries, machine translators or other web resources. Table 4-3 shows a superficial lexical problem with the proper noun, Luxor, experienced by Alexandra in Task 1. In this example, Alexandra checks Luxor in *Bing Translator* and directly uses its Chinese transliteration (盧克索) in the TT.

Table 4-3 Alexandra's Superficial Lexical Problem (Task 1)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
00:11.80	*Bing Translator* (www.bing.com/translator)	首先看這個標題Visiting the Ancient City of Luxor, 其實我對這個地名不是很熟, 我先來搜一下這個地名, 用中文應該怎麼說…L-u-x-o-r…盧克索…粘貼過來, Ancient City of Luxor…就是參觀老城盧克索。	查[必應翻譯]: 盧克索

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

First of all, take a look at this title <Visiting the Ancient City of Luxor>, actually I'm not very familiar with this place name, I first search this place name, how should it say in Chinese…L-u-x-o-r [*Bing Translator*, 00:11.80] ○lukesuo○ (the Chinese transliteration of <Luxor>)…paste it here, <Ancient City of Luxor>…it's visiting the old city, ○lukesuo○.

Occasionally, if the students fail to find the corresponding meanings or translations of an ST segment in dictionaries, machine translators or other web resources, they solve their superficial lexical problems by using literal translation or description. Table 4-4 shows another superficial lexical problem with the proper noun, the Grand Strand, experienced by Hanna in Task 3. In this example, Hanna fails to find the Chinese translation of the Grand Strand although she keeps checking *Google*, *TripAdvisor*, *Mafengwo*'s map and *Youdao Dictionary*. Finally, she decides to use literal translation to render the Grand Strand into '大海灣' (grand bay).

Table 4-4 Hanna's Superficial Lexical Problem (Task 3)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
59:45.10	*Google* (www.google.com.tw)	現在就回去看這個 Grand Strand, 我在*Google*裡面查這個 Grand Strand, 這個*TripAdvisor*的網頁給它直接的翻譯就是美特爾海灘, 我來找一個中國的旅遊網站, 試一下 Grand Strand 然後加螞蜂窩看有沒有會出現中文的翻譯…還是沒有中文的, 我再用卡西歐查一下strand這個詞, 我覺得跟這個相關的就是海濱的意思, 那就說這是一條海岸線？ Grand Strand我拿有道查一下還是沒有, 那我打算直譯是大海灣。	查[谷歌]: Grand Strand
59:58.40	*TripAdvisor* (www.tripadvisor.com)		查[貓途鷹 – Grand Strand(美特爾海灘)]
1:02:28.30	*Mafengwo*'s Map (www.mafengwo.cn)		查[螞蜂窩 – 默特爾比奇地圖]
1:06:13.40	TT Word File		查[卡西歐電子詞典]: 海岸, 海濱
1:06:44.10	*Youdao Dictionary* (www.youdao.com)		查[有道詞典]: 沒有結果

> **English gloss of TAP and consultation of external resources:**
>
> **(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)**
>
> Now, go back to see this <Grand Strand>, I check this <Grand Strand> in *Google* [*Google*, 59:45.10], this *TripAdvisor* website [*TripAdvisor*, 59:58.40] gives its direct translation which is ○meiteerhaitan○ (the Chinese translation of <Myrtle Beach>). I'm looking for a Chinese travel website, try <Grand Strand>, add *Mafengwo*, and see if there is a Chinese translation [*Mafengwo*'s Map, 1:02:28.30]…still no Chinese (translation). I again use *Casio* to check this word <strand> [*Casio Electronic Dictionary*, 1:06:13.40]. I feel this is related to the meaning of ○beachside○, or is this a ○coastline○? I check <Grand Strand> in *Youdao* and there is still no (translation) [*Youdao Dictionary*, 1:06:44.10]. Then I decide to literally translate it into grand bay.

ST-comprehension problems can be found at the lexical level. Table 4-5 shows an ST-comprehension problem with the word 'curry' experienced by Una in Task 1. In this example, Una does not understand the literal meaning of 'curry' in the ST context. Then, she keeps checking 'curry' in *Casio Electronic Dictionary* and finally finds the correct meaning of 'curry favor' as '拍馬屁' (to try to please someone) (see further Table 6-2, Chapter 6).

Table 4-5 Una's Lexis-induced ST-comprehension Problem (Task 1)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
53:22.40	TT Word File	to curry是什麼意思？我怎麼覺得是咖哩的意思…咖哩，它做動詞是用咖哩燒菜，顯然不是這個意思，我看看什麼叫curry favor upon her death with the sun god...唉，還是不明白這個curry是什麼意思，我看看換個詞典…英漢大詞典…刷飾，整理，抽打，謀求…這幾個看起來都不大對勁，換柯林斯看看…哦是拍馬屁，意思就 curry favor upon…try to please someone, 就是為了讓女	查[卡西歐電子詞典]: 咖哩, 用咖哩燒菜
54:49.30	TT Word File		查[卡西歐英漢大詞典]: 刷飾, 整理, 抽打, 謀求
55:09.50	TT Word File		查[卡西歐柯林斯詞典]: 拍馬屁

		王高興。	

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

What does <to curry> mean? I somehow feel it means curry [*Casio Electronic Dictionary*, 53:22.40]…○curry○, its verb means ○use curry to cook○, obviously it's not this meaning. Let me see what is <curry favor upon her death with the sun god>…sigh, I still don't understand the meaning of <curry>. I change another dictionary…*English-Chinese Dictionary* [*English-Chinese Dictionary* of *Casio Electronic Dictionary*, 54:49.30]…○dress up, sort out, whip, seek○…these look wrong, change *Collins* [*Collins Dictionary* of *Casio Electronic Dictionary*, 55:09.50]…oh, its meaning is ○to flatter○, <curry favor upon> means…○try to please someone○, it's for making the Queen happy.

Similarly, after all the endeavour of checking web and electronic resources, there are occasions where the students still have or claim to have **TT-expression problems** at the lexical level. Table 4-6 shows a TT-expression problem with the words 'greenery' and 'lines' experienced by Alexandra in Task 1. In this example, Alexandra checks the expression 'greenery lines' in *Bing Translator* and an example sentence in *Bing Dictionary*. Although she finds that 'line' functions as a verb in the ST, she still has difficulty in expressing 'greenery' and 'lines' in suitable Chinese (see further Table 6-1, Chapter 6).

Table 4-6 Alexandra's Lexis-induced TT-expression Problem (Task 1)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
11:56.90	*Bing Translator* (www.bing.com/translator)	greenery lines到底有什麼比較好的方法可以形容呢？綠色線…這實在太奇怪了，換個詞典看有沒有比較好的表述方法…greenery line…綠色的道路和走廊...Roads and corridors of greenery line the eastern…哦知道了，這個line是個動詞…形成，沿什麼而成行，一小塊的綠化帶沿著尼羅河岸邊而成行…這樣說起來很不地道。	查[必應翻譯]: 綠色線
12:11.10	*Bing Dictionary* (cn.bing.com/dict/search)		查[必應詞典例句]: Roads and corridors of greenery line the eastern side of the reservoir.
12:34.40	*Bing Dictionary* (cn.bing.com/dict/search)		查[必應詞典]: 形成，沿…而成行

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

What is a better way to express <greenery lines> [*Bing Translator*, 11:56.90]? ○green line○…it's really weird, change another dictionary and see if there is a better expression…<greenery line>…[example sentence of *Bing Dictionary*, 12:11.10] ○Roads and corridors of greenery line the eastern○…oh, I see, this <line> is a verb…[*Bing Dictionary*, 12:34.40] ○form, line up along○, a small patch of greenery belt line up along the side of the Nile River...this expression doesn't sound very idiomatic.

When multiple translations occur, the students are found to check these translations in search engines so that a more frequently used version on the web can be adopted (Shei 2010: 22-24). Table 4-7 shows another TT-expression problem with the proper noun, Myrtle Beach, experienced by Alexandra in Task 3. In this example, Alexandra finds three translations of Myrtle Beach in *Bing Dictionary* and *Sina Blog*. Then, she checks these translations in *Baidu* and finally chooses the transliteration of Myrtle Beach（默特爾比奇）in *Wikipedia* as the most frequently used version (see further Table 6-6, Chapter 6).

Table 4-7 Alexandra's Lexis-induced TT-expression Problem (Task 3)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
01:42.50	*Bing Dictionary* (cn.bing.com/dict/search)	首先找到這個海灘它的中文的一個官方翻譯，我就直接到必應裡面搜索看有沒有官方的一個中文的翻譯，關於這個海岸，它有三個翻譯全都是網絡上的一個解釋，好像並沒有一個官方的，所以我就單獨搜一下這三個解釋，看到底會不會…哪一個會比較多的那個…美特爾海灘…美特爾海灘搜出來的大概是142,000個結果，那我看一下默特爾海灘搜出來的結果大概是多少？很少…39,800個結果，好像默特爾海灘很少，但是有一個默特爾比奇它有一個維基百科的介紹，但是這個比其他的直接beach這兩個音譯過來感覺好像也不是太好的樣子…默特爾比奇搜索的話，這個比奇它有一個字在百度百科，但是介紹很少，也不是像特別正規的一個，官方的一個翻譯，默特	查[必應詞典]: 默特爾比奇, 默特爾海灘
02:17.70	*Sina Blog* (blog.sina.com.cn)		查[新浪博客 – 美特爾海灘彼岸 Cherry]
02:26.80	*Baidu* (www.baidu.com)		查[百度]: 美特爾海灘
02:45.60	*Baidu* (www.baidu.com)		查[百度]: 默特爾海灘
03:00.40	*Wikipedia* (zh.wikipedia.org)		查[中文維基百科 – 默特爾比奇(南卡羅來納州)]

| 03:26.20 | *Baidu*
(www.baidu.com) | 爾比奇搜索出來的結果是75,500個，但默特爾海灘的結果好像又更多了一些…哦，不對，是默特爾比奇的結果會比較多，那就翻成默特爾比奇會比較好，既然沒有官方翻譯的話，就選擇一個搜索結果最高的一個翻譯吧。 | 查[百度]: 默特爾比奇 |

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

First of all, find the official Chinese translation of this beach, I directly search for its official Chinese translation in *Bing* [*Bing Dictionary*, 01:42.50], about this beach, it has three translations and they are all the explanations online, it seems there is no official one, so I search the three explanations individually and see which one is more [*Sina Blog*, 02:17.70]…○meiteerhaitan○ (a Chinese translation of <Myrtle Beach>) [*Baidu*, 02:26.80]…the entry of ○meiteerhaitan○ is probably 142,000 results, then I take a look at how many results ○moteerhaitan○ (another Chinese translation of <Myrtle Beach>) probably has [*Baidu*, 02:45.60]? Fewer…39,800 results, it seems ○moteerhaitan○ has fewer (results), but there is a ○moteerbichi○ (the Chinese transliteration of <Myrtle Beach>) in *Wikipedia*'s introduction [*Wikipedia* – Moteerbichi (South Carolina), 03:00.40], but this transliteration of <beach> doesn't seem good compared with its other translations…search ○moteerbichi○, there is the word ○moteerbichi○ in *Baidu Baike*, but its introduction is less, and it's not like a regular official translation. The results of ○moteerbichi○ are 75,500 [*Baidu*, 03:26.20], but the results of ○moteerhaitan○ are more…oh, no, the results of ○moteerbichi○ are more, then translating into ○moteerbichi○ is better. Although there is no official translation, choose a translation as the most search result.

Knowledge problems can also occur at the lexical level. Table 4-8 shows a knowledge problem with the proper noun, the El Badi Palace, experienced by Una in Task 2. In this example, Una lacks the cultural knowledge of the El Badi Palace, so she reads about the palace in *Wikipedia* and corrects her misunderstanding of 'impressive collection of ruins' that describes the palace.

Table 4-8 Una's Lexis-induced Knowledge Problem (Task 2)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
1:09:57.40	*Baidu* (www.baidu.com)	我要查一下巴蒂皇宮會有什麼 …impressive collection of ruins 難道是若干廢墟組成？真是奇怪，這個皇宮有一點小眾，好像沒有什麼人聽說過…is a ruined…什麼 commissioned…它是幹嘛用的？這個皇宮裡到底有沒有儲存著東西？這些感覺都不大像，都是說它歷史的…	查[百度]: 巴蒂皇宮
1:10:52.40	*Wikipedia* (en.wikipedia.org)	我看看 Decline 和 Today…對裡頭還是好像有點東西，還有展覽，還有 museum…什麼 for a number of years the folklore…但它感覺不是主要儲存什麼東西？還是它自己是個廢墟？就是這種感覺…這個皇宮是建於 16 世紀的，還是這個 collection 怎麼翻譯呢？所以還是這個皇宮自己是個廢墟，因為它曾經被…然後現在又修繕了一下，所以它裡頭並沒有儲存什麼東西，對這塊之前可能理解錯了，我需要修改一下，這裡善存著大量的遺跡基本上是錯誤的理解。	查[英文維基百科 – El Badi Palace]

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

I want to check what <El Badi Palace> has inside…<impressive collection of ruins> is it composed of several ruins? It's weird [*Baidu*, 1:09:57.40], this palace is a little unpopular, it seems fewer people have heard of it [*Wikipedia* – El Badi Palace, 1:10:52.40]…○is a ruined○…what ○commissioned○…what is it for? Does this palace store something inside? These doesn't feel like…all about its history…let me take a look at ○Decline and Today○…yeah, it seems something is there inside, and ○exhibition, museum○…what is ○for a number of years the folklore○? But it feels that it's not storing something, or is it a ruin itself? That's the feeling…this palace was built in the 16th century, and how to translate this <collection>? So this palace itself is a ruin, because it was once…and then now it's refurbished, so there is nothing more stored inside. Maybe there was a miscomprehension of this part, I need to revise (the translation). Here, a good storage of massive ruins is basically a wrong understanding.

Secondly, '**superficial syntax**' is defined as long sentences or paragraphs with a complicated grammatical structure. If the students face superficial syntactic problems, they simply read or re-read the ST sentences or paragraphs while verbalising their problems with the grammatical structure, or while analysing or segmenting the grammatical structure. It is worth re-iterating that superficial syntactic problems simply mean that there is no cognitive or behavioural indication that such syntactic problems are specifically related to comprehension or expression problems, in contrast to syntax-induced ST-comprehension problems (which will be explained shortly) for example. Table 4-9 shows a superficial syntactic problem with a sentence, 'the official burial site of the Egyptian pharaohs for over 500 years, elaborate underground burial chambers that were constructed to safeguard the mummified remains of the kings of Egypt line the valley', experienced by Alexandra in Task 1. In this example, Alexandra reads the ST sentence containing 'line the valley' and analyses its modifiers for a clearer grammatical structure.

Table 4-9 Alexandra's Superficial Syntactic Problem (Task 1)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
51:25.90	TT Word File (ST Analysis)	line the valley…這個句式有點不是很清楚…were constructed to safeguard the mummified remains of the kings of Egypt…這個line the valley應該是修飾remains, 然後the kings of Egypt又是修飾這個mummified remains, 這樣就清楚多了。	N/A

> **English gloss of TAP and consultation of external resources:**
>
> **(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○:**
> **search results of external resources)**
>
> <line the valley>…this sentence structure is a little unclear…<were constructed to safeguard the mummified remains of the kings of Egypt>…this <line the valley> should modify <remains>, and then <the kings of Egypt> further modifies this <mummified remains>, this is clearer.

ST-comprehension problems at the syntactic level are coded as syntax-induced ST-comprehension problems. Table 4-10 shows an ST-comprehension problem with the ST sentence, 'the longest river in the world, a small patch of greenery lines the shores of the River Nile', experienced by Una in Task 1. In this example, Una verbalises her difficulty in understanding the existence of the two nouns ('the longest river in the world' and 'a small patch of greenery lines') in the sentence structure. Then, she segments the sentence structure and finds the verb meaning of 'line' in *Casio Electronic Dictionary* (see further Table 6-1, Chapter 6).

Table 4-10 Una's Syntax-induced ST-comprehension Problem (Task 1)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
10:27.40	TT Word File (ST Analysis)	我總是不能明白這個 the longest river in the world和這個small patch這兩塊同時都是兩個名詞, 感覺有點奇怪, 先不管逗號前面的這片, 先從small patch of greenery lines…喔, a small patch這塊可以假裝是個插入語不理它, 所以從前頭開始, 先從河開始…這條世界上最長的河, 曲折穿過撒哈拉大沙漠, 它的水源是讓這片土地能夠建立文明的唯一原因…唉, 聽著好翻譯腔呀, 我再想想, 而且我也沒有把flourish翻譯出來…它的水流的灌溉是讓這片土地能	N/A

12:54.70	TT Word File	夠建立文明的唯一原因, 然後才是把small patch of greenery lines這塊給插入到這個句子裡我看看…一小片, 這片土地…所以把這句話放在這整句話的前頭比較好…這片小土地…聽著還是有點奇怪…這片充滿…長滿綠植的一小片土地, 但是這個lines又沒有翻譯出來, 我要查一下字典是怎麼解釋, 在牛津高階裡這個line做動詞的意思是…唉找啊找, 它的名詞實在太長了, 還沒有找到動詞那一頁, 動詞的意思是做襯裡, 形成一行, 沿什麼成行…哎呀, 字典的解釋也是很難直接套用到這裡, 所以就是這片沿著尼羅河岸形成的…長滿綠植的土地…把這一小片放在前頭一點…這一小片長滿綠植的土地, 喔這句話翻譯成了, 但還是沒有和整條句子構成一個邏輯性, 所以我覺得還是把這個長句話留下來…這條世界上最長的河流, 曲折穿過撒哈拉大沙漠, 它的河流灌溉是讓這片土地…改成是讓兩邊河岸長滿綠植的土地…能夠建立文明的唯一原因, 這樣還能理解一點。	查[卡西歐電子詞典]: 做襯裡, 形成一行, 沿成行

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

I always don't understand this <the longest river in the world> and this <small patch> the two segments are nouns at the same time, it's a little weird, first ignore the segment before the comma, first from <small patch of greenery lines>…oh, this segment <a small patch> can be pretended to be an inserted phrase, ignore it, so from the river…the longest river in the world, snaking through the Sahara Desert, its water source is the only reason to let the land establish a civilisation…sigh, it sounds very translationese. Let me think, and I haven't translated <flourish>…its water irrigation is the only reason to let the land establish a civilisation, and then insert this segment <small patch of greenery lines> into the sentence, let me see…a small patch, this land… so it's better to put this phrase at the beginning of the whole sentence…this small land…still sounds weird…this full of…this small land full of green plants, but this <lines> is still not translated. I want to check its explanation in a dictionary. In *Oxford Advanced Dictionary*, the verb meaning of <line> is…keep searching, the explanations of its nouns are too long, I haven't found that page about its verb...[*Oxford Advanced Dictionary* of *Casio Electronic Dictionary*, 12:54.70] its verb meaning is ○do lining, form a line of something, line up along something○…oh, it's hard to directly use these explanations in the dictionary, so it's the patch lining up along the side of the Nile River…the land full of green plants…put a small patch in the beginning… the land full of green plants, oh, this sentence is translated, but it's still not logical in the whole sentence, so I feel I still keep this long sentence…the longest river in the world, snaking through the Sahara Desert, its river irrigation lets the land…revise it into lets the land grow green plants on the riversides…the only reason to be able to establish a civilisation, this sounds clearer.

TT-expression problems at the syntactic level are coded as syntax-induced TT-expression problems. Table 4-11 shows a TT-expression problem with the same sentence, 'the longest river in the world, a small patch of greenery lines the shores of the River Nile', experienced by Hanna in Task 1. In this example, Hanna clearly segments the sentence structure and confirms the verb meaning of 'line' in *Casio Electronic Dictionary*. However, she still has difficulty in expressing the sentence in fluent Chinese due to the complicated grammatical structure (see further Table 6-1, Chapter 6).

Table 4-11 Hanna's Syntax-induced TT-expression Problem (Task 1)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
14:35.40	TT Word File (ST Analysis)	the longest river in the world, a small patch of greenery lines the shores of the River Nile as it snakes through…這句話很長，有很多動詞，我要先分析句子結構…the longest river in the world…同位語, a small patch of greenery lines…我先把動詞都加粗，因為這樣比較能看出平行，就是主句和分句怎麼構成的，第一個動詞line, 第二的動詞snake, 第三個是be動詞are, 前面同位語，這都不是句子主幹，所以我可以先用括號畫起來…the shores of the River Nile…所以as連接了一個狀語從句，這個its指的是尼羅河，前面的it snakes的it也是尼羅河，我把兩個都當狀語從句圈起來，所以它的主句說a small patch of greenery lines the shores of the 尼羅河，有兩個講尼羅河的狀語，一個分句，一個是snake through撒哈拉沙漠，還有一個它的水，文明…這是濫觴文明的原因，現	N/A

		在比較清楚了 [...]	
21:48.90	TT Word File	a small patch of greenery lines…其實就是講城市，但我還是查一下greenery，用卡西歐EB99裡面的綜合查詢牛津高階的解釋…綠色植物…然後英漢…一般都是說綠色植物…朗文的是綠色植物，柯林斯也是，所以我覺得這裡是用了一個隱喻，先翻成一小塊綠地…lines名詞做動詞，那用卡西歐查它的名詞做動詞時候給的中文釋義，還是看牛津雙解	查[卡西歐牛津高階電子詞典]: 綠色植物
22:50.20	TT Word File	翻到最後看它動詞的部分…做裡襯這肯定不對…行成行，對，這是我們想要的，沿…行成行，那就是沿著河岸展開…展開肯定不對，但我先把句子順下去，然後又說尼羅河在撒哈拉沙漠中蜿蜒，因為snake一般都直接翻作蜿蜒，所以先不用查，然後講它的河水only reason civilization ever flourished here…這裡又出現名詞換動詞的問題，英文裡面直接用the reason一個名詞，但中文我肯定要變成動詞才能讓句子流動起來，所以一般都說是河水養育的…所以我要先用養育這個動詞，civilization其實就是埃及文明，這邊要具體點出來，因為我已經把它變成動詞了，所以不想要再留是什麼的原因，感覺細掉了結構，感覺很囉唆，把 is the only reason給刪掉，然後變成它的河水養育了…或者造就了埃及文明的繁榮，感覺會跟flourish更貼，我先把養育先留著，用一個slash把兩個都留著等下再定奪…在	查[卡西歐牛津雙解電子詞典]: 做襯裡, 沿成行

		這條世界上最長的河流兩岸，一小塊綠地沿著河岸展開，展開肯定不對，我先給它上黃色膏料…這裡對尼羅河的介紹夾雜在對這個城市的兩邊，然後說這個城位於尼羅河，這條河很長什麼，然後又說這個綠地沿著尼羅河出現，由此又再說尼羅河，所以覺得信息很亂，一下講路克索，一下講尼羅河…我要調整一下信息的順序，我想把the longest river這個信息挪到後面…先把路克索都講完，再去講尼羅河的事情，好像還是不太順。	

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

<the longest river in the world, a small patch of greenery lines the shores of the River Nile as it snakes through>…this sentence is very long, there are many verbs, I want to analyse the sentence structure first…<the longest river in the world>…an appositive, <a small patch of greenery lines>…I highlight these verbs because it's easier to see the paralleled structure, which means how the main sentence and subordinate sentence are formed. The first verb is <line>, and second verb is <snake>, and the third be-verb is <are>. The beginning one is an appositive. These are not the main sentence structure, so I can first use parentheses to include…<the shores of the River Nile>…so <as> connects an adverbial phrase, and this <its> refers to the Nile River, and the <it> of <it snakes> also refers to the Nile River. I circle the two adverbial phrases, so its main sentence says <a small patch of greenery lines the shores of the River Nile>, there are two adverbial phrases talking about the Nile River, one is the subordinate sentence, and the other is <snake through the Sahara Desert>, and its water, civilisation…this is the cause of the cradle for the civilisation, now it's clearer (…)

<a small patch of greenery lines>…it's actually talking about the city, but I still need to check <greenery>, use *Casio EB99* and check the explanation in *Oxford Advanced Dictionary*...[*Oxford Advanced Dictionary* of *Casio Electronic Dictionary*, 21:48.90] ○green plants○...and then *English-Chinese Dictionary*…its general

explanation is ○green plants○…*Longman*'s explanation is ○green plants○ and so is that of *Collins*, so I feel a metaphor is used here, first translate it into a small patch of green land…<lines> transforms from a noun into a verb, use *Casio* to check its verb meaning in Chinese, I still check *Oxford Advanced Dictionary* and turn to that page about its verb in the end…[*Oxford Advanced Dictionary* of *Casio Electronic Dictionary*, 22:50.20] ○do lining○ is not right, ○line up along○…yes, this is what I want, ○line up along something○, that means spreading along the riversides, spreading is not right, but I finish writing the sentence first and then say the Nile River snakes in the Sahara Desert. Because <snake> is generally translated into 'wanyan' (meander), there is no need to check it. Then, it's talking about its river <only reason civilization ever flourished here>…here is another problem about the transformation of a noun into a verb, in English it says <the reason> as a noun, but in Chinese I must use a verb to make the sentence flow, so generally it says raised by the river…so I want to use the verb 'yangyu' (raise), <civilization> is actually the Egyptian civilisation. Here I need to clearly point it out because I've already changed it into a verb, so I don't want to keep 'for what reason', it feels weakening the structure and redundant. Cross off <is the only reason> and then revise it into raised by its river…or making the Egyptian civilisation blooming, it feels closer to the meaning of <flourish>. I keep the word 'raised' first and use a slash to keep the two (translations) for a final decision later…On the two sides of the longest river in the world, a small patch of green land spreads along the riversides, 'spreads' is not right, I highlight it in yellow first…here is an introduction to the Nile River between the two sides of this city, and then it says this city is located on the Nile River, this river is long, and then it says the green land lines up along the Nile River and appears, and from here it again refers to the Nile River, so I feel the information is messy, here it's talking about Luxor, there it's talking about the Nile River…I want to adjust the order of this information, I want to move the information <the longest river in the world> to the back…finish talking about Luxor and then the Nile River, but it still doesn't sound coherent.

Finally, '**knowledge gaps**' are defined as a gap in translators' background knowledge related to the ST, including, for example, the geography, history and culture of a tourist location. This type of knowledge problem, which tends to happen at the beginning of the translation task, is an *independent* category which is not triggered at the lexical level. If the students lack or claim to lack background knowledge of the main tourist spot of the ST, they mainly check online encyclopedias for more background information. Table 4-12 shows a knowledge gap problem with Marrakech City indicated by Jessie in Task 2. In this example, Jessie consults *Baidu Baike* for the geographical knowledge about Marrakech City before translating, and she also uses *Baidu Baike* as a parallel text for locating relevant terms (see further Table 6-3, Chapter 6).

Table 4-12 Jessie's Knowledge Gap Problem (Task 2)

Timeframe (h:m:s.ms)	On-screen Windows/Tabs	TAP	Consultation of External Resources
01:41.00	*Youdao Dictionary* (www.youdao.com)	Marrakech…馬拉喀什是在摩洛哥西南部的一座城市, 查一下背景知識…這個…馬拉喀什…是一個來自南方的駝隊…綠洲…中世紀的傳奇和神祕…炎熱塵土使馬拉喀什…非洲的摩洛哥城市…馬拉喀什以紅色的城市而聞名於世…豪茲經濟區的首府…摩洛哥的南方明珠…一個古老的要塞城區和一個鄰近的現代化郊區, 還有機場, 一條鐵路連接卡薩布蘭卡…哦賈馬夫納廣場…最繁忙的廣場…名稱由來…歷史風貌, 氣候。	查[有道詞典]: 馬拉喀什
02:16.60	*Baidu Baike* (baike.baidu.com)		查[百度百科 – 馬拉喀什]

English gloss of TAP and consultation of external resources:

(<xxx>: ST segments; [xxx]: external resources used and timeframe; ○xxx○: search results of external resources)

<Marrakech>…[*Youdao Dictionary*, 01:41.00] ○Malakeshi○ (the Chinese transliteration of <Marrakech>) is a city in southwest Morocco, check its background knowledge [*Baidu Baike* – Malakeshi, 02:16.60]…this...○Malakeshi…is a camel group from the south…oasis…the legend and myth in the Middle Age…hot dust and soil makes Malakeshi…Africa's Moroccan city…Malakeshi is known as a red city…the capital of El Haouz Economic Area…Morocco's southern pearl…an ancient fortress city and neighbouring modern suburbs, there is an airport, a railway connecting Casablanca…oh, Jemaa el-Fnaa Square is the busiest square…the origin of the title…historical scenes, climate○.

4.2.2 Number of Translation Problems

Section 4.2.1 illustrated each category of translation problems and sub-problems: superficial lexis, lexis-induced ST comprehension, lexis-induced TT expression, lexis-induced knowledge, superficial syntax, syntax-induced ST comprehension, syntax-induced TT expression and knowledge gaps. This section reports on the overall number of translation problems experienced by the ten students in each of the three tasks, before the frequencies of translation problems are presented quantitatively in Section 4.2.3. I will first briefly present the individual student's number of translation problems for the three tasks and then focus on the overall number across all the student population (see further Section 4.2.3).

Tables 4-13 and 4-14 show the overall number of translation problems experienced by Alexandra and Nicole in the three tasks respectively. As Table 4-13 shows, Alexandra encounters problems with superficial lexis, lexis-induced ST comprehension, lexis-induced TT expression and lexis-induced knowledge. Nicole's translation problems appear to be similar to those of Alexandra.

Table 4-13 Alexandra's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	28	34	23
	Lexis-induced ST-comprehension Problems	4	6	2
	Lexis-induced TT-expression Problems	8	9	5
	Lexis-induced Knowledge Problems	1	0	0
Syntax	Superficial Syntactic Problems	1	3	0
	Syntax-induced ST-comprehension Problems	1	1	0
	Syntax-induced TT-expression Problems	2	0	0
Knowledge Gaps	N/A	0	0	0

Table 4-14 Nicole's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	31	50	38
	Lexis-induced ST-comprehension Problems	1	5	6
	Lexis-induced TT-expression Problems	1	11	3
	Lexis-induced Knowledge Problems	2	2	3
Syntax	Superficial Syntactic Problems	0	0	0
	Syntax-induced ST-comprehension Problems	0	0	0
	Syntax-induced TT-expression Problems	0	0	0
Knowledge Gaps	N/A	0	0	0

Table 4-15 shows the overall number of translation problems experienced by Summer in the three tasks. As Table 4-15 shows, Summer faces problems with superficial lexis, lexis-induced ST comprehension, lexis-induced TT expression and lexis-induced knowledge. Unlike Alexandra and Nicole, Summer does not seem to have many lexis-induced ST-comprehension or lexis-induced TT-expression problems. In fact, the majority of Summer's problems appear to be at the superficial lexical level.

Table 4-15 Summer's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	24	17	16
	Lexis-induced ST-comprehension Problems	1	0	2
	Lexis-induced TT-expression Problems	1	2	0
	Lexis-induced Knowledge Problems	1	0	0
Syntax	Superficial Syntactic Problems	0	0	0
	Syntax-induced ST-comprehension Problems	0	0	0
	Syntax-induced TT-expression Problems	1	0	0
Knowledge Gaps	N/A	0	0	0

Table 4-16 shows the overall number of translation problems experienced by Hanna in the three tasks. As Table 4-16 shows, Hanna encounters problems with superficial lexis, lexis-induced ST comprehension, lexis-induced TT expression and lexis-induced knowledge. The number of superficial lexical problems slightly reduces from Task 1 to Task 2 and rebounds in Task 3, but the number of lexis-induced ST-comprehension and lexis-induced TT-expression problems increases from Task 1 to Task 2 and decreases in Task 3. Compared with the previous students, Hanna appears to have more problems related to syntax, particularly in Task 1.

Table 4-16 Hanna's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	26	24	27
	Lexis-induced ST-comprehension Problems	1	3	1
	Lexis-induced TT-expression Problems	3	8	6
	Lexis-induced Knowledge Problems	4	0	1
Syntax	Superficial Syntactic Problems	7	0	0
	Syntax-induced ST-comprehension Problems	2	0	0
	Syntax-induced TT-expression Problems	1	0	0
Knowledge Gaps	N/A	1	0	0

Table 4-17 shows the overall number of translation problems experienced by Una in the three tasks. Una's figures are relatively similar to those of Alexandra and Nicole.

Table 4-17 Una's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	34	29	25
	Lexis-induced ST-comprehension Problems	3	2	1
	Lexis-induced TT-expression Problems	3	6	8
	Lexis-induced Knowledge Problems	0	1	0
Syntax	Superficial Syntactic Problems	3	0	0
	Syntax-induced ST-comprehension Problems	1	0	0
	Syntax-induced TT-expression Problems	0	0	0
Knowledge Gaps	N/A	0	0	0

Table 4-18 shows the overall number of translation problems experienced by Rebecca in the three tasks. Just like the previous students, Rebecca's problems are largely at the superficial lexical level although she also experiences lexis-induced TT-expression problems throughout the three tasks.

Table 4-18 Rebecca's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	18	33	34
	Lexis-induced ST-comprehension Problems	0	2	3
	Lexis-induced TT-expression Problems	5	8	2
	Lexis-induced Knowledge Problems	0	0	0
Syntax	Superficial Syntactic Problems	0	0	0
	Syntax-induced ST-comprehension Problems	0	0	0
	Syntax-induced TT-expression Problems	0	0	0
Knowledge Gaps	N/A	0	0	0

Tables 4-19 and 4-20 show the overall number of translation problems experienced by Isaac and Bonnie in the three tasks respectively. Again, Isaac's and Bonnie's figures are relatively similar to those of Alexandra, Nicole and Una.

Table 4-19 Isaac's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	22	28	24
	Lexis-induced ST-comprehension Problems	3	0	1
	Lexis-induced TT-expression Problems	1	7	3
	Lexis-induced Knowledge Problems	3	0	0
Syntax	Superficial Syntactic Problems	2	0	0
	Syntax-induced ST-comprehension Problems	1	0	0
	Syntax-induced TT-expression Problems	1	0	0
Knowledge Gaps	N/A	0	0	0

Table 4-20 Bonnie's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	19	34	22
	Lexis-induced ST-comprehension Problems	2	4	0
	Lexis-induced TT-expression Problems	2	7	6
	Lexis-induced Knowledge Problems	0	0	1
Syntax	Superficial Syntactic Problems	0	0	1
	Syntax-induced ST-comprehension Problems	0	0	0
	Syntax-induced TT-expression Problems	0	0	0
Knowledge Gaps	N/A	1	1	0

Table 4-21 shows the overall number of translation problems experienced by Joy in the three tasks. Joy's figures are similar to those of Rebecca in that she has lexis-induced TT-expression problems. That is in addition to lexis-induced knowledge problems.

Table 4-21 Joy's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	25	40	38
	Lexis-induced ST-comprehension Problems	0	1	2
	Lexis-induced TT-expression Problems	3	5	2
	Lexis-induced Knowledge Problems	4	0	4
Syntax	Superficial Syntactic Problems	1	2	0
	Syntax-induced ST-comprehension Problems	0	0	0
	Syntax-induced TT-expression Problems	1	0	0
Knowledge Gaps	N/A	0	0	0

Table 4-22 shows the overall number of translation problems experienced by Jessie in the three tasks. Similarly to Hanna, Isaac and Bonnie, Jessie has both superficial lexical problems and a variety of other lexis-induced problems.

Table 4-22 Jessie's Translation Problems (3 Tasks)

Major Categories of Translation Problem	Superficial Problems & Sub-problems	Task 1	Task 2	Task 3
Lexis	Superficial Lexical Problems (words + terms + phrases + proper nouns)	24	31	17
	Lexis-induced ST-comprehension Problems	2	3	1
	Lexis-induced TT-expression Problems	1	1	3
	Lexis-induced Knowledge Problems	4	3	2
Syntax	Superficial Syntactic Problems	0	0	0
	Syntax-induced ST-comprehension Problems	0	0	0
	Syntax-induced TT-expression Problems	0	0	0
Knowledge Gaps	N/A	0	1	1

4.2.3 Varieties of Translation Problems

Section 4.2.2 presented the overall number of translation problems faced by the ten students in the three tasks. This section reports on the varieties of their translation problems. The frequencies of translation problems encountered by the students vary across the three tasks. I will present these quantitative data (including the means and SDs) following the chronological order of the tasks.

In Figure 4-1, the frequencies of translation problems in Task 1 are shown. It shows that the ten students face most problems with superficial lexis (74%; SD: 4.98), followed by lexis-induced TT expression (8%; SD: 2.25), lexis-induced knowledge (6%; SD: 1.73), lexis-induced ST comprehension (5%; SD: 1.34), superficial syntax (4%; SD: 2.22), syntax-induced TT expression (2%; SD: 0.70), syntax-induced ST comprehension (1%; SD: 0.71) and knowledge gaps (1%; SD: 0.42). The mean number of translation problems in Task 1 is 34.2.
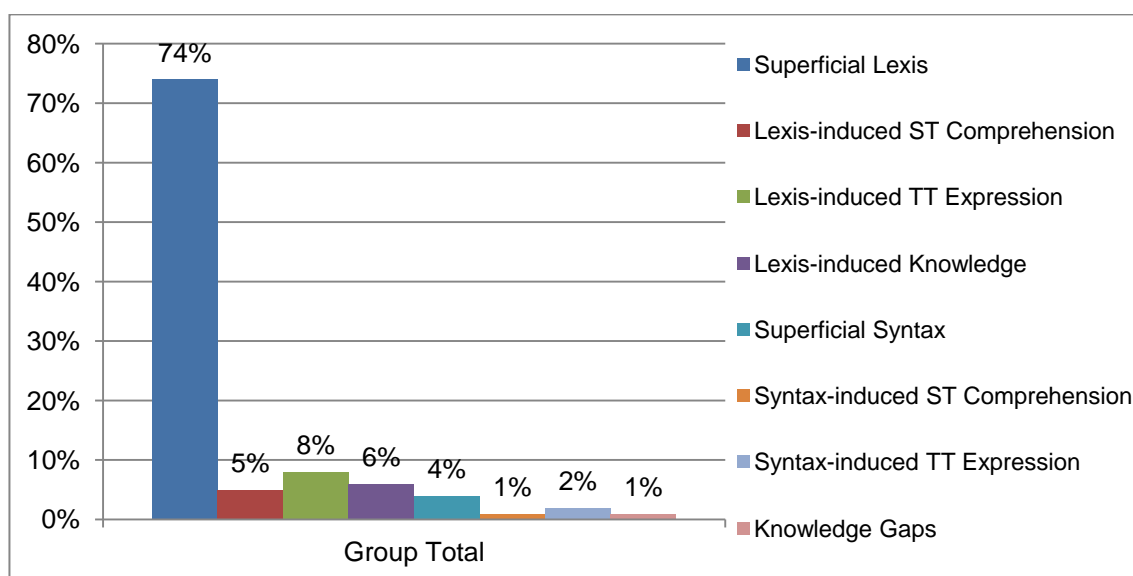
Figure 4-1 Frequencies of Translation Problems (Task 1)

Figure 4-2 shows the frequencies of translation problems in Task 2. These frequencies show that problems with superficial lexis (75%; SD: 8.91), lexis-induced ST comprehension (6%; SD: 2.01) and lexis-induced TT expression (16%; SD: 2.88) increase compared with Task 1. In contrast, problems with lexis-induced knowledge (1%; SD: 1.07), superficial syntax (1%; SD: 1.08), syntax-induced ST comprehension (0%; SD: 0.32), syntax-induced TT expression (0%; SD: 0.42) and knowledge gaps (0%; SD: 0) decrease. In other words, overall, there appear to be many more lexis-induced TT-expression problems in Task 2. The mean number of translation problems in Task 2 is 42.4.
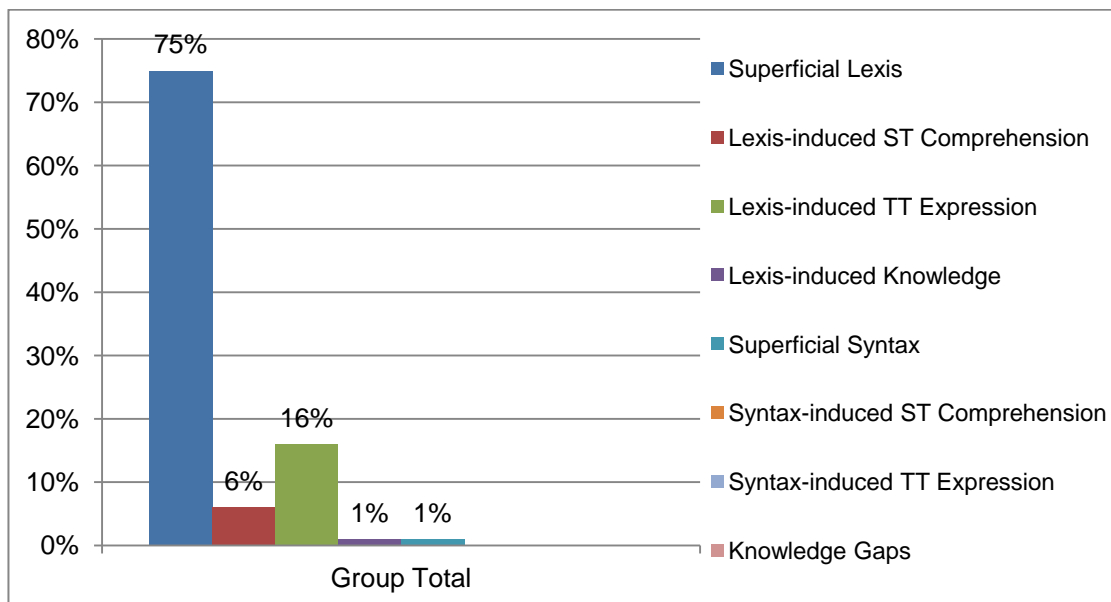
Figure 4-2 Frequencies of Translation Problems (Task 2)

Figure 4-3 shows the frequencies of translation problems in Task 3. The frequencies show that problems with superficial lexis (79%; SD: 7.90) and lexis-induced knowledge (4%; SD: 1.45) increase compared with Task 2, and problems with lexis-induced ST comprehension (6%; SD: 1.66) and knowledge gaps (0%; SD: 0) are the same. However, problems with lexis-induced TT expression (11%; SD: 2.39) and superficial syntax (0%; SD: 0.32) are fewer in number. In Task 3, no problems with syntax-induced ST comprehension (0%; SD: 0.32) and syntax-induced TT expression (0%; SD: 0) occur. Again, overall, similar to Task 2, there appear to be more lexis-induced TT-expression problems, apart from superficial lexical problems. The mean number of translation problems in Task 3 is 33.4.
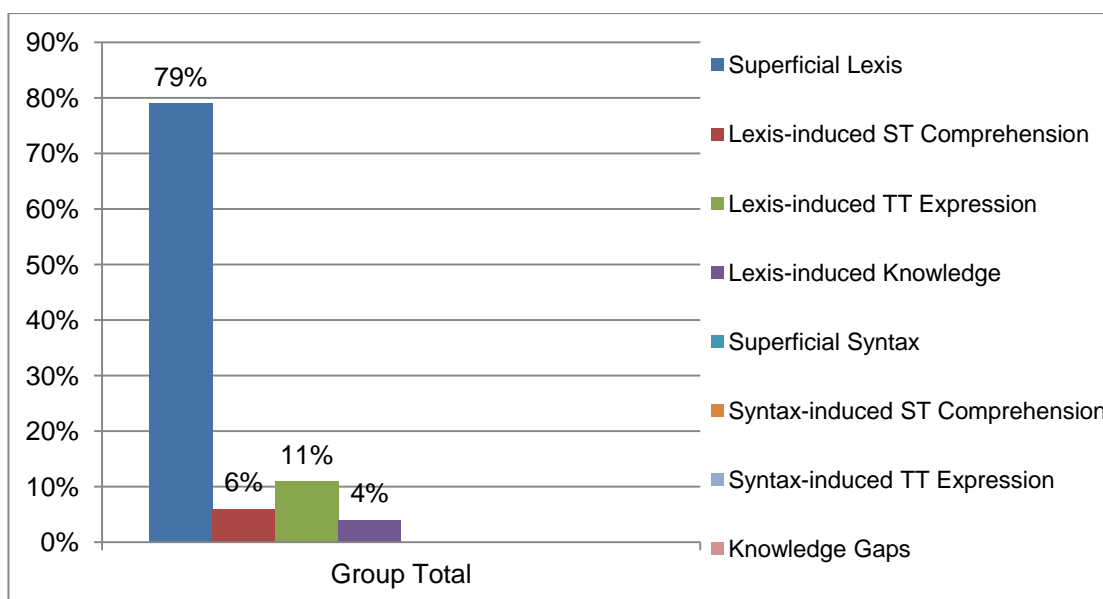
Figure 4-3 Frequencies of Translation Problems (Task 3)

To sum up, the above means of the students' translation problems increase from Task 1 to Task 2 and decrease in Task 3. The frequencies show that the students face most problems with superficial lexis, lexis-induced ST comprehension, lexis-induced TT expression and lexis-induced knowledge during the three tasks. Problems with superficial syntax, syntax-induced ST comprehension and syntax-induced TT expression occur most in Task 1 but gradually decrease from Task 2 to Task 3. Although knowledge gap problems are much less common than superficial lexical and syntactic problems, it is interesting to investigate how the students manage to solve this type of problem (see further Table 6-3, Chapter 6).

4.2.4 Problem-solving Strategies Involving the Use of External Resources

In order to solve the above translation problems mentioned in Section 4.2.3, the students consulted many external resources, including electronic dictionaries and web-based resources, such as online dictionaries, machine translators, search engines and various other websites. In the present study, I distinguish between online or electronic dictionaries and machine translators on the one hand and search engines and other web resources on the other to avoid potential confusion between types of external resources. *Online or electronic dictionaries and machine translators* are used for checking the meanings, definitions or translations of the ST words, terms, phrases or proper nouns. *Search engines and other web resources* are used for acquiring background knowledge about the topics of the ST and other information that online or electronic dictionaries and machine translators cannot provide. Table 4-23 shows the types of external resources (frequently) used by the students.

Table 4-23 Types of External Resources

Major Categories of External Resources	Types	Types of Individual Resources
Dictionaries (online and electronic)	Online	*Bing Dictionary* 必應詞典 (www.bing.com)
	Online	*Youdao Dictionary* 有道詞典 (www.youdao.com)
	Online	*ICIBA Dictionary* 愛詞霸詞典 (www.iciba.com)
	Online	*Lingoes Dictionary* 靈格斯詞典 (www.lingoes.com)
	Online	*Oxford Dictionaries* 牛津英英詞典 (www.oxforddictionaries.com)
	Electronic	*Casio* 卡西歐電子詞典 (Installed with other e-dictionaries such as *Oxford Advanced Dictionary*)
Machine Translators	Machine Translator	*Bing Translator* 必應機器翻譯 (www.bing.com/translator)
	Machine Translator	*Google Translate* 谷歌翻譯 (www.translate.google.com)
Search Engines	Search Engine	*Baidu* 百度 (www.baidu.com)
	Search Engine	*Google* 谷歌 (www.google.com)
	Search Engine	*Yahoo* 雅虎 (www.yahoo.com)
Online Encyclopedias	Online Encyclopedia	*Wikipedia* 維基百科 (www.wikipedia.org)
	Online Encyclopedia	*Baidu Baike* 百度百科 (baike.baidu.com)
Travel Websites	Travel Website (ST Website)	*Traveler's Digest* (www.travelersdigest.com)
	Travel Website	*TripAdvisor* 貓途鷹 (www.tripadvisor.com)
	Travel Website	*Booking* 繽客 (www.booking.com)
	Travel Website	*Qyer* 窮遊網 (www.qyer.com)
	Travel Website	*Mafengwo* 螞蜂窩 (www.mafengwo.cn)
	Travel Website	*CTrip* 攜程旅行網 (www.ctrip.com)
Online Images	Online Image	*Google Images* 谷歌圖片 (images.google.com)
Online Maps	Online Map	*Google Maps* 谷歌地圖 (maps.google.com)
Other web resources including online reference articles such as *Sina Blog* (blog.sina.com.cn) and non-travel websites such as *UNESCO* (www.unesco.org)		

As Table 4-23 shows, many (bilingual) online or electronic dictionaries such as the *Bing*, *Youdao*, *ICIBA*, *Lingoes* and *Casio* are used. Some students also use English-English dictionaries, such as the *Oxford Dictionaries*, which provides English definitions for English words, terms and phrases. Alternatively, the students use machine translators (e.g. the *Bing Translator* or *Google Translate*) to find the meanings or translations of words and proper nouns. If online or electronic dictionaries and machine translators fail to produce satisfactory results, the students turn to use search engines (e.g. *Baidu* or *Google*) in which they can access different types of web resources such as online encyclopedias (e.g. *Wikipedia* and *Baidu Baike*), travel websites (e.g. *TripAdvisor* and *Booking*), non-travel websites (e.g. *UNESCO*), online reference articles (e.g. *Sina Blog*), online images (e.g. *Google Images*) and online maps (e.g. *Google Maps*).

The students consult *Wikipedia* and *Baidu Baike* as major online encyclopedias, and they also provide parallel texts for the students to check background information and similar expressions for their TT (Shei 2010: 10). *Wikipedia* contains information in English, Chinese and other languages, while *Baidu Baike* provides information mainly in Chinese only. As for travel websites, the students visit *TripAdvisor*, *Booking* and *CTrip*, which offer information in both Chinese and English, and *Qyer* and *Mafengwo* which provide information in Chinese only. *Traveler's Digest* as the ST website, where the three STs of the present study are also checked, contains information in English only. In other words, the students use a wide variety of web resources both in English and in Chinese.

In the following, I will first report on the overall number of external resources used by the individual students in each of the three tasks, before the frequencies of use of the individual resources are presented quantitatively in Section 4.2.5.

Table 4-24 shows Alexandra's overall number of use of external resources in the three tasks. The number of use of online dictionaries and machine translators increases from Task 1 to Task 2 but decreases in Task 3. The number of use of search engines, travel websites and online reference articles increases from Task 1 to Task 3. The largest number of use of online images and online maps occurs in each of Task 2 and Task 3. In other words, the predominant resource used is online dictionaries. Interestingly, this is followed by machine translators.

Table 4-24 Alexandra's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	26	56	40
Electronic Dictionaries	0	0	0
Machine Translators	6	13	8
Search Engines	3	6	21
Online Encyclopedias	0	8	5
Travel Websites	1	2	9
ST Website	1	2	1
Non-travel Websites	0	0	0
Online Reference Articles	1	2	3
Online Images	0	5	1
Online Maps	0	0	4

Table 4-25 shows Nicole's overall number of use of external resources in the three tasks. The number of use of online dictionaries increases from Task 1 to Task 2 but decreases in Task 3, and the largest number of use of machine translators occurs in each of Task 1 and Task 3. The number of use of search engines and the ST website increases from Task 1 to Task 3. The number of use of online encyclopedias increases from Task 1 to Task 2, and the number of use of travel websites rises from Task 2 to Task 3. Like Alexandra, the largest number of Nicole's use of online images and online maps occurs in each of Task 2 and Task 3.

Table 4-25 Nicole's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	26	68	49
Electronic Dictionaries	0	0	0
Machine Translators	10	0	5
Search Engines	10	21	28
Online Encyclopedias	1	3	3
Travel Websites	2	2	15
ST Website	1	2	4
Non-travel Websites	0	0	1
Online Reference Articles	2	1	2
Online Images	0	3	1
Online Maps	0	1	1

Table 4-26 shows Summer's overall number of use of external resources in the three tasks. The number of use of online dictionaries decreases from Task 1 to Task 3, and the number of use of machine translators increases from Task 1 to Task 2 but reduces in Task 3. The number of use of search engines and travel websites increases from Task 1 to Task 3, and the number of use of online encyclopedias and online reference articles increases from Task 1 to Task 2 but decreases in Task 3. Similar to Alexandra and Nicole, the largest number of Summer's use of non-travel websites, online images and online maps occurs in each of Task 2 and Task 3.

Table 4-26 Summer's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	12	2	1
Electronic Dictionaries	0	0	0
Machine Translators	11	19	12
Search Engines	5	15	16
Online Encyclopedias	0	5	2
Travel Websites	0	1	7
ST Website	0	0	1
Non-travel Websites	0	2	2
Online Reference Articles	2	6	4
Online Images	0	1	1
Online Maps	0	0	3

Table 4-27 shows Hanna's overall number of use of external resources in the three tasks. The number of use of online dictionaries increases from Task 1 to Task 3, and the number of use of electronic dictionaries increases from Task 1 to Task 2 and then remains the same in Task 3. There are two uses of machine translators in Task 3. The number of use of search engines and travel websites increases from Task 1 to Task 3. The largest number of use of online encyclopedias, the ST website and online reference articles occurs in Task 1 but the number decreases in Task 2 and Task 3. In addition, online images are used once in each of Task 1 and Task 2, and online maps are used three times in Task 3.

Table 4-27 Hanna's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	1	3	7
Electronic Dictionaries	26	32	32
Machine Translators	0	0	2
Search Engines	5	14	21
Online Encyclopedias	13	3	7
Travel Websites	3	3	11
ST Website	3	0	1
Non-travel Websites	0	0	0
Online Reference Articles	3	2	0
Online Images	1	1	0
Online Maps	0	0	3

Table 4-28 shows Una's overall number of use of external resources in the three tasks. The number of use of online dictionaries and machine translators increases from Task 1 to Task 3, but unlike Hanna, the number of Una's use of electronic dictionaries decreases from Task 1 to Task 3. The number of use of search engines and online encyclopedias increases from Task 1 to Task 3. Additionally, travel websites are used once in Task 3, and online images are used once in Task 2.

Table 4-28 Una's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	6	40	45
Electronic Dictionaries	23	7	0
Machine Translators	0	2	4
Search Engines	0	1	6
Online Encyclopedias	0	1	4
Travel Websites	0	0	1
ST Website	0	0	0
Non-travel Websites	0	0	0
Online Reference Articles	0	0	0
Online Images	0	1	0
Online Maps	0	0	0

Table 4-29 shows Rebecca's overall number of use of external resources in the three tasks. The number of use of online dictionaries increases from Task 1 to Task 2 but slightly decreases in Task 3. There are three uses of machine translators in Task 3. The number of use of search engines, travel websites, and the ST website increases from Task 1 to Task 3. The number of use of online encyclopedias decreases from Task 1 to Task 2 but rebounds in Task 3. Online images are used once in Task 2, and online maps are used seven times in Task 3.

Table 4-29 Rebecca's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	21	40	37
Electronic Dictionaries	0	0	0
Machine Translators	0	0	3
Search Engines	3	6	9
Online Encyclopedias	4	1	7
Travel Websites	0	2	5
ST Website	0	1	2
Non-travel Websites	0	0	0
Online Reference Articles	0	0	0
Online Images	0	1	0
Online Maps	0	0	7

Table 4-30 shows Isaac's overall number of use of external resources in the three tasks. The number of use of online dictionaries increases from Task 1 to Task 2 but slightly reduces in Task 3, and the number of use of machine translators increases from Task 1 to Task 3. The number of use of search engines slightly decreases from Task 1 to Task 2 but surges in Task 3. The number of use of travel websites increases from Task 1 to Task 3. In addition, online encyclopedias are used three times in each of Task 1 and Task 3. Online reference articles are used twice in Task 3, and online images are used once in Task 1.

Table 4-30 Isaac's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	21	30	28
Electronic Dictionaries	0	0	0
Machine Translators	0	1	4
Search Engines	9	8	17
Online Encyclopedias	3	0	3
Travel Websites	1	2	5
ST Website	0	0	0
Non-travel Websites	0	0	0
Online Reference Articles	0	0	2
Online Images	1	0	0
Online Maps	0	0	0

Table 4-31 shows Bonnie's overall number of use of external resources in the three tasks. Like Isaac, the number of Bonnie's use of online dictionaries increases from Task 1 to Task 2 but decreases in Task 3, and the number of her use of machine translators also increases from Task 1 to Task 3. The number of use of search engines and travel websites increases from Task 1 to Task 3. Additionally, online encyclopedias are used twice in each of Task 1 and Task 2, and there are six uses of non-travel websites in Task 3. The largest number of use of online images and online maps occurs in each of Task 2 and Task 3.

Table 4-31 Bonnie's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	18	54	23
Electronic Dictionaries	0	0	0
Machine Translators	0	1	4
Search Engines	4	32	36
Online Encyclopedias	2	2	0
Travel Websites	1	1	10
ST Website	0	0	0
Non-travel Websites	0	0	6
Online Reference Articles	0	0	1
Online Images	0	2	1
Online Maps	0	0	1

Table 4-32 shows Joy's overall number of use of external resources in the three tasks. The number of use of online dictionaries and machine translators increases from Task 1 to Task 3. The number of use of search engines, online encyclopedias and travel websites also increases from Task 1 to Task 3. Non-travel websites and the ST website are used twice in each of Task 1 and Task 2 respectively, and the largest number of use of online reference articles occurs in each of Task 2 and Task 3. In addition, like Bonnie, online images are used twice by Joy in Task 2.

Table 4-32 Joy's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	21	49	58
Electronic Dictionaries	0	0	0
Machine Translators	0	2	4
Search Engines	9	12	18
Online Encyclopedias	4	6	11
Travel Websites	0	1	2
ST Website	0	2	0
Non-travel Websites	2	0	0
Online Reference Articles	0	2	1
Online Images	0	2	0
Online Maps	0	0	0

Table 4-33 shows Jessie's overall number of use of external resources in the three tasks. The number of use of online dictionaries increases from Task 1 to Task 2 but reduces in Task 3, and the number of use of machine translators increases from Task 1 to Task 3. The number of use of search engines and travel websites decreases from Task 1 to Task 2 but increases in Task 3. Like Joy, the number of Jessie's use of online encyclopedias rises from Task 1 to Task 3. In addition, online images and online reference articles are used once in each of Task 1 and Task 3 respectively.

Table 4-33 Jessie's Use of External Resources (3 Tasks)

Types of External Resources	Task 1	Task 2	Task 3
Online Dictionaries	19	40	23
Electronic Dictionaries	0	0	0
Machine Translators	0	4	5
Search Engines	3	2	5
Online Encyclopedias	5	7	9
Travel Websites	2	0	7
ST Website	0	0	0
Non-travel Websites	0	0	0
Online Reference Articles	0	0	1
Online Images	1	0	0
Online Maps	0	0	0

4.2.5 Varieties of Use of External Resources

Section 4.2.4 presented the overall number of external resources used by the ten students in the three tasks. This section reports on the frequencies of use of external resources during the three tasks. I will present these quantitative data (including the means and SDs) following the chronological order of the tasks.

Figure 4-4 shows the frequencies of use of external resources in Task 1. The frequencies show that the students use online dictionaries most frequently (48%; SD: 8.28), followed by (portable) electronic dictionaries (14%; SD: 10.35), search engines (14%; SD: 3.25), online encyclopedias (9%; SD: 3.78), machine translators (8%; SD: 4.52), travel websites (3%; SD: 1.05), online reference articles (2%; SD: 1.14), the ST website (1%; SD: 0.97), non-travel websites (1%; SD: 0.63) and online images (1%; SD: 0.48). The mean of external resource use in Task 1 is 36.
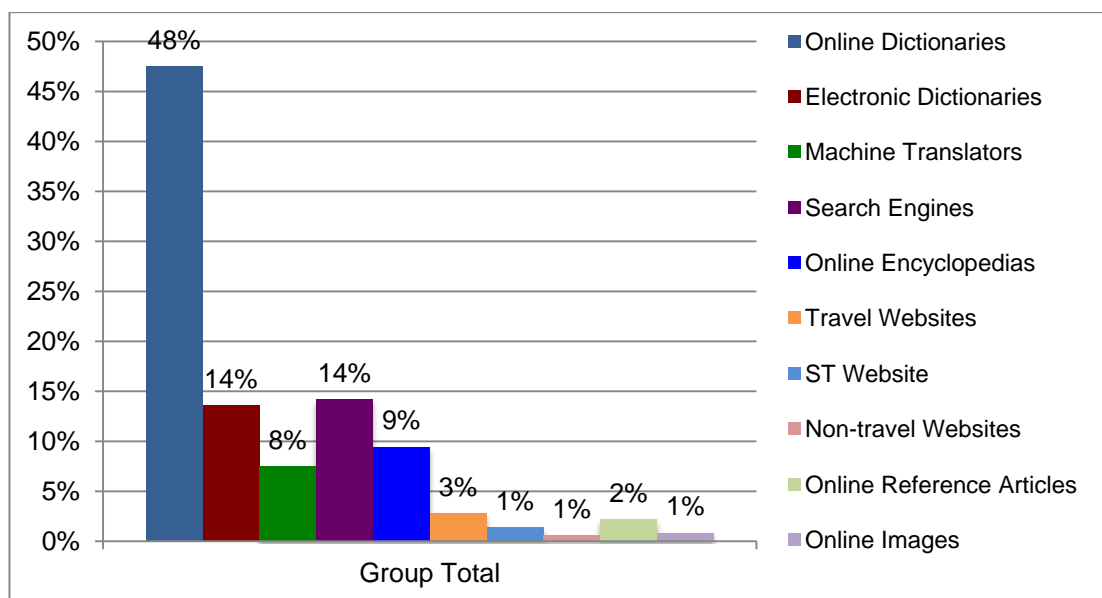
Figure 4-4 Frequencies of Use of External Resources (Task 1)

Figure 4-5 shows the frequencies of use of external resources in Task 2. Compared with Task 1, the frequencies with which the students use online dictionaries (57%; SD: 21.60), search engines (18%; SD: 9.44) and online images (2%; SD: 1.51) increase, but the frequencies of use of (portable) electronic dictionaries (6%; SD: 10.12), machine translators (6%; SD: 6.56), online encyclopedias (5%; SD: 2.76), travel websites (2%; SD: 0.97) and non-travel websites (0%; SD: 0.63) decrease. The frequencies of use of the ST website (1%; SD: 0.95) and online reference articles (2%; SD: 1.89) remain the same. The mean of external resource use in Task 2 is 66.8.
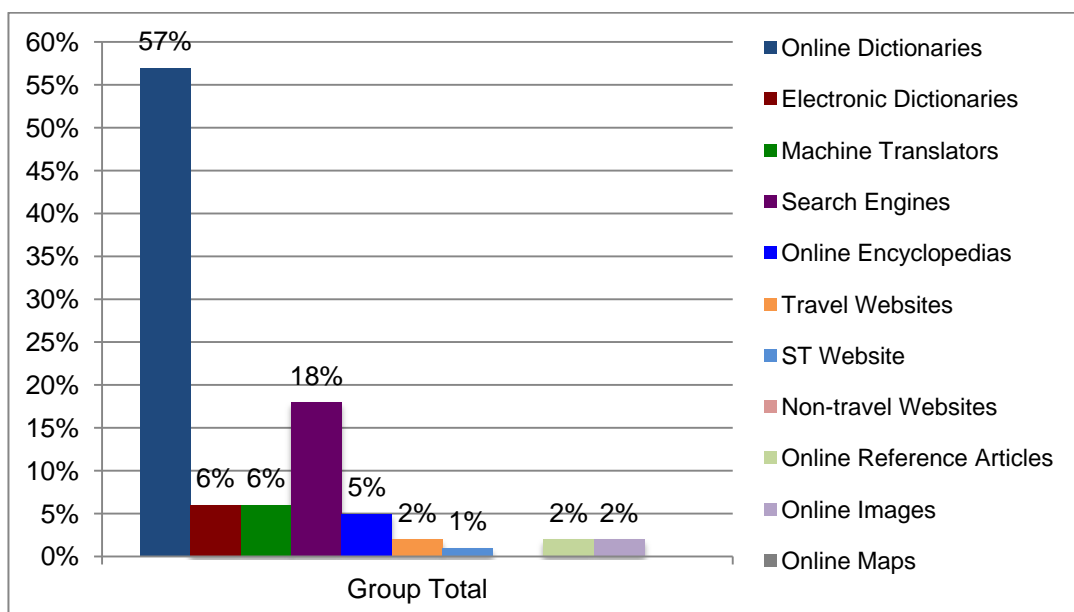
Figure 4-5 Frequencies of Use of External Resources (Task 2)

Figure 4-6 shows the frequencies of use of external resources in Task 3. Compared with Task 2, the frequencies with which the students use online dictionaries (42%; SD: 18.19), (portable) electronic dictionaries (4%; SD: 10.12) and online images (1%; SD: 0.52) decrease, but the frequencies of use of search engines (24%; SD: 9.66), online encyclopedias (7%; SD: 3.38), travel websites (10%; SD: 4.24), non-travel websites (1%; SD: 1.91) and online maps (3%; SD: 2.33) increase. The frequencies of use of machine translators (6%; SD: 3.30), the ST website (1%; SD: 1.29) and online reference articles (2%; SD: 1.35) remain the same. The mean of external resource use in Task 3 is 74.5.
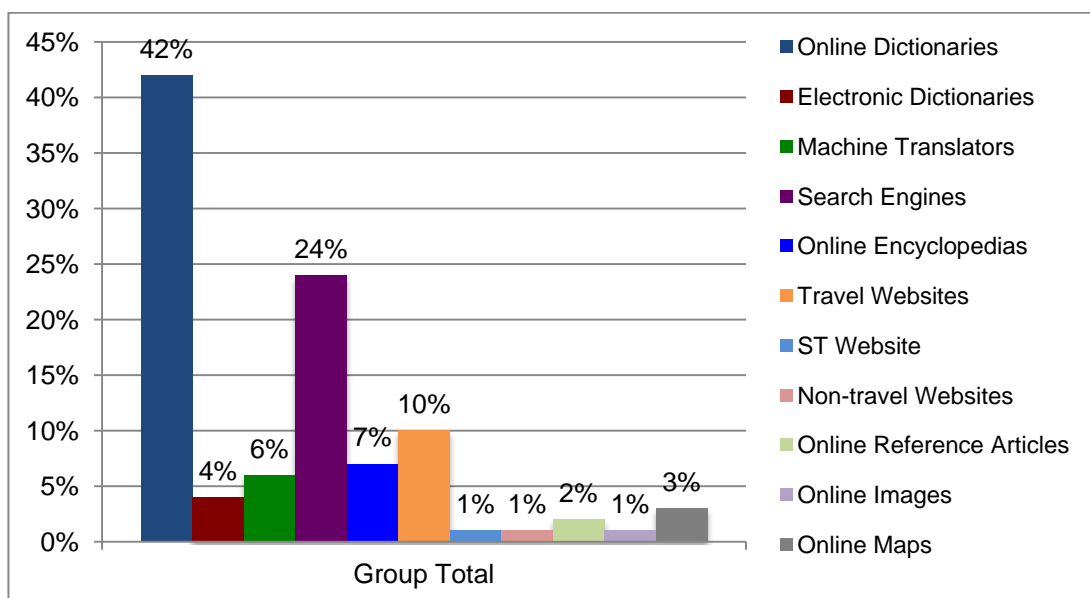
Figure 4-6 Frequencies of Use of External Resources (Task 3)

In summary, the above means of the students' external resource use sharply increase from Task 1 to Task 2 but gradually from Task 2 to Task 3. The frequencies show that the students use online dictionaries most frequently throughout the three tasks. The frequencies of use of electronic dictionaries and machine translators gradually decrease from Task 1 to Task 3, but the frequencies of use of search engines gradually increase from Task 1 to Task 3. The frequencies with which the students consult online encyclopedias, travel websites and non-travel websites also increase marginally. The frequencies with which the students check online images slightly increase from Task 1 to Task 2 and drop in Task 3, but the frequencies with which they browse online maps increase in Task 3 compared with the previous tasks. These figures demonstrate an overall picture of the use of external resources, not the details of how and why such resources are used. The latter will be presented in Section 4.2.6.

4.2.6 Types of Cross-checks of External Resources

Section 4.2.5 presented the varieties of use of external resources by the ten students during the three tasks. Similar to Zheng's finding (2014) that his subjects displayed an investigative attitude towards consultation sources with reverse lookups, the students in the present study cross-check dictionaries and other types of web resources in order to make more reliable decisions about how to solve their translation problems. Table 4-34 shows the types of cross-checks of external resources made by the students.

Table 4-34 Types of Cross-checks of External Resources

Major External Resources	Types of Cross-checks of Individual Resources
Dictionaries (online or electronic), Machine Translators, Search Engines and Other Web Resources	Dictionaries (Dics) + Machine Translators (MTs)
	Dics + Search Engines (SEs)
	MTs + SEs
	Dics + Online Encyclopedias (OEs)/Online Reference Articles (ORAs)
	MTs + OEs/ORAs
	SEs + OEs/ORAs/ST/Travel/Non-travel Websites
	OEs/ORAs + ST/Travel/Non-travel Websites
	Dics/SEs/OEs/ORAs + Online Images (OIs)
	Dics/MTs/SEs/OEs/ORAs + Online Maps (OMs)

Table 4-34 shows that the students cross-check online or electronic dictionaries, machine translators and search engines with different web-based resources such as online encyclopedias, online reference articles, travel websites, online images and online maps to solve their superficial lexical and lexis-induced problems. In other words, the students tend to use external resources, such as online or electronic dictionaries and/or MTs initially to locate the meaning or the TT equivalent of an ST lexis. After an initial or provisional translation solution is obtained, they then go on to use other types of web resources to check and confirm the reliability of their initial solution. More details about the ways of cross-checking external resources will be discussed in Chapter 6.

CHAPTER 5

CUE-BASED RETROSPECTIVE INTERVIEW RESULTS

5.0 Preamble

This chapter presents cue-based retrospective interview results from the three translation tasks. **Section 5.1** explains how the interview data were analysed based on a hybrid model of 'grounded theory' and 'responsive interviewing'. **Section 5.2** reports on the individual students' interview answers following the chronological order of the tasks, including their reflection on translation problems and solutions (Section 5.2.1), their self-evaluation of translation performance and the two professional translators' assessment results of the students' translation products (Section 5.2.2) as well as their personal comments on and reasons for self-evaluated translation performance in the three translation tasks (Section 5.2.3).

5.1 Data Analysis

The traditional approach of grounded theory to analysing qualitative data requires a great amount of coding to secure rich results (Charmaz 2001). Hence, Rubin and Rubin (2005: 223) propose a hybrid model composed of 'grounded theory' and 'responsive interviewing'. In this model, the researchers do not have to code each passage of interviewees' answers but choose only those concepts or themes that are most relevant to their research questions. I adopted Rubin and Rubin's model to analyse the interview data more efficiently by listening to the individual students' interview recordings, adding more notes and then summarising their key answers based on the three themes mentioned in Section 3.3, Chapter 3.

5.2 Results

5.2.1 Students' Reflection on Translation Problems and Solutions

This section related to the Question (1) to (4) reports on the individual students' reflection on their translation problems and solutions following the chronological order of the tasks. I will present the individual students' interview answers in the following tables showing the triggers of translation problems, actual ST segments (words, terms, proper nouns, phrases, sentences and paragraphs) and solutions. Then, I will identify the patterns in the students' problem-solving behaviours.

5.2.1.1 Alexandra's Reflection

Table 5-1 shows Alexandra's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-1 Alexandra's Reflection

	Triggers of Translation Problems	Actual ST Segments	Solutions
Task 1	Lexis-induced ST Comprehension	the golden-era of Thebes, as Luxor was then known	*Bing Translator*
	Syntax-induced ST Comprehension	The longest river in the world, a small patch of greenery lines the shores of the River Nile.	Segmentation
	Lexis-induced Knowledge	Amon Ra	*Baidu* and *Sina Blog*
Task 2	Lexis-induced ST Comprehension	walled medina	Online Images (OIs)
	Lexis-induced ST Comprehension	covered street market	OIs
	Lexis-induced TT Expression	the Jemaa el-Fnaa Square	*Bing Dictionary*, *Bing Translator*, *Baidu Baike*, *Google* and *TripAdvisor*
	Superficial Lexis	riad	OIs
	Superficial Syntax	the first paragraph	Segmentation
Task 3	Lexis-induced TT Expression	Myrtle Beach	*Bing Dictionary*, *Sina Blog* and *Wikipedia*
	Lexis-induced TT Expression	Little River	*Google Maps*
	Lexis-induced TT Expression	pack an outsized punch	*ICIBA Dictionary* and *NPR News*
	Lexis-induced ST Comprehension	dichotomy	*Bing Dictionary*

In Task 1, Alexandra reflected on her overall solutions but felt dissatisfied with them because according to her, some TT expressions were rather confusing and not colloquial enough. Although Alexandra faced an ST-comprehension problem with the relationship between Thebes and Luxor, she entered part of the sentence, 'the golden-era of Thebes, as Luxor was then known', into the *Bing Translator* and realised that Thebes and Luxor are the same name used in different times. She also found that the *Bing Translator* concluded some ways of the expression for 'the golden-era of

Thebes, as Luxor was then known' and regarded machine translations as one of the best ways for her to solve her problems related to comprehension.

In Task 2, Alexandra reflected on her overall solutions and particularly felt satisfied with the online images she checked. Because the online images were consistent with the description of the ST proper nouns, Alexandra claimed that they were very helpful for her translation, but she reported that she failed to find other useful online images to understand 'covered street market' (see further the discussion of Table 6-4, Chapter 6).

In Task 3, Alexandra reflected on her overall solutions and mostly felt satisfied with translating Little River by checking *Google Maps* and *Baidu Baike*. She reported that since this tourism text provides more information about the directions of some locations, she looked for their translations in *Google Maps* to make herself clear about these locations. Hence, Alexandra claimed that *Google Maps* were very helpful for her translation (see further the discussion of Table 6-5, Chapter 6).

In summary, Alexandra used the *Bing Translator* to solve a lexis-induced ST-comprehension problem in Task 1. In Task 2, she checked more online images to solve her lexis-induced ST-comprehension problems. In Task 3, she cross-checked online dictionaries with different web resources, *Google Maps* in particular, to solve her lexis-induced TT-expression problems.

5.2.1.2 Nicole's Reflection

Table 5-2 shows Nicole's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-2 Nicole's Reflection

	Triggers of Translation Problems	**Actual ST Segments**	**Solutions**
Task 1	Superficial Lexis	greenery lines	*WordReference Dictionary* and *Baidu*
	Lexis-induced Knowledge	the golden-era of Thebes, as Luxor was then known	*Baidu* and *Mafengwo*
	Lexis-induced Knowledge	Amon Ra	*Baidu*
Task 2	Lexis-induced TT Expression	guest house	*Youdao Dictionary*
	Lexis-induced TT Expression	plunge pools	*Baidu Images*
	Lexis-induced Knowledge	the El Badi Palace	*Baidu* and *Sina Blog*
Task 3	Superficial Lexis	the Grand Strand	*Baidu*, *Youdao Dictionary*, *Booking* and *Wikipedia*
	Superficial Lexis	the Brunswick Plantation and Golf Resort	*Baidu* and *Booking*
	Lexis-induced TT Expression	pack an outsized punch	*Youdao Dictionary*
	Lexis-induced ST Comprehension	condos and beach homes	OIs

In Task 1, Nicole reflected on her overall solutions and generally felt satisfied with them because she found relevant online information to solve her lexis-induced knowledge problems, but she experienced some difficulty in checking for background knowledge about Amon Ra in the entries of *Baidu* and reported that very limited information of *Baidu* could be used for translation. She also felt dissatisfied with resorting to her personal knowledge to translate 'greenery lines' (see further the discussion of Table 6-1, Chapter 6). Nicole reported that she needed to use different web resources because she usually prioritised *Baidu*, *Wikipedia* and *Google*. As for the credibility of online information, Nicole believed that travel websites with tourism-related terms are more reliable for word choices of the TT, and she would consider checking similar websites when translating a tourism text in the future.

In Task 2, Nicole reflected on her overall solutions but felt unsure of their success because she was uncertain of some TT expressions. She claimed that e-text information (e.g. tourism articles) was insufficient for her translation but the online images were more reliable than those tourism articles.

In Task 3, Nicole reflected on her overall solutions and felt satisfied with her solutions to translating most location names because she claimed that their translations and relevant information could be found on the web. However, she failed to find the online images of 'condos' and 'beach homes' when she attempted to understand their appearances before translating.

In summary, Nicole mainly checked the information of *Baidu* to solve her superficial lexical and lexis-induced knowledge problems in Task 1. In Task 2, she checked the *Youdao Dictionary* and *Baidu Images* to solve her lexis-induced TT-expression problems. In Task 3, she cross-checked the information of *Baidu* with the *Youdao Dictionary* and *Booking* to solve her superficial lexical problems.

5.2.1.3 Summer's Reflection

Table 5-3 shows Summer's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-3 Summer's Reflection

	Triggers of Translation Problems	Actual ST Segments	Solutions
Task 1	Lexis-induced TT Expression	payoff	*Lingoes Dictionary*
	Syntax-induced TT Expression	The official burial site of the Egyptian pharaohs for over 500 years, elaborate underground burial chambers that were constructed to safeguard the mummified remains of the kings of Egypt line the valley.	Sentence Restructuring
Task 2	Lexis-induced TT Expression	the Jemaa el-Fnaa Square	*Google Translate*, *Google*, *Wikipedia*, *Baidu* and *UNESCO*
	Superficial Lexis	riad	*Google Translate*, *Google*, *Baidu*, *Wikipedia* and *Sina Blog*
Task 3	Superficial Lexis	Myrtle Beach	*Baidu*, *TripAdvisor* and *Booking*
	Superficial Lexis	the Grand Strand	*Baidu*, *Google*, *Wikipedia* and *Sina Blog*
	Superficial Lexis	Little River	*Baidu*, *Booking* and Online Maps (OMs)

In Task 1, Summer reflected on her overall solutions and generally felt satisfied with them because she made her TT natural and attractive to the target readers. Summer reported that she checked some names of scenic spots and historical terms on the web to confirm whether they were translated in a normal way. She also claimed that cultural knowledge was not a major problem for her.

In Task 2, Summer reflected on her overall solutions and generally felt satisfied with them, particularly using the omission strategy to delete some unimportant ST information for a natural TT. Although Summer did not experience difficulty in searching for online information, it was difficult for her to choose the translations of some terms and proper nouns from excessive information. Summer also claimed that although she checked some information on the *UNESCO* website, very little was useful for her translation, but she still gave more credits to the *UNESCO* website than travel websites for translating proper nouns.

In Task 3, Summer reflected on her overall solutions and particularly felt satisfied with her creative translation for the expressions of some phrases and sentences, but she claimed that her creative translation was sometimes unfaithful to the ST. Summer also reported that she combined the information of *Baidu* and *Google* to check the Chinese translations of the location names, but she felt that the Chinese translations in online maps were less correct.

In summary, Summer mainly checked the *Lingoes Dictionary* to solve a lexis-induced TT-expression problem in Task 1. In Task 2, she cross-checked different information from *Google* and *Baidu*, the *UNESCO* website in particular, to solve her superficial lexical and lexis-induced TT-expression problems. In Task 3, she also cross-checked different information from *Baidu* and *Google* to solve her superficial lexical problems.

5.2.1.4 Hanna's Reflection

Table 5-4 shows Hanna's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-4 Hanna's Reflection

	Triggers of Translation Problems	**Actual ST Segments**	**Solutions**
Task 1	Syntax-induced TT Expression	A small patch of greenery lines the shores of the River Nile.	*Casio Electronic Dictionary*
	Lexis-induced TT Expression	line the valley	*Wikipedia*
	Lexis-induced ST Comprehension	curry	*Casio Electronic Dictionary* and *Sintu Travel*
Task 2	Lexis-induced ST Comprehension	covered street market	*Wikipedia* and *Google Images*
	Lexis-induced ST Comprehension and TT Expression	intense experience	*Casio Electronic Dictionary* and *Youdao Dictionary*
Task 3	Superficial Lexis	the Grand Strand	*Wikipedia*, *TripAdvisor* and OMs
	Lexis-induced ST Comprehension and TT Expression	dichotomy	*Casio Electronic Dictionary* and *Youdao Dictionary*

In Task 1, Hanna reflected on her overall solutions but felt dissatisfied with them because she spent much time looking for solutions that were not really successful. Hanna reported that she checked *Wikipedia* mostly for relevant background knowledge before translating. Although much online information was found, Hanna felt that very little could be used for translation. She also reported that she went too far online while searching for the Chinese translation of Amon Ra. Hanna reported that changing sentence order for a fluent TT was her best solution and she would have improved the expression for 'greenery' (see further the discussion of Table 6-1, Chapter 6) if she had spent more time on this task.

In Task 2, Hanna reflected on her overall solutions and felt satisfied with the solutions to translating 'covered street market' (souk) because she checked *Google Images* and made her translation faithful and distinguishable from general markets. She also claimed that since she had been to Marrakech and the ST information mostly coincided with her memories, her personal experience was helpful for translating 'covered street market' (see further the discussion of Table 6-4, Chapter 6).

In Task 3, Hanna reflected on her overall solutions and felt satisfied with the solutions to translating the Grand Strand. She reported that she checked the Chinese translation of the Grand Strand in an online map of a travel website (*Mafengwo*) and felt that her translation should be acceptable because she might not come up with a better solution after a few hours. Hanna also claimed that she did not experience difficulty in searching for the Chinese translations of most location names.

In summary, Hanna mainly checked the *Casio Electronic Dictionary* and *Wikipedia* to solve her lexis-induced ST-comprehension, lexis-induced TT-expression and lexis-induced knowledge problems in Task 1. In Task 2, she cross-checked *Wikipedia* with *Google Images* to solve a lexis-induced ST-comprehension problem. In Task 3, she cross-checked *Wikipedia* with *TripAdvisor* and an online map of *Mafengwo* to solve a superficial lexical problem.

5.2.1.5 Una's Reflection

Table 5-5 shows Una's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-5 Una's Reflection

	Triggers of Translation Problems	**Actual ST Segments**	**Solutions**
Task 1	Lexis-induced ST Comprehension and TT Expression	curry favor upon	*Casio Electronic Dictionary*
	Lexis-induced TT Expression	payoff	*Casio Electronic Dictionary*
	Syntax-induced ST Comprehension	The longest river in the world, a small patch of greenery lines the shores of the River Nile.	Reformulation
Task 2	Lexis-induced TT Expression	riad	*Youdao Dictionary*
	Lexis-induced ST Comprehension	collection of ruins	*Wikipedia*
	Lexis-induced Knowledge	the El Badi Palace	*Baidu* and *Wikipedia*
Task 3	Lexis-induced TT Expression	dichotomy	*Youdao Dictionary*
	Superficial Lexis	Little River	*Wikipedia*
	Lexis-induced TT Expression	Myrtle Beach	*Bing Dictionary*, *Wikipedia* and *Baidu Baike*

In Task 1, Una reflected on her overall solutions and generally felt satisfied with them, particularly using the reformulation technique to solve a syntax-induced ST-comprehension problem (see further the discussion of Table 6-1, Chapter 6). However, she felt dissatisfied with the expressions for 'curry' and 'payoff'. Although Una knew the meanings of the two words, she had difficulty in expressing them in a formal way. She also claimed that she would have produced a better translation of 'curry favor upon her death' if she had known more about the relationship between Amon Ra and Queen Hatshepsut (see further the discussion of Table 6-2, Chapter 6).

In Task 2, Una reflected on her overall solutions and felt satisfied with them, but she felt that online information was less helpful for translation because very limited information about the El Badi Palace and its translation could be found in *Baidu* and *Wikipedia*. Nevertheless, she claimed that she did her best to find the translations of some proper nouns by referring to few online results. Una also claimed that she would need to read more online articles to solve her ST-comprehension problems.

In Task 3, Una reflected on her overall solutions and felt particularly satisfied with the use of free translation because this technique made her TT acceptable to the target readers, but she felt dissatisfied with the use of literal translation for some TT expressions. Una also claimed that she improved ST comprehension by checking for Little River, but she still had difficulty in translating this location name because very few Chinese online articles provided its translation (see further the discussion of Table 6-5, Chapter 6).

In summary, Una mainly checked the *Casio Electronic Dictionary* to solve her superficial lexical, lexis-induced ST-comprehension and lexis-induced TT-expression problems in Task 1. In Task 2, she checked *Wikipedia* to solve a lexis-induced ST-comprehension problem. In Task 3, she cross-checked the *Bing Dictionary* with *Wikipedia* and *Baidu Baike* to solve a lexis-induced TT-expression problem.

5.2.1.6 Rebecca's Reflection

Table 5-6 shows Rebecca's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-6 Rebecca's Reflection

	Triggers of Translation Problems	Actual ST Segments	Solutions
Task 1	Lexis-induced TT Expression	line the valley	*Youdao Dictionary*
	Superficial Lexis and Lexis-induced TT Expression	the Avenue of Sphinxes, the Valley of the Kings, the Mortuary Temple of Hatshepsut, and Amon Ra	*Youdao Dictionary*, *Baidu*, *Google* and *Wikipedia*
Task 2	Lexis-induced TT Expression	riad	*Youdao Dictionary*, *Google* and *Wikipedia*
	Lexis-induced TT Expression	unassuming door, special offering, and well-traveled	*Youdao Dictionary*
	Superficial Lexis and Lexis-induced TT Expression	medina and impressive collection of ruins	*Youdao Dictionary* and *Mafengwo*
Task 3	Lexis-induced TT Expression	Myrtle Beach	*Youdao Dictionary*, *Google*, *Wikipedia* and *Qyer*
	Lexis-induced ST Comprehension	pack an outsized punch	*Youdao Dictionary* and *Baidu*
	Superficial Lexis	the Grand Strand, Little River, and the Brunswick Plantation and Golf Resort	*Wikipedia*, *Booking*, *Qyer* and *Google Maps*

In Task 1, Rebecca reflected on her overall solutions and generally felt satisfied with them because she checked the information of *Baidu*, *Google* and *Wikipedia* to confirm the correct translations of some proper nouns, and it was not difficult for her to find the translations and relevant information of these proper nouns. Rebecca also claimed that she preferred parallel texts to other online information because reading parallel texts was more time-saving and reduced the risk of being misled by various pieces of online information. However, she felt dissatisfied with some Chinese

expressions in the TT and claimed that she needed to learn translation strategies in the long term.

In Task 2, Rebecca reflected on her overall solutions but felt dissatisfied with them because they were not very successful. She claimed that she would have come up with better solutions if she had spent more time on this task. Rebecca also reported that she mainly checked for the tourist attractions of Morocco in *Mafengwo*, and the example sentences in the *Youdao Dictionary* were helpful for TT expressions.

In Task 3, Rebecca reflected on her overall solutions and generally felt satisfied with them. She reported that because it was the third translation task she had done, she did not waste much time on the first draft for TT expressions. Rebecca also reported that she checked not only online dictionaries but also *Google Maps* and travel websites (*Booking* and *Qyer*) for the translations of some location names. If she failed to find the existing translations in *Booking* and *Qyer*, she turned to *Google Maps* as the last resort because she often checked *Google Maps* for Chinese locations in real life (see further the discussion of Table 6-5, Chapter 6).

In summary, Rebecca mainly cross-checked the *Youdao Dictionary* with *Wikipedia* to solve her superficial lexical and lexis-induced TT-expression problems in Task 1. In Task 2, she checked *Mafengwo* to solve a lexis-induced TT-expression problem. In Task 3, Rebecca cross-checked *Google Maps* with travel websites to solve her superficial lexical problems.

5.2.1.7 Isaac's Reflection

Table 5-7 shows Isaac's reflection on the triggers of his translation problems, actual ST segments and solutions.

Table 5-7 Isaac's Reflection

	Triggers of Translation Problems	Actual ST Segments	Solutions
Task 1	Lexis-induced ST Comprehension	greenery lines	*Youdao Dictionary*
	Lexis-induced TT Expression	elaborate underground burial chambers	*Youdao Dictionary*
	Lexis-induced TT Expression	the Mortuary Temple of Hatshepsut	*Youdao Dictionary* and *Baidu*
Task 2	Lexis-induced TT Expression	impressive collection of ruins	*Baidu*
	Lexis-induced TT Expression	riad	*Youdao Dictionary*
Task 3	Lexis-induced TT Expression	Little River	*Youdao Dictionary* and *CTrip*
	Superficial Lexis	Georgetown	*Baidu*
	Lexis-induced TT Expression	spend time	*Youdao Dictionary* and *Baidu*

In Task 1, Isaac reflected on his overall solutions but reported that it was difficult for him to evaluate their success, but he believed that the target readers would accept his TT because he made it natural with appealing words and expressions, which also achieved the objective of the translation brief. Isaac also reported that he used *Baidu* to check the correct expression for the Mortuary Temple of Hatshepsut and refined the unnatural expression for 'female ruler' after reading about Queen Hatshepsut in the information provided by *Baidu*.

In Task 2, Isaac reflected on his overall solutions but felt dissatisfied with the solutions to translating 'impressive collection of ruins' because his translation was slightly shifted from the ST meaning. Although Isaac looked for the collocation in the entries of *Baidu* and found some proper expressions, he still experienced difficulty in expressing 'impressive collection of ruins'. Nevertheless, he felt satisfied with the solutions to translating 'riad' but claimed that he should have done more online research on this term.

In Task 3, Isaac reflected on his overall solutions and felt satisfied with the solutions to translating the proper nouns, particularly combining the pronunciation and meaning to translate Little River and Georgetown. He even justified the strategy of combining both pronunciation and meaning for translating any proper nouns without existing translations (see further the discussion of Table 6-5, Chapter 6). Isaac also claimed that because there was much online information, he spent some time reading the ST and other authoritative websites to judge the credibility of different pieces of online information.

In summary, during the three tasks, Isaac mainly checked the *Youdao Dictionary* and the information of *Baidu* to solve his superficial lexical, lexis-induced ST-comprehension and lexis-induced TT-expression problems.

5.2.1.8 Bonnie's Reflection

Table 5-8 shows Bonnie's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-8 Bonnie's Reflection

	Triggers of Translation Problems	Actual ST Segments	Solutions
Task 1	Lexis-induced ST Comprehension	quite the contrast	Changing the ST segment into an adjective
	Lexis-induced ST Comprehension	curry	*ICIBA Dictionary*
	Lexis-induced TT Expression	payoff	Translating the ST segment into a sentence
	Knowledge Gaps	Luxor	*Baidu Baike*
Task 2	Lexis-induced ST Comprehension	souk	*ICIBA Dictionary* and *Google Images*
	Lexis-induced ST Comprehension	medina	*ICIBA Dictionary*, *Google*, *Oxford Dictionaries* and *CTrip*
Task 3	Lexis-induced TT Expression	dichotomy	*ICIBA Dictionary*, *Google* and *TripAdvisor*
	Superficial Syntax	A good example of Myrtle Beach's dichotomy is that it's probably one of the few locations in the world.	Sentence Restructuring
	Lexis-induced TT Expression	pack an outsized punch	*ICIBA Dictionary* and *Baidu*

In Task 1, Bonnie reflected on her overall solutions but felt unsure of their success because she over-changed the TT sentences while attempting to maintain the ST meaning. Bonnie also reported that she checked for historical and geographical knowledge about Luxor in *Baidu Baike* and became more familiar with this city after doing online research.

In Task 2, Bonnie reflected on her overall solutions but felt dissatisfied with them because she could not come up with other solutions. Bonnie claimed that she used the sentence-restructuring technique to make the TT close to the ST, but she still felt unsure of the TT fidelity. Bonnie also reported that she checked the meanings or translations of terms and proper nouns in the *ICIBA Dictionary*, and she combined the English terms or proper nouns with some Chinese keywords such as '翻譯' (translation) or '中文' (Chinese) in *Google*. Although there were sometimes satisfactory translations, Bonnie still felt uncertain of their correctness.

In Task 3, Bonnie reflected on her overall solutions but felt unsure of their success. Bonnie reported that she still felt uncertain of the TT fidelity because of the use of free translation. Bonnie also claimed that she could find the Chinese translations of most location names by combining the English words and phrases with some Chinese keywords such as '中文' (Chinese) in *Google*.

In summary, Bonnie mainly checked the *ICIBA Dictionary* to solve a lexis-induced ST-comprehension problem in Task 1. She also consulted *Baidu Baike* for background information and similar expressions. In Task 2, she cross-checked the *ICIBA Dictionary* with the *Oxford Dictionaries* and *Google Images* to solve her lexis-induced ST-comprehension problems. In Task 3, she cross-checked the *ICIBA Dictionary* with the information of *Google* and *Baidu* to solve her lexis-induced TT-expression problems.

5.2.1.9 Joy's Reflection

Table 5-9 shows Joy's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-9 Joy's Reflection

	Triggers of Translation Problems	**Actual ST Segments**	**Solutions**
Task 1	Syntax-induced TT Expression	The official burial site of the Egyptian pharaohs for over 500 years, elaborate underground burial chambers that were constructed to safeguard the mummified remains of the kings of Egypt line the valley.	Sentence Combination
	Lexis-induced TT Expression	the Mortuary Temple of Hatshepsut	*Bing Dictionary*, *Baidu*, *Wikipedia* and *Google Scholar*
Task 2	Lexis-induced ST Comprehension	medina	*Oxford Dictionaries* and *Wikipedia*
	Superficial Lexis	riad	*Wikipedia* and Online Reference Articles
	Lexis-induced TT Expression	intense	*Bing Dictionary*
	Superficial Syntax	the first and second paragraphs	Segmentation and Reformulation
Task 3	Lexis-induced TT Expression	the Grand Strand	*Bing Dictionary*, *Baidu* and *Baidu Baike*
	Lexis-induced Knowledge	Little River	*Bing Dictionary*, *Baidu* and *Wikipedia*
	Lexis-induced Knowledge	plantation	*Oxford Dictionaries* and *Wikipedia*
	Lexis-induced Knowledge	canoe and kayak	*Bing Dictionary* and *Wikipedia*
	Lexis-induced TT Expression	dichotomy	*Bing Dictionary* and *Oxford Dictionaries*

159

In Task 1, Joy reflected on her overall solutions but felt dissatisfied with them because most words and sentences in the TT needed improving. Nevertheless, Joy felt satisfied with her solutions to a syntax-induced TT-expression problem because she grasped the ST meaning and made her TT sentence read naturally for the target readers. Joy also reported that it was difficult for her to choose the most suitable translations for some proper nouns such as the Mortuary Temple of Hatshepsut because she found several translations in the *Bing Dictionary* and the information provided by *Baidu*. She decided to pick a version that is mostly used on the web.

In Task 2, Joy reflected on her overall solutions and felt satisfied with the solutions to translating the Jemaa el-Fnaa Square, the El Badi Palace and the El Bahia Palace because she claimed that the target readers would understand her translations of these proper nouns and further search for their information after reading her TT. Joy also reported that she spent some time checking for English definitions and parallel texts to translate 'medina' (see further the discussion of Table 6-3, Chapter 6) and 'riad'.

In Task 3, Joy reflected on her overall solutions and generally felt satisfied with them, but she claimed that the information provided by *Baidu* and *Wikipedia* could not help her to solve all the translation problems. Joy also reported that she checked 'canoe', 'kayak' and Little River for their translations and background information in *Wikipedia*, but she felt unsure of the information provided by *Wikipedia* because it seemed inadequate for translation.

In summary, Joy mainly cross-checked the *Bing Dictionary* with the information provided by *Baidu* to solve a lexis-induced TT-expression problem in Task 1. In Task 2, she cross-checked the *Oxford Dictionaries* and *Wikipedia* for the English definitions of some terms to solve her superficial lexical and lexis-induced TT-expression problems. In Task 3, she cross-checked online dictionaries with *Wikipedia* to solve her lexis-induced knowledge problems.

5.2.1.10 Jessie's Reflection

Table 5-10 shows Jessie's reflection on the triggers of her translation problems, actual ST segments and solutions.

Table 5-10 Jessie's Reflection

	Triggers of Translation Problems	**Actual ST Segments**	**Solutions**
Task 1	Superficial Lexis	the Mortuary Temple of Hatshepsut	*Wikipedia* and *Google Images*
Task 2	Lexis-induced TT Expression	medina	*Youdao Dictionary* and *Baidu Baike*
	Superficial Lexis	riad	*Youdao Dictionary*
	Lexis-induced ST Comprehension	covered street market	*Youdao Dictionary* and *Baidu Baike*
Task 3	Lexis-induced TT Expression	Myrtle Beach	*Baidu Baike* and *Booking*
	Lexis-induced TT Expression	Little River	*Wikipedia*, *Baidu Baike* and *CTrip*

In Task 1, Jessie reflected on her overall solutions but felt unsure of their success because of the TT accuracy. However, she felt satisfied with the online information that assisted her in solving translation problems. Jessie reported that she spent some time teasing out useful information for the TT and believed that *Wikipedia* was more reliable with references than *Baidu Baike*. She also claimed that *Google Images* were helpful for acquiring the background information about the Mortuary Temple of Hatshepsut.

In Task 2, Jessie reflected on her overall solutions and generally felt satisfied with them, particularly reformulating the ST information in the second paragraph to produce a natural translation. However, she reported that little online information about 'souk' could be found to guide her translation (see further the discussion of Table 6-4, Chapter 6). Due to limited Chinese information about Marrakech, Jessie claimed that she preferred checking for its background information in various Chinese online articles which helped her to understand the ST better.

In Task 3, Jessie reflected on her overall solutions and felt satisfied with the solutions to translating Myrtle Beach because she found its translation in *Baidu Baike* and *Booking* which she believed is more authoritative (see further the discussion of Table 6-6, Chapter 6). Because Jessie was unfamiliar with the locations in the ST, she reported that she read *Baidu Baike* and *Wikipedia* where she found sufficient background information and authoritative translations for some location names and suitable TT expressions.

In summary, Jessie mainly checked *Baidu Baike* and *Wikipedia* to solve her superficial lexical problems in Task 1. In Task 2, she cross-checked the *Youdao Dictionary* with *Baidu Baike* to solve her lexis-induced ST-comprehension and lexis-induced TT-expression problems. In Task 3, she cross-checked *Baidu Baike* and *Wikipedia* with travel websites to solve her lexis-induced TT-expression problems.

5.2.2 Students' Self-evaluation of Translation Performance and Professional Translators' Assessment

Following the chronological order of the tasks, this section related to the Question (5) and (6) reports on the individual students' ratings of their translation performance on a 1-10 scale, their reasons for giving these ratings and actual ST segments (words, terms, proper nouns, phrases, sentences and paragraphs) they believed that they had translated most successfully. I will present the above interview answers in the following tables, summarising the students' reflection on their improvement in solving translation problems in Task 2 and Task 3 and what they had learned in solving translation problems in tourism texts. The results of the two professional translators' assessment on the students' translations will be reported at the end of this section.

5.2.2.1 Alexandra's Ratings

Table 5-11 shows Alexandra's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-11 Alexandra's Ratings and Reasons

	Ratings of Translation Performance	**Reasons for Ratings**	**Actual ST Segments Successfully Translated**
Task 1	6.5	She grasped most of the ST meaning for translation.	She used Chinese idioms to translate 'quite the contrast' and 'rather green'.
Task 2	6.5	She was clear about the whole ST meaning for translation.	She used natural expressions to translate 'wiggle room' and 'easy to appreciate the grandeur'.
Task 3	7	She solved most difficult translation problems and felt that the Task 3 text was easier to translate than the Task 1 and Task 2 texts.	She chose the frequently used translations for most location names.

In summary, Alexandra reported that she searched for online images to better understand the ST in Task 2, and she also learned to use more web searching methods to solve translation problems in tourism texts. In addition, she learned the importance of the ST background for translation and claimed that she had read more Chinese online articles about Marrakech. In Task 3, Alexandra reported that she knew better where to find reliable translations of some location names in more ways such as checking *Google Maps* and other travel websites (e.g. *TripAdvisor* and *Booking*).

5.2.2.2 Nicole's Ratings

Table 5-12 shows Nicole's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-12 Nicole's Ratings and Reasons

	Ratings of Translation Performance	**Reasons for Ratings**	**Actual ST Segments Successfully Translated**
Task 1	6	She did some online research on the ST information to produce a more correct TT.	She made the target readers close to the TT by attractively expressing 'rivaled even that of Athens or Rome' and 'to visit the illuminated ruins and admire the small statues of the Avenue of Sphinxes'.
Task 2	7	She generally understood the ST meaning for translation.	She successfully translated the last few paragraphs where she did not face comprehension and expression problems.
Task 3	7	She faced less difficulty in translating proper nouns, and she did online research and found relevant background information at the beginning of Task 3.	She went smoothly in translating the last three paragraphs.

In summary, Nicole reported that she did more online research on particular tourist attractions in Task 2 to deliver correct information to the target readers. In addition, she learned to read the whole ST paragraphs because she made mistakes in analysing some ST sentences in Task 1. In Task 3, Nicole claimed that she made a little progress in solving translation problems but reported that she went more smoothly in translating because she became more familiar with the pattern, style and language use in a tourism text.

5.2.2.3 Summer's Ratings

Table 5-13 shows Summer's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-13 Summer's Ratings and Reasons

	Ratings of Translation Performance	Reasons for Ratings	Actual ST Segments Successfully Translated
Task 1	8	She accurately translated the meanings of the ST words without omissions and did not face difficulty in understanding the ST sentences.	She put effort in the TT elegance by using Chinese idioms to translate 'rivaled even that of Athens or Rome' and 'illuminated'.
Task 2	8.5	She became familiar with the text style and put effort in TT expressions by using Chinese idioms.	She made the TT read naturally by omitting 'will be further challenged' and describing 'an incredible experience'.
Task 3	8.5	She realised the problem of a double-negative sentence structure and tackled it well, and the TT style improved compared with Task 1 and Task 2.	She successfully translated the first paragraph with creative translation and a double-negative sentence structure in the second paragraph.

In summary, Summer reported that her online research skills improved by consulting the *UNESCO* website in Task 2 for translating terms and acquiring relevant background information. She also learned to check *Wikipedia* for translating culture-specific terms (e.g. 'medina' and 'riad') and claimed that *Wikipedia* was more helpful than online dictionaries for translation. In Task 3, Summer stressed more using creative translation to improve the TT style because she was lucky to find some creative points in the ST. Summer also learned that there were no particular translation strategies because she usually resorted to her inspirations for translation in the real world. In addition, Summer reported that she checked online maps to translate the location names because this

tourism text involves three different cities, whereas the previous texts focus on only one city. However, she felt that her use of online maps was not really successful.

5.2.2.4 Hanna's Ratings

Table 5-14 shows Hanna's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-14 Hanna's Ratings and Reasons

	Ratings of Translation Performance	Reasons for Ratings	Actual ST Segments Successfully Translated
Task 1	5	She felt that the TT needed improving and her solutions to translation problems were not really successful.	She successfully translated the meaning of Luxor in the ST title because she did some online research to verify that Luxor should not refer to an ancient city.
Task 2	6	She faced fewer comprehension problems and did not make serious mistakes in the TT.	She combined the meaning of 'lively and incredible place to shop' to produce an attractive translation.
Task 3	5	She felt that some TT expressions needed improving and a few translation problems remained unsolved.	She used a Chinese idiom to express 'even more peace and quiet'.

In summary, Hanna reported that her information-searching skills became more efficient because she was controlling her pace in online searches and believed that she had found adequate results for translation. In Task 3, Hanna claimed that she felt more comfortable with using online information to solve translation problems compared with the previous tasks. She also learned to choose reliable translations of proper nouns and express the TT more attractively to the target readers.

5.2.2.5 Una's Ratings

Table 5-15 shows Una's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-15 Una's Ratings and Reasons

	Ratings of Translation Performance	**Reasons for Ratings**	**Actual ST Segments Successfully Translated**
Task 1	6	She felt unconfident in ST comprehension and the meanings of some words despite a few lookups in the dictionaries, and she felt uncertain of the TT accuracy because she usually added or deleted words in translations.	She successfully translated the last paragraph because it seemed the easiest.
Task 2	6	She basically achieved the ST meaning and produced a fluent TT, but she faced ST-comprehension problems and felt unsure of the TT accuracy because she omitted some ST information.	She successfully translated the fourth paragraph because she did not face difficulty in understanding and expressing this paragraph.
Task 3	7	She correctly under-stood the whole ST and made fewer mis-translations, and she became faster in translating because she faced fewer ST-comprehension pro-blems. She also felt that her translation efficiency improved.	She successfully translated the last paragraph because it was easy to understand.

In summary, Una reported that she checked online dictionaries, *Wikipedia* and online images in Task 2 to help with her understanding of an ST proper noun, the El Badi Palace. She also learned to read more Chinese and English tourism articles containing similar words and expressions for improving ST comprehension. In Task 3, Una reported that she checked for more online information to improve ST comprehension and find translations because she used the *Casio Electronic Dictionary* more in Task 1.

5.2.2.6 Rebecca's Ratings

Table 5-16 shows Rebecca's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-16 Rebecca's Ratings and Reasons

	Ratings of Translation Performance	**Reasons for Ratings**	**Actual ST Segments Successfully Translated**
Task 1	7/8	She did not face ST-comprehension pro-blems and attempted to make the TT read naturally.	She successfully translated 'payoff' because she clearly understood its meaning in the ST context.
Task 2	5/6	The Task 2 text was more difficult to translate.	She did not suc-cessfully translate any words and sentences but pro-duced a readable TT.
Task 3	7/8	The Task 3 text was less difficult than the Task 2 text and she became more confi-dent in understanding the ST. She also properly conveyed the ST meaning and pro-duced a natural TT for the target readers.	She successfully translated 'pack an outsized punch' and 'get the lion's share' because she made a good guess of their meanings from the ST context.

In summary, Rebecca reported that she improved in checking the example sentences in the *Youdao Dictionary* for Chinese expressions in Task 2. She claimed that she became more efficient in substituting the ST words for close Chinese meanings because she did not waste much time looking for exact TT expressions. Moreover, Rebecca claimed that she became more confident in checking subject-related websites such as *Mafengwo*. Because the Task 2 text was more difficult, Rebecca learned the importance of searching for background information in translation. In Task 3, Rebecca claimed that she learned about the usefulness of the Internet for solving translation problems because she found much information in not only online dictionaries but also various websites.

5.2.2.7 Isaac's Ratings

Table 5-17 shows Isaac's ratings of his translation performance, his reasons for giving these ratings and actual ST segments he believed that he had translated successfully.

Table 5-17 Isaac's Ratings and Reasons

	Ratings of Translation Performance	Reasons for Ratings	Actual ST Segments Successfully Translated
Task 1	6.5	He did not have time to improve the TT and some translation problems were not adequately solved.	He successfully translated the last paragraph because he became more familiar with the text style while translating.
Task 2	6.5	There were mistranslations shifted from the ST meanings, and he should do more research for translating abstract words and complex sentences.	He successfully translated 'unassuming door' because he maintained its metaphor for expression.
Task 3	6	He was demanding for his translation.	He did not successfully translate any words and sentences, so he could not comment on anything in the TT.

In summary, Isaac claimed that he did not make any progress in Task 2 but became familiar with the text style for translation. He also learned to read more Chinese tourism articles to better translate specific words and improve TT expressions. In Task 3, Isaac claimed that he had made a little progress in solving translation problems but became cautious of using formal Chinese expressions in translating tourism texts. Moreover, he learned to do more online research on proper nouns and nuances in similar words.

5.2.2.8 Bonnie's Ratings

Table 5-18 shows Bonnie's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-18 Bonnie's Ratings and Reasons

	Ratings of Translation Performance	Reasons for Ratings	Actual ST Segments Successfully Translated
Task 1	7	She kept the TT fidelity to the ST.	She successfully translated 'payoff' because she put much effort in translating this word and its whole paragraph.
Task 2	5	She preferred using free translation by making minor changes in the TT.	She successfully translated 'medina', 'riad' and 'tiled courtyard' by checking online images.
Task 3	5	She felt unsure of some TT expressions and the TT fidelity with the use of free translation.	She successfully translated most proper nouns and the first few para-graphs because they seemed easier to translate.

In summary, Bonnie reported that she improved in searching for online information in Task 2 because she became more careful of confirming the accuracy of some information. For example, she learned the differences between English and Chinese explanations in the *ICIBA Dictionary*. Bonnie also learned to focus on the TT function by making acceptable changes in TT expressions. In Task 3, Bonnie reported that her information-searching skills improved because she could easily find the information about some popular tourist attractions for translation.

5.2.2.9 Joy's Ratings

Table 5-19 shows Joy's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-19 Joy's Ratings and Reasons

	Ratings of Translation Performance	**Reasons for Ratings**	**Actual ST Segments Successfully Translated**
Task 1	7	She felt that it was a mistake to omit some ST words such as 'quite the contrast', and she should have used more beautiful words in the TT to attract the target readers.	She did not successfully translate any words and sentences.
Task 2	6	She did not really use many attractive words in the TT.	She successfully translated some sentences with a face-to-face style to communicate with the target readers.
Task 3	7	She made the TT read naturally by changing the sentence structures, but the translations of some proper nouns (e.g. Little River) were not accurate.	She successfully translated 'spend time', 'crown jewel' and 'pack an outsized punch' more attractively to the target readers.

In summary, Joy reported that she improved in looking up the definitions of some ST words in Task 2 because she only checked the literal meanings of unknown words in Task 1. In Task 3, Joy reported that she had previously checked English-Chinese dictionaries for unknown words and translations, but now realised the importance of checking the definitions of words in English-English dictionaries or *Wikipedia* for understanding the ST information. In addition, Joy also learned to let the target readers acquire relevant information about the ST proper nouns by choosing commonly used translations that do not always come from dictionaries.

5.2.2.10 Jessie's Ratings

Table 5-20 shows Jessie's ratings of her translation performance, her reasons for giving these ratings and actual ST segments she believed that she had translated successfully.

Table 5-20 Jessie's Ratings and Reasons

	Ratings of Translation Performance	**Reasons for Ratings**	**Actual ST Segments Successfully Translated**
Task 1	7	The Task 1 text was more common than scientific texts, and she could basically understand the ST sentence structures. She could come up with a number of Chinese sentences for TT expressions, but she needed to look up more information about some ST words because she occasionally faced TT-expression problems.	She paraphrased 'payoff' into a more fluent sentence.
Task 2	7	She produced an attractive TT by changing passive voice into active in Chinese.	She successfully translated 'riad' because the way she explained this term might be a better solution.
Task 3	8	She did much online research, properly translated proper nouns and used beautiful Chinese expressions. She felt that the Task 3 text was easier to translate.	She used natural expressions to translate 'equal amount', 'hustle and bustle', 'get off the beaten path' and 'tourist-laden'.

In summary, Jessie reported that she improved in translating the ST terms in Task 2 but still had difficulty in choosing the most suitable translations. In Task 3, Jessie reported that she checked more online information such as *Baidu Baike* and learned the importance of background information for solving translation problems because she used to look up unknown terms and proper nouns only in online dictionaries during the previous tasks. Although Jessie did not search for any online images in Task 3, she realised their usefulness for understanding the ST words since she had checked some online images in Task 2.

Table 5-21 shows the two professional translators' assessment of the ten students' translations in the three tasks, including their average marks and t-test results.

Table 5-21 Professional Translators' Assessment (3 Tasks)

	Task 1	Task 2	Task 3
Average Marks (Rater A)	54	69	68
Average Marks (Rater B)	64	69	58
T-test (p-values)	0.1	0.9	0.1

As Table 5-21 shows, the two professional translators' average marks generally increase from Task 1 to Task 2 but decrease in Task 3 (for one assessor only slightly). The t-test results of the three tasks show no significant difference in the p-values (p > 0.05) and suggest good inter-rater reliability between the two professional translators' assessment.

The two professional translators' average marks also indicate that the students' overall translation quality falls into the category of 'passable translation with some inaccuracies' based on the translation marking guideline (see Appendix 8), though the students seem to make limited progress during the three tasks.

The students' self-rating and web searching data (see from Table 5-11 to 5-20) and the two professional translators' product assessment data show less significant correlations because firstly, there exist differences between the individual students' and the professional translators' subjectivity in assessment. Secondly, the scale of 1-10 for the students' self-ratings does not include the description of their actual translation performance. This makes it difficult to correlate the students' self-ratings with the professional translators' product assessment with respect to translation quality (also see Appendix 8).

Thirdly, different insights are revealed by the students' self-ratings and the professional translators' assessment. The students generally rated their translation performance higher because of their potential improvement in their web searching behaviours across the three tasks (see further Section 6.2.2, Chapter 6), but the two professional translators focused more on the style and fluency of the students' TT expressions. As a result, this demonstrates less significant correlations because of the different criteria between the students' self-ratings and the professional translators' product assessment.

5.2.3 Students' Personal Comments on and Reasons for Self-evaluated Translation Performance

This section related to the Question (7) and (8) reports on the individual students' personal comments on and reasons for their self-evaluated translation performance following the chronological order of the three translation tasks.

5.2.3.1 Alexandra's Comments

In Task 1, Alexandra commented on her translation performance by reporting that she would become more efficient in translating tourism texts by learning the vocabulary and idioms (e.g. 'curry favor upon') from reading more this type of articles. In Task 2, Alexandra claimed that doing more online research was helpful for understanding the ST meaning and producing a better-quality TT. In Task 3, Alexandra reported that she knew better how to find relevant online information and choose the most suitable translations for TT expressions. Throughout the three tasks, Alexandra reported that she became clearer about referring to web resources in her thinking process and learned a few effective ways of searching for online information while translating.

5.2.3.2 Nicole's Comments

In Task 1, Nicole commented on her translation performance by reporting that she had learned the importance of doing good online research to solve knowledge problems and of evaluating online information. In Task 2, Nicole reported that she should have spent more time doing online research on some tourist attractions to produce a more attractive TT. In Task 3, Nicole commented on the translation task by claiming that the TA method was helpful for identifying her translation problems and solutions. Throughout the three tasks, she felt more comfortable with verbalising her thoughts without influencing her mind.

5.2.3.3 Summer's Comments

In Task 1, Summer commented on her translation performance by reporting that she did not leave more time to revise the TT because of her fatigue from TA. In Task 2, Summer claimed that her creative expressions could be acceptable in translating tourism texts. In Task 3, Summer reported that throughout the three tasks she learned how to deal with such translation problems as culture-specific terms, relative clauses and a double-negative sentence structure.

In Task 1, Summer looked up unknown words while translating. In Task 2, she read the ST and checked unknown words first before translating. In Task 3, she looked up unknown words while translating as she did in Task 1. In terms of changing her translation approach to Task 3, Summer claimed that both Luxor and Myrtle Beach were more general locations and she did not have to check their background information before translating. In Task 2, she checked unknown words and read some information on the *UNESCO* website before translating because Marrakech was a more culture-rooted city for her.

5.2.3.4 Hanna's Comments

In Task 1, Hanna commented on the translation task by reporting that she felt exhausted in verbalising her thoughts despite having some experience of TA. She claimed that her fatigue influenced the translation quality to some extent. In Task 2, Hanna commented on her translation performance by reporting that she felt more prepared for TA and translating this tourism text because she knew the text type and potential translation problems better. In Task 3, Hanna reported that throughout the three tasks she learned the usefulness of reflecting on her translation problems and solutions for improvement.

At the beginning of Task 1, Hanna checked Luxor and related background knowledge first before translating. At the beginning of Task 2, she did not check unknown words or proper nouns before translating but just looked them up in the electronic dictionary while translating. In Task 3, she checked unknown words or proper nouns while translating as she did in Task 2. In terms of not changing her translation approach to Task 3, Hanna claimed that the Task 2 text about Marrakech was more familiar to her (since she had travelled there) and the Task 3 text about Myrtle Beach seemed easier to translate according to the ST title. In Task 1, she checked the background information about Luxor before translating because she did not know this city.

5.2.3.5 Una's Comments

In Task 1, Una commented on the translation task by reporting that the TA method helped her to concentrate on the task and improve translation efficiency. However, she claimed that this method sometimes distracted her from thinking and influenced the translation quality to some extent. In Task 2, Una also reported that the TA method made her more focused on the completion of this task. In Task 3, Una claimed that throughout the three tasks, as Hanna did, she learned the usefulness of reflecting on her translation problems and solutions by reviewing her translation processes.

5.2.3.6 Rebecca's Comments

In Task 1 and Task 2, Rebecca commented on the translation tasks by reporting that the TA method was helpful for reviewing her translation problems and solutions for future improvement, but she felt that this method was impractical for translators in the real world. In Task 3, Rebecca reported that throughout the three tasks, as Hanna and Una did, she learned the usefulness of the experiments because she realised what needed to be improved, such as being more efficient in looking for Chinese expressions, by reviewing her translation processes.

5.2.3.7 Isaac's Comments

In Task 1 and Task 2, Isaac commented on his translation performance by reporting that he learned the style of tourism texts and should practice translating this text type more in the future. In Task 3, Isaac claimed that he became more active in considering different strategies to translation problems, but he still felt that the TA method reduced his translation efficiency and quality to some extent.

In Task 1, Isaac looked up unknown words while translating. At the beginning of Task 2, he read the ST and checked unknown words first before translating. In Task 3, he read the ST and checked unknown words before translating as he did in Task 2. In terms of not changing his translation approach to Task 3, Isaac reported that he was intentionally testing which approach worked better for translating tourism texts, particularly when he did not have any experience of translating this text type.

5.2.3.8 Bonnie's Comments

In Task 1, Bonnie commented on her translation performance by reporting that this tourism text was easy to understand but difficult to translate in terms of its style and expressions. In Task 2, Bonnie reported that she attempted to achieve the TT function and style by using communicative words for the target readers, but she still felt confused about whether using literal or free translation was more appropriate in translating tourism texts. In Task 3, Bonnie reported that throughout the three tasks she learned how to balance between keeping the ST meaning and using free translation.

5.2.3.9 Joy's Comments

In Task 1, Joy commented on her translation performance by reporting that she should work more on understanding the ST meaning and making the TT read naturally. In Task 2, Joy reported that she attempted to keep the ST sentence structures and elements as best as she could because she omitted some ST information in Task 1.

In Task 1, Joy tended to read the ST paragraphs and check unknown words first before translating. In Task 2, she did not read the ST but checked unknown words while translating. In Task 3, she scanned some words and proper nouns in the ST and checked them while translating as she did in Task 2. In terms of not changing her translation approach to Task 3, Joy reported that it was unnecessary to check each ST word before translating because they would deliver different meanings in the context. She claimed that she preferred this checking-while-translating approach.

5.2.3.10 Jessie's Comments

In Task 1 and Task 2, Jessie commented on the translation task by reporting that the TA method helped her to pay attention to the information she selected. She claimed that this method slowed down her translation speed but did not influence the translation quality. In Task 3, Jessie reported that throughout the three tasks she learned the importance of background knowledge for translation other than correctly checking the meanings or translations of the ST words.

CHAPTER 6
DISCUSSION

6.0 Preamble

This chapter discusses the analysis of the ten students' TAP, screen-recording and cue-based retrospective interview results. **Section 6.1** first discusses the occurrences of the students' translation problems and the variations in their use of external resources. Then, the students' reflection on the main translation problems perceived and solutions used in each of the three tasks will be discussed (from Section 6.1.1 to 6.1.3). **Section 6.2** summarises the students' learning of translation with respect to TC development from their reflection (Section 6.2.1). Then, their evaluation of and comments on translation performance and the translation tasks will be summarised and discussed (Section 6.2.2). **Section 6.3** focuses on the students' instrumental competence formation through their improvement in web searching skills across the three tasks.

6.1 Students' Translation Problems and Solutions

The ten students' TAP and screen-recording results show that the translation problems they encountered most frequently were superficial lexical problems (see Tables 4-3 and 4-4). This is largely in line with the findings of previous TAP-based studies (e.g. Englund Dimitrova 2005; Shih 2006; Zheng 2008) that translation students or novice translators focused on or revised most problems at the lexical level. The gradual and slight increases in the number of superficial lexical problems faced by the students (see Figures 4-1, 4-2 and 4-3) may have occurred partly because lexis is one of the most recognisable segments of a text and probably because of the slowing-down effect of the TA method (see Section 3.1.1.1, Chapter 3). This means that the students constantly checked and double-checked the ST words they did not know in dictionaries or other web resources. This effect itself may have made the students process the ST in more fragments and possibly be more acutely aware of these superficial lexical problems. Another reason, of course, is because the students may have taken their translation problems on the superficial level and accepted a solution (either from online or electronic dictionaries or machine translation) as a quick and easy way to solve their problems.

Apart from superficial lexical problems, the students also had ST-comprehension problems at the lexical level (see Table 4-5). Their lexis-induced ST-comprehension problems occurred because they misunderstood the meanings or translations of the ST segments in dictionaries or other web resources. A very interesting example found in Task 1 can illustrate this. In Task 1, most students typically had difficulty in understanding the expression 'curry favor upon' because they misinterpreted the meaning of 'curry' in dictionaries as 'curry powder'. Details of this will be discussed in Section 6.1.1.

In addition, it was found that the students also had TT-expression problems at the lexical level (see Tables 4-6 and 4-7). Their lexis-induced TT-expression problems derived from their difficulty in choosing more suitable meanings or translations for the ST segments from dictionaries or other web resources. Lexis-induced knowledge problems were sometimes found leading to comprehension problems with another related ST segment (see Table 4-8). A minority of the students also encountered knowledge gap problems which are not triggered by specific lexis as such (see Table 4-12).

Overall, inconclusive results were shown in terms of the frequencies of the students' superficial lexical and lexis-induced problems (also see Figures 4-1, 4-2 and 4-3). Although lexis-induced problems occur much less frequently than superficial lexical problems, a closer examination indicates interesting phenomena in terms of the students' problem-solving behaviours in this category. This warrants further discussion in Sections 6.1.1, 6.1.2 and 6.1.3.

In terms of the students' use of external resources, the data shows that online dictionaries remain the most frequently used resource throughout the three tasks (see Figures 4-4, 4-5 and 4-6) although, overall, the use of electronic dictionaries and machine translators appears to decrease from Task 1 to Task 3. This is not just in contrast to the increased use of search engines throughout the three tasks. There is also an increasing range of different web resources such as online encyclopedias, travel websites, etc. Interestingly, online images are also used as a source of information. This is particularly evident in the use of online maps in Task 3. In other words, during the course of a one-year postgraduate translation degree, via the three tasks, the students use more varieties of web-based resources other than dictionary-based (web) resources (see Tables 4-4 and 4-7). This finding resembles Enríquez Raído's (2011: 67) that her students generally displayed a 'shallow

online search style' for fast and easy access to information in earlier translation tasks but later showed an 'interactionistic style of online search'.

In the following, I will examine the students' reflection on the main translation problems and solutions in each of the three tasks (see Section 5.2.1, Chapter 5). The students' TAP, screen-recording and cue-based retrospective interview results show that their different perceptions of these problems lead to different and consequently successful or unsuccessful solutions. The following sections will answer the research questions of Aim 1 for the present study (see Section 1.2, Chapter 1).

6.1.1 Students' Reflection on Task 1

Based on the students' reflection, the following two expressions (as they appeared to some of the students): '**a small patch of greenery lines**' and '**curry favor upon**' appear to be mentioned by most students as main problems in Task 1. Table 6-1 shows the context of one main problem: 'a small patch of greenery lines'.

Table 6-1 Main Translation Problem and Solutions in Task 1 (1)

ST Context and Problematic ST Segment	Problem Categories	Correct Interpretation of ST Segment	Observed Translations	External Resources Checked/Cross-checked
Roughly 700 kilo-meters south of Cairo, Luxor, like most Egyptian cities, sits on the River Nile. **The longest river in the world, a small patch of greenery lines the shores of the River Nile** as it snakes through the Sahara Desert and its waters are the only reason civilization ever flourished here.	Superficial Lexis (Nicole), Lexis-induced ST Comprehension (Isaac), Syntax-induced ST Comprehension (Una), or Syntax-induced TT Expression (Hanna)	'The longest river in the world' is the appositive of the River Nile, and 'lines' in the sentence func-tions as a verb rather than a noun.	**Unsuccessful Translation(s)/ Translation Shift(s):** '綠化帶' (Back Translation: greened belt) and '綠色絲帶' (Back Translation: green ribbon) as shown by Nicole and Isaac respectively	• *WordReference Dictionary* and *Baidu* • *Youdao Dictionary*
	Difficulty: The students had difficulty in translating the ST segment because they did not under-stand why there were apparently two nouns ('the longest river' and 'a small patch of greenery lines') in the sentence structure.		**Successful Translation(s):** '這條世界上最長的河流, 曲折穿過撒哈拉大沙漠, 河流的灌溉是讓河岸長滿綠植, 並在這一小片土地建立文明的唯一原因' (Back Trans-lation: This is the longest river in the world, snaking through the Sahara Desert. The river irrigation lets green plants grow on the riversides, and it is the only reason for establishing a civili-sation on the small	• *Casio Electronic Dictionary*

			patch) and '這條世界上最長的河流在撒哈拉沙漠中蜿蜒, 河岸旁, 有一塊綠地, 正是尼羅河水造就了這裡埃及文明的繁榮' (Back Translation: The longest river in the world snakes in the Sahara Desert. On the riverside, there is a green land, and it is right the River Nile that makes the Egyptian civilisation blooming here) as shown by Una and Hanna respectively	

The data suggests that some students did not successfully translate the ST segment because of a misconception of what their problem was. They did not understand the sentence structure and focused on the wrong combination of words as their problems, i.e. 'greenery lines', as an adjective-noun structure. Actually, 'line' functions as a verb in the ST segment. During the interview (see Section 5.2.1.2), Nicole reported that she translated 'greenery lines' as '綠化帶' (greened belt) by her personal knowledge about the River Nile but could not find its correct meaning in the *WordReference Dictionary* and the information provided by *Baidu*. However, she felt that her solution of using personal knowledge was unsuccessful. In the interview of Task 2 (see Section 5.2.2.2), Nicole particularly reported that she made mistakes in analysing the ST sentences in Task 1 and learned to read entire ST paragraphs. This suggests that

190

the retrospective interview might help Nicole to examine her inadequate solutions to syntactic problems, though she was still unaware of why her solution of translating 'greenery lines' was unsuccessful in Task 1.

Likewise, Isaac did not correctly recognise the sentence structure of the ST segment and as a result checked the wrong collocation, 'greenery lines' in the *Youdao Dictionary* (see Table 5-7). Similar to Nicole, Isaac claimed to have a comprehension problem with 'greenery lines' at the lexical level. In the interview, he explained that he might have made a mistake in translating the combined words into '綠色絲帶' (green ribbon) as a literal expression. Although Isaac did not know whether his solution was successful, his reflection indicates that he suspected that this was a mistranslation but did not correct it possibly because he did not know how to revise it. Again, this suggests that the retrospective interview could help Isaac to detect his translation error. In terms of the syntax, however, Isaac claimed that the sentence structure of the ST segment was not difficult for him, and this also explains why he was unaware of the difficulty in the sentence structure and mistranslated 'greenery lines'.

In summary, the above two examples show that analysing what a translation problem was thoroughly in the first place may have helped students to solve it. In other words, instead of rushing to find a translation equivalent, at least in the first instance, students should be advised to devote their time in analysing the problem or go back to re-analyse the problem if no apparent solutions can be found.

By contrast, other students successfully translated the ST segment because of a correct conception of what their problem was. They realised the syntactic problem of the ST segment and analysed its sentence structure before translating. Moreover, they understood that 'line' functions as a verb and checked its meaning in the dictionary. In the interview (see Section 5.2.1.5), Una reflected on her comprehension problem with the ST segment at the syntactic level and felt that her solution of reformulating the ST information was successful. In fact, Una's translation was correct and her reflection indicates that she spent her time analysing the syntactic problem and consequently made a successful translation.

In addition, Hanna reported that she changed the sentence order (see Section 5.2.1.4), which is similar to Una's solution of reformulating the ST information, to solve her expression problem with the ST segment at the syntactic level. However, she felt that her solution was not very successful because she needed to improve the translation of 'greenery'. Nevertheless, Hanna's translation still reads fluently and her reflection also indicates that she devoted her time in analysing the syntactic problem and produced a successful translation.

In summary, the above example shows that students who correctly diagnosed and analysed their problem initially had a greater chance of successfully translating the ST segment, which echoes Newell and Simon's problem-solving theory (1972) that if a problem space is fully understood or constructed by the problem solver, the problem is often half solved.

The other main problem for most students can be seen in Table 6-2, where the context of 'curry favor upon' was mainly misunderstood at the lexical level, which differs from the 'greenery lines' or noun-verb problem previously discussed.

Table 6-2 Main Translation Problem and Solutions in Task 1 (2)

ST Context and Problematic ST Segment	Problem Categories	Correct Interpretation of ST Segment	Observed Translations	External Resources Checked/Cross-checked
Leaving the Valley of the Kings a small trail climbs the mountain and leads hikers on a 45-minute trek through the desert to its payoff of stunning pano-ramic views of the Mortuary Temple of Hatshepsut. This temple was built by Queen Hatshepsut, Egypt's first female ruler, to **curry favor upon** her death with the sun god Amon Ra.	Lexis-induced ST Comprehension (Bonnie, Hanna, and Una) **Difficulty:** The students had difficulty in trans-lating the ST seg-ment because they did not understand 'curry' in the ST context and mis-interpreted its literal meaning as 'curry powder'.	to please or flatter someone	**Unsuccessful Translation(s)/ Translation Shift(s):** '用咖哩粉' (Back Translation: use curry powder) and '祭拜' (Back Translation: worship) as shown by Bonnie and Hanna res-pectively **Successful Translation(s):** '歌頌緬懷' (Back Translation: hail and reminisce) as shown by Una	• *ICIBA Dictionary* • *Casio Electronic Dictionary* and *Sintu Travel* • *Casio Electronic Dictionary*

The data suggests that many students did not successfully translate the ST segment because they failed to understand the correct meaning of 'curry favor upon' which is unrelated to the spice, curry powder. In the interview (see Table 5-8), Bonnie reported that she checked the verb meaning of 'curry' in the *ICIBA Dictionary* and referred to the context for translation. Bonnie also claimed that she kept loyal to the original meaning of 'curry', but she still mistranslated 'curry favor upon' into '用咖哩粉' (use curry powder). Although Bonnie did not report whether her solution was successful, her reflection indicates that she seemed to follow the online dictionary superficially and take it as a solution.

Similarly, Hanna reported that she checked the verb 'curry' in the *Casio Electronic Dictionary* and read an online reference article (*Sintu Travel*) about Queen Hatshepsut's acquisition of spice (see Table 5-4). Although Hanna felt that her solution of generalising the meaning of 'curry favor upon' was successful, she still mistranslated the phrase into '祭拜' (worship). Hanna's reflection indicates that she did not see her translation error due to her misinterpretation of the information from the *Casio Electronic Dictionary* and *Sintu Travel*.

By contrast, other students successfully translated the ST segment because they found the correct meaning of 'curry favor upon' as a fixed expression rather than a verb. In the interview (see Table 5-5), Una reported that she had found the meaning of 'curry favor upon' as 'to please or flatter someone' in the *Casio Electronic Dictionary*. However, she felt that her solution was not very successful because she needed to improve the expression. Una correctly refined 'curry favor upon' into '歌頌緬懷' (hail and reminisce). In the interview (see Section 5.2.1.5), Una particularly mentioned that she would have translated 'curry favor upon' better if she had known more about the relationship between Queen Hatshepsut and Amon Ra. Her reflection indicates that she acknowledged the advantage of

checking more background information about the ST words rather than checking them in the dictionary only.

In summary, the discussion of Tables 6-1 and 6-2 highlights the fact that the students' mistranslations happened because they misperceived or misjudged their translation problems, which consequently led to wrong solution paths and misinterpretation of online information. Interestingly, upon reflection, some students (e.g. Isaac) who mistranslated the ST segment knew that they might have done so, but they were still unsure of a successful translation solution. Thus, a pedagogical recommendation for advising students' mistranslations would be that they use TAP and screen-recording data as cues to re-assess what their problem actually was, as this may lead to a successful solution. Alternatively, peer-work may be useful for helping the individual students to understand what went wrong in the first place.

6.1.2 Students' Reflection on Task 2

In Task 2, '**medina**' and '**covered street market**' are identified by many students as the most problematic segments to translate. Table 6-3 shows the context of 'medina'.

Table 6-3 Main Translation Problem and Solutions in Task 2 (1)

ST Context and Problematic ST Segment	Problem Categories	Correct Interpretation of ST Segment	Observed Translations	External Resources Checked/Cross-checked
Marrakech is a city from another time and visiting its walled **medina** is an incredible experience of twisting lanes lined with spice markets, souks and vendors, with a few palaces and mosques interspersed among the maze.	Lexis-induced ST Comprehension (Joy and Alexandra) or Lexis-induced TT Expression (Jessie)	the old city district or the Arab community in the modern cities of North Africa	**Unsuccessful Translation(s)/ Translation Shift(s):** '城市' (Back Translation: city) and '麥地那地形' (Back Translation: medina landscape) as shown by Joy and Alexandra respectively	• *Oxford Dictionaries* and *Wikipedia* • Online Images (OIs) of *TripAdvisor*
	Difficulty: The students had difficulty in translating the ST segment because they did not understand whether 'medina' was referred to as the city 'Medina' or another location. They also had difficulty in choosing a suitable translation		**Successful Translation(s):** '阿拉伯人社區' (Back Translation: the Arab community) as shown by Jessie	• *Youdao Dictionary* and *Baidu Baike*

| | for the ST segment. | | | |

The data suggests that many students did not successfully translate the ST segment because they failed to understand the exact meaning of 'medina'. In the interview (see Section 5.2.1.9), Joy reported that she spent time checking the English definition of 'medina' as 'a town of North Africa' in the *Oxford Dictionaries* and *Wikipedia*. Although Joy felt that her solution was successful, '城市' (city) as shown in her translation was actually a translation shift from the meaning of 'medina'. Translation shifts are defined as 'departures from formal correspondence in the process of going from the SL to the TL' (Catford 1965: 73). Joy's reflection indicates that although she cross-checked the *Oxford Dictionaries* with *Wikipedia*, it was still insufficient for her to grasp the actual meaning of 'medina' in the context, and this might be why she made a translation shift.

On the other hand, Alexandra reported that she specifically checked the online images in *TripAdvisor* for 'walled medina' and thought that this term might refer to a kind of landscape (see Table 5-1). Although Alexandra felt that checking the online images was useful, she still mistranslated 'medina' into '麥地那地形' (medina landscape). Alexandra's reflection indicates that the online images were still insufficient for her to grasp the exact meaning of the ST segment in the context, and this also suggests that it may be beneficial for her to evaluate other web resources against online images which could be misleading for translation.

In summary, the above two examples illustrate a translation shift and a mistranslation respectively, caused by the students' misperceptions of the problem, which resulted in their under-interpretation or mis-association of online information. Interestingly, upon reflection, the students felt that their solutions were successful and did not sense what went wrong in their problem-solving processes. For this reason, a pedagogical recommendation for improving students' translations would also be that they use TAP and screen-recording data as cues to re-interpret the online information they checked, as this may lead to a different or successful solution.

By contrast, other students successfully translated the ST segment because they found the correct or suitable meaning for 'medina'. In the interview (see Table 5-10), Jessie reported that she specifically consulted *Baidu Baike* and chose its translation of 'medina', and she believed that the translation of *Baidu Baike* read more naturally than that of the *Youdao Dictionary*. Although Jessie did not report whether her solution was successful, she correctly chose the translation, '阿拉伯人社區' (the Arab community). Jessie's reflection indicates that she made the correct choice because she was able to compare the information of *Baidu Baike* with that of the *Youdao Dictionary*, and this also suggests that in her view, *Baidu Baike* may be a more useful resource than monolingual dictionaries and online images for term translation.

The other main problem for most students is presented in Table 6-4, where the context of 'covered street market' was mainly misunderstood at the lexical level, which resembles the 'medina' problem previously discussed.

Table 6-4 Main Translation Problem and Solutions in Task 2 (2)

ST Context and Problematic ST Segment	Problem Categories	Correct Interpretation of ST Segment	Observed Translations	External Resources Checked/Cross-checked
Also within walking distance from Jemaa el-Fnaa are the famed souks of Marrakech. Basically one big **covered street market**; the streets of the souks intersect with one another and form a lively and incredible place to shop.	Lexis-induced ST Comprehension (Jessie, Alexandra, and Hanna)	a covered or roofed street market	**Unsuccessful Translation(s)/ Translation Shift(s):** '露天市場' (Back Translation: open-air market) and '馬路集市' (Back Translation: road market) as shown by Jessie and Alexandra respectively	• *Baidu Baike* • OIs of the ST Website (*Traveler's Digest*)
	Difficulty: The students had difficulty in translating the ST segment because they did not understand 'covered' whose meaning contradicts 'souk' (an open-air market). As a result, they did not know whether souk is a covered or open-		**Successful Translation(s):** '有頂棚的街頭市場' (Back Translation: roofed street market) as shown by Hanna	• *Google Images*

air market.			

The data suggests that some students did not successfully translate the ST segment because they failed to understand the exact meaning of 'covered street market'. In the interview (see Section 5.2.1.10), Jessie reported that she read *Baidu Baike* but could not find more online information about 'souk' for her translation of 'covered street market'. Although Jessie did not report whether her solution was successful, '露天市場' (open-air market) as shown in her translation was a translation shift from the meaning of 'covered street market'. Jessie's reflection indicates that because she failed to find more information about 'souk', she decided to settle for 'an open-air market' to translate 'covered street market'.

Once again, Alexandra reported that she checked the online images of 'covered street market' in the ST website (*Traveler's Digest*), but she felt that her solution was unsuccessful because she did not find other useful images to understand 'covered' (see Section 5.2.1.1). Actually, '馬路集市' (road market) as shown in her translation was another translation shift from the meaning of 'covered street market'. Alexandra's reflection indicates that online images were insufficient for her to grasp the actual meaning of 'covered street market' in the context, and this might be why she made a translation shift.

In summary, the two examples discussed above show that the students made translation shifts due to their misperceptions of the problem and over-reliance on a single web resource as Wakabayashi (2003) and Shih (2017) also found. Interestingly, upon reflection, the students realised that their solutions were unsuccessful but did not know how to identify a correct translation. Therefore, a pedagogical recommendation for improving students' translations would also be that they use TAP and screen-recording data as cues to re-evaluate

the web resources they checked, as this may lead to a different or successful solution.

By contrast, other students successfully translated the ST segment because they resorted to their inferential resources (e.g. personal experience) for ST comprehension. In the interview (see Section 5.2.1.4), Hanna reported that she not only checked *Google Images* of 'souk' but also recalled her own experience of travelling in Marrakech to understand 'covered street market'. Because of her personal experience, she believed a 'souk' to be a covered market and claimed that her personal experience was helpful for translation. Hanna followed the ST information and correctly translated the ST segment into '有頂棚的街頭市場' (roofed street market).

Hanna's reflection indicates that she might realise the limitation of checking online images for ST comprehension and decided to rely on her personal experience as a more reliable resource. Nevertheless, online images are still useful to understand the ST information for those students without this kind of inferential resources, as claimed by Alexandra and Jessie (see Sections 5.2.2.1 and 5.2.2.10). Among the ten students, only Hanna had the experience of travelling in Marrakech. Although Hanna relied on her personal experience to make a successful translation, most students would need to consult other potential informants as human resources if they failed to find suitable online results. As Kiraly (2015: 27) points out, using human resources determines part of translators' TC development. However, this is a limitation of the present study since it did not allow the students to consult any informants.

6.1.3 Students' Reflection on Task 3

In Task 3, two sections in **Little River** and **Myrtle Beach** are identified by the students as the most problematic segments to translate. Table 6-5 shows the context of Little River.

Table 6-5 Main Translation Problem and Solutions in Task 3 (1)

ST Context and Problematic ST Segment	Problem Categories	Correct Interpretation of ST Segment	Observed Translations	External Resources Checked/Cross-checked
At the end of the Grand Strand, at **Little River**, there are some marshes that can be explored by canoe or kayak, which is a good way to get off the beaten path a bit.	Superficial Lexis (Rebecca and Una) or Lexis-induced TT Expression (Isaac and Alexandra) **Difficulty:** The students could not translate Little River because they had difficulty in choosing between the literal translation and a transliteration of the ST segment.	correct translation as the literal translation or transliteration	**Unsuccessful Translation(s)/ Translation Shift(s):** '利特爾小河' (Back Translation: Little small river) as shown by Isaac	• *Youdao Dictionary* • *CTrip*
			Successful Translation(s): '利特爾里弗' (Back Translation: the transliteration) and '小河' (Back Translation: small river) as shown by Alexandra, Rebecca, and Una respectively	• *Baidu Baike* and *Google Maps* • *Google Maps* • *Wikipedia*

The data suggests that some students did not successfully translate the ST segment because they did not do online research to evaluate their translations. In the interview (see Section 5.2.1.7), Isaac reported that he combined the pronunciation and meaning of Little River for translation, and he also justified this solution for translating any proper nouns without corresponding translations. However, '利特爾小河' as shown in his translation was a structural shift (Catford 1965: 75) as a combination of the transliteration of 'Little' and the literal translation of 'small river'.

By contrast, other students successfully translated the ST segment because they carried out online research to evaluate their translations. In the interview (see Section 5.2.1.1), Alexandra reported that she checked the transliteration of Little River in *Baidu Baike* and *Google Maps* to confirm whether it was commonly used. She felt that her use of *Google Maps* was successful because the Task 3 text provides the directions for many geographical locations and that was why she checked *Google Maps* for the translations. This was also mentioned by Summer about her reason for checking online maps (see Section 5.2.2.3). Alexandra chose the transliteration of the ST segment (利特爾里弗) because it is a common translation for this place on the web.

Alexandra's reflection indicates that *Google Maps* may be a useful resource for translating unknown location names, and her reason for using *Google Maps* suggests that students' translation solutions could be guided by the clues in the ST information. In my opinion, this should be stressed in translator training to help students to find their solutions more efficiently.

Likewise, Rebecca reported that she checked *Google Maps* and found the transliteration of Little River (see Section 5.2.1.6). Although Rebecca did not report whether her solution was successful, she reported that she used *Google Maps* because she often checked it for Chinese locations in real life. Rebecca chose the transliteration of the ST segment (利特爾里弗) as Alexandra did. Again, Rebecca's reflection indicates not only the usefulness of *Google Maps* but also the significance of her personal experience in checking online maps for solving translation problems.

On the other hand, Una reported that she specifically checked for Little River in *Wikipedia* (see Table 5-5), but she felt that her solution was unsuccessful because there was little online information about the translation. Nevertheless, Una translated the ST segment by its literal meaning, small river (小河) which is another common translation on the web.

Una's reflection indicates that she might realise the limitation of consulting *Wikipedia* for translation, as mentioned by Joy about her uncertainty of the adequacy of *Wikipedia* for translating Little River (see Section 5.2.1.9). Regardless of the controversy over the credibility of *Wikipedia*, O'Neal (2006) believes that this type of Web 2.0 online encyclopedia should be a good starting point for learning and presents new methods for acquiring information. Compared with traditional paper-based encyclopedias, it is indeed easy and faster to obtain information from *Wikipedia* as a typical Web 2.0 resource. Hence, it is important for students to realise that no online information (including *Wikipedia*) should be used uncritically. In other words, information on *Wikipedia* should be used with caution and always be cross-checked with other web resources, and the skills of confirming and cross-checking information are what modern translation pedagogy should aim for.

The other main problem for most students is seen in Table 6-6, where the context of Myrtle Beach was largely perceived as an expression problem at the lexical level. This resembles the last problem with Little River.

Table 6-6 Main Translation Problem and Solutions in Task 3 (2)

ST Context and Problematic ST Segment	Problem Categories	Correct Interpretation of ST Segment	Observed Translations	External Resources Checked/Cross-checked
The crown jewel of the Grand Strand is the city of **Myrtle Beach**, which is the epi-center of all the action. Here high-rise condos and hotels line the sand, and the city is practically over-run with families on holiday.	Lexis-induced TT Expression (Alexandra, Jessie, and Una) **Difficulty:** The students had difficulty in choosing the most suitable translation for the ST segment because there are a few trans-lated versions on the web.	correct trans-lation as the literal translation or transliteration	**Unsuccessful Translation(s)/ Translation Shift(s):** N/A	N/A
			Successful Translation(s): '默特爾比奇' (Back Translation: the transliteration) and '默特爾海灘' (Back Translation: the literal translation) as shown by Alexandra, Jessie, and Una respec-tively	• *Wikipedia*, *Bing Dictionary*, and *Sina Blog* • *Baidu Baike* and *Booking* • *Wikipedia*, *Baidu Baike*, and *Bing Dictionary*

The data suggests that the students successfully translated the ST segment because they attempted to explore various translated versions online and choose one they thought was the best based on different considerations. Some students might think one version sounded better than the other; others would consider doing online research to see which versions were more frequently found.

In the interview (see Table 5-1), Alexandra reported that she found the transliteration of Myrtle Beach in *Wikipedia*, and she felt that her solution was successful because the transliteration of *Wikipedia* was the most frequently used version over those of the *Bing Dictionary* and *Sina Blog*. Alexandra chose the transliteration of the ST segment (默特爾比奇) which is a common translation on the web. Alexandra's reflection indicates that she actively compared the information of *Wikipedia* with that of the *Bing Dictionary* and *Sina Blog*.

Similarly, Jessie reported that she found the transliteration of Myrtle Beach in *Baidu Baike* and *Booking* (see Section 5.2.1.10), and she felt that her solution was successful because she spent time looking for the translation and believed that the transliteration sounded more authoritative. Jessie chose the transliteration of the ST segment（默特爾比奇）as Alexandra did. Jessie's reflection indicates that she was able to evaluate the information of *Baidu Baike* and *Booking* against other online information.

In contrast, Una found the transliteration of Myrtle Beach in *Wikipedia* and *Baidu Baike* (see Table 5-5), but she felt that this location name should be translated by the literal meaning of 'beach'. Although Una did not report whether her solution was successful, she chose the literal translation of the ST segment (默特爾海灘) in the *Bing Dictionary* which is another common translation on the web. Una's reflection indicates that she was able to evaluate the information in the *Bing Dictionary* against that in *Wikipedia* and *Baidu Baike*.

In summary, the three examples discussed above show that the students successfully translated Myrtle Beach due to their correct conception of the problem, which consequently led to their successful solutions by cross-checking different web resources for decision making. The students' reflection also indicates that they could manage uncertainty well in their metacognitive problem-solving and decision-making processes, which differs from Angelone and Shreve's finding (2011) that professional translators perform better uncertainty management (UCM) in their metacognitive problem-solving behaviours than translation students (see Section 2.1.2.1, Chapter 2). Finally, the students' successful translations again confirm Newell and Simon's problem-solving theory (1972) according to which reconstructing a problem space interacts with searching for solutions, and once the problem space is fully constructed, a solution is often found as a result.

6.2 Students' Learning of Translation and TC Development

6.2.1 What did students learn via their reflection on their problem-solving and decision-making behaviours?

In this section, I will summarise the students' problem-solving and decision-making behaviours that typically represent what they potentially learned and what TC they appeared to develop from their reflection, which will answer the first research question of Aim 2 for the present study (see Section 1.2, Chapter 1). Across the three tasks, new varieties of unconventional web resources are used and identified through the students' reflection. These resources include **online encyclopedias**, **online images** and **online maps**.

According to most students, the background knowledge of online encyclopedias was identified as more useful than other web resources not only for solving knowledge problems but also for understanding the ST information or finding suitable translations. The students' reflection indicates that they considered online encyclopedias to be a one-stop shop for all kinds of translation problems. This explains the students' effort of acquiring extra-linguistic knowledge to improve their ST comprehension and TT expressions and seems to echo the interrelation between extra-linguistic competence (PACTE 2003: 57) and ST-analytic and communicative competence (Nord 1992: 42; Göpferich 2009: 21). More importantly, this finding fills the gap in PACTE's model (2003) about the missing link of different TC development related to instrumental competence or web searching.

Some students highlighted online images as a useful way to solve their translation problems, particularly with ST comprehension. Some students also stressed that online maps supplemented the geographical information of other web resources such as travel websites. Thus, the students' reflection indicates that they not only used but also were consciously aware of an ever-increasing variety of web resources for cross-checking their translations. This largely tallies with the findings of previous studies (e.g. Massey and Ehrensberger-Dow 2011; Daems et al. 2016). Moreover, the students' reflection shows that the cue-based retrospective interview focusing on the success of their translation solutions encouraged them to justify their use of specific resources (whether these resources were successful in solving translation problems or not) in the 'post-decisional consolidation process' stage (Svenson 1992: 145). Moreover, this finding also fills the gap in Göpferich's model (2009) about the missing link between the students' instrumental competence and strategic (metacognitive) competence development.

6.2.2 How did students evaluate their translation performance and why did such evaluation occur?

The students' retrospective interview data shows that their general ratings for their translation performance grew higher during the course of undertaking the three tasks (see Section 5.2.2, Chapter 5). In other words, by completing the three tasks, and during the course of a one-year postgraduate translation degree, the students gradually built up more confidence in their abilities to solve translation problems and their self-concept as translators was enhanced (Ehrensberger-Dow and Massey 2013: 106). Largely based on the interview results, I will summarise and discuss in what ways and potentially why the students' self-concept changed for the better. It is also worth mentioning here that a minority of the students remained unsure whether they had learned or improved during the course of the year. These will be discussed separately in the

following and answer the second research question of Aim 2 for the present study (see Section 1.2, Chapter 1).

Overall, according to most students, the main reasons that they gave themselves higher ratings are that **they had become better at dealing with ST-comprehension problems, translating proper nouns of tourism texts and locating proper search results for translation due to their experience and consequent improvement in web searching**. These reasons are exemplified and discussed by the following students' reflection.

Firstly, Una rated her performance in Task 3 higher than in the previous tasks (see Table 5-15) because she claimed that the actual ST presented fewer comprehension problems in the first place, and the decreases of ST-comprehension problems also made her translate more efficiently. Similarly, Rebecca rated her performance in Task 3 higher than in Task 2 (see Table 5-16) because she claimed that she produced a natural TT due to her increased confidence in ST comprehension. Both the students' reflection shows that there was an enhancement of their self-concept as translators, particularly in terms of how they felt that they were able to deal with ST-comprehension problems.

Secondly, Jessie rated her performance in Task 3 higher than in the previous tasks (see Table 5-20) because she claimed that she did online research and was able to translate proper nouns properly. Jessie's reflection indicates that she enhanced her self-concept as a translator by carrying out online research, particularly in terms of how she felt that she was capable of choosing the most suitable translations of proper nouns from different versions on the web.

Thirdly, Hanna reported in Task 1 that she spent much time doing web searching but gained very few useful results for translation (see Section 5.2.1.4). However, she rated her performance in Task 2 higher than in Task 1 (see Table 5-14) and claimed that her information-searching skills became more efficient because she was controlling her pace in online searches for adequate translation results (see Section 5.2.2.4). Hanna's reflection indicates that she was trying to slow down and make sure that she took her time to appropriately evaluate online information or search results in Task 2. In other words, she benefited from doing metacognitive reflection on her web searching behaviours and decided to act to improve it next time. Therefore, Hanna enhanced her self-concept as a translator by her improvement in locating proper search results for translation.

By contrast, there were also occasions where some students gave lower ratings for their translation performance. For example, Isaac rated his performance in Task 3 lower than in the previous tasks (see Table 5-17) because he claimed to be critical of his translation and felt that he made little progress in solving translation problems. Isaac's reflection indicates that he might become frustrated by some unsolved translation problems and mistranslations as reported in Task 1 and Task 2 (also see Table 5-17). Consequently, he failed to build a positive self-image as a translator possibly because of his loss of self-confidence in translating tourism texts. This shows that there are two sides of the same coin, and despite the fact that most students found translation process research methods useful in aiding self-reflection, they may be of insufficient value for some students to simply self-reflect. More guidance is required for such students.

In the following, I will summarise and discuss the students' main comments on their self-evaluated translation performance in the three tasks. Firstly, online research was identified by most students as an important approach to solving translation problems, particularly knowledge problems, understanding the ST information and producing a better-quality TT (see Sections 5.2.3.1 and 5.2.3.2). This does not just indicate the significance of using web resources for translation but perhaps more importantly shows that web searching skills play a fundamental role in helping students to build a positive self-concept as translators.

Secondly, some students claimed to experiment with their overall translation approach regarding checking online information due to the level of their background knowledge and their translating experience (see Sections 5.2.3.3, 5.2.3.4, 5.2.3.7 and 5.2.3.9). In other words, they claimed to deliberately change their approach to web searching from checking-while-translating to checking-before-translating and vice versa. For example, Isaac tested the checking-while-translating and checking-before-translating approaches both in Task 1 and Task 2. In Task 3, he decided to read the ST and check unknown words before translating because he reckoned that the checking-before-translating approach, which he *intentionally* tested during the first two tasks, was working better for translating tourism texts (see Section 5.2.3.7). This suggests that Isaac's awareness (or self-concept) of the effect of this translation approach or more broadly, of his capacity of fulfilling the translation task, was enhanced and developed into professional translator competence (i.e. translation expertise) from the novice level to the expert level (Kiraly 2015) via his self-evaluation of translation performance during the course of a year.

As mentioned before, this provides more evidence that the retrospective interview as a self-reflection practice actually helps the students to become more aware of what they did and to make them plan and adapt different web searching strategies in order to improve their translations. Although the TA method may have its disadvantages (see Section 5.2.3.6), most students still rated this method highly in terms of how it made them concentrate on completing the tasks or selecting online information (see Sections 5.2.3.5 and 5.2.3.10). More importantly, some students claimed that this research project using the TA method and the retrospective interview helped them to become more acutely aware of how they solved their translation problems (see Sections 5.2.3.4, 5.2.3.5 and 5.2.3.6), which implies that this enhanced awareness can help the students become better translators in the future.

6.3 Students' Instrumental Competence Formation

6.3.1 How had students developed instrumental competence through their improvement in web searching skills?

This section will answer the first research question of Aim 3 for the present study (see Section 1.2, Chapter 1). Section 6.2.2 mentioned that it was web searching that most students appeared to reflect on regarding their improvement throughout the three tasks, and such reflection also points to the formation of **instrumental competence** (PACTE 2003: 58) as a particular focus of the present study. Figure 6-1 compares the total frequencies of the students' use of dictionaries (online and electronic) and machine translators with those of their use of search engines and web resources from Task 1 to Task 3 (see Figures 4-4, 4-5 and 4-6). Figure 6-1 indicates that the students' use of dictionaries (online and electronic) and machine translators had decreased from 70% to 52%, while their use of search engines and other web resources had increased from 30% to 48%. This explains that the students developed instrumental

competence through their metacognitive reflection on or awareness of the importance of web-based resources for translation, rather than predominantly relying on dictionary-based (web) resources and machine translators for simplistic TT equivalents of the ST items.

In other words, there are potentially both cognitive and behavioural shifts for the students. On the one hand, they learned to use the web better as an instrument to find useful information or search for solutions. On the other, they also developed an understanding that simplistic answers or solutions offered by dictionary-based (web) resources or machine translators should be treated with a pinch of salt and often require some forms of further cross-checking.
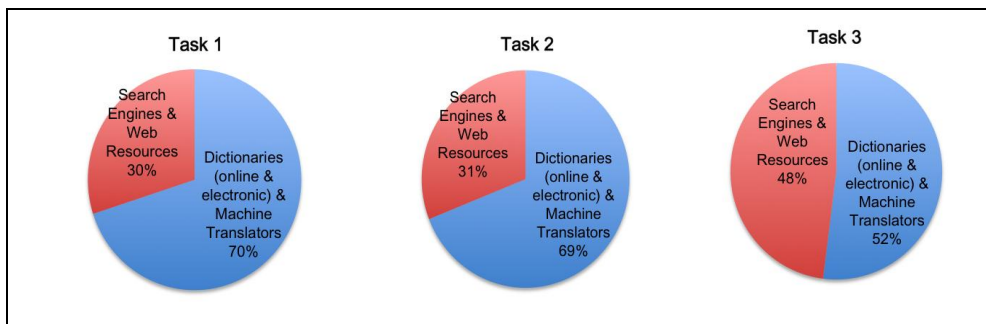

Figure 6-1 Students' Instrumental Competence Formation (3 Tasks)

6.3.2 In what aspects had students developed instrumental competence?

In the following, I will discuss how and in what respects the students developed instrumental competence as a research gap in EMT's model (2009). This will answer the second research question of Aim 3 for the present study (see Section 1.2, Chapter 1).

Firstly, a new finding of the present study concerning the students' consultation of online maps indicates that they had developed **thematic competence** as an indicator of instrumental competence by using appropriate information to grasp thematic knowledge needed for translation (EMT 2009: 7). The use of online maps is related to thematic competence because online maps (particularly *Google Maps*) are a specific type of web resource useful for translating tourism texts in many ways. For instance, the students in the present study checked *Google Maps* not only to find the translations of some location names but also to obtain concrete geographical information that helped them to translate these location names. The students' thematic competence development achieves the cognitive objective proposed by Alcina et al. (2007: 231) that they learned to retrieve subject and instrumental knowledge for solving translation problems.

Secondly, some students claimed that they improved the efficiency of their ability to locate proper search results, and they also claimed that they felt more comfortable with using web resources throughout the three tasks. This suggests that they had developed **information mining competence** as another indicator of instrumental competence by identifying information requirements and developing strategies for documentary research (EMT ibid: 6). The students' information mining competence development achieves the procedural objective proposed by Alcina et al. (ibid: 231) that they learned to plan for their online searches and assess suitable search results by controlling their web searching behaviours.

In summary, the present study demonstrates that a combination of translation process research methods (i.e. TA, screen recording and a cue-based retrospective interview) as self-reflection tools was particularly useful for developing students' instrumental competence, or more precisely, their web searching skills.

CHAPTER 7
CONCLUSION

7.0 Preamble

Section 7.1 stresses the significance of this research project and summarises the key findings based on its research questions. **Section 7.2** draws out the pedagogical implications of this research project from both the students' and the researcher's point of view. Finally, **Section 7.3** provides some recommendations for future research.

7.1 Significance of the Study and Key Findings

7.1.1 Significance of this Research Project

The significance of this research project is highlighted in the following points. Firstly, the present study observes the TC formation of ten Chinese students following a one-year long British postgraduate translation programme via three translation tasks they completed during the course of their degree. My research project is longitudinal in nature. Secondly, the present study includes a focus on web searching since this appears to be a main approach to solving translation problems, particularly seen from the students' point of view. Compared with other web searching studies, such as those done by Enríquez Raído (2011, 2014) and Shih (2017), my study covers a larger subject population longitudinally. Perhaps more importantly, the present study investigates not only students' cognitive behaviours but also their metacognitive behaviours as the data-elicitation methods also act as self-reflection tools for students to reflect on their cognitive behaviours.

7.1.2 Summary of Key Findings

In the present study, I used translation process research methods (i.e. TA, screen recording and a cue-based retrospective interview) as self-reflection tools to investigate students' problem-solving and decision-making behaviours in translating tourism texts from English into Chinese, their metacognitive reflection on their own behaviours and more importantly, their instrumental competence formation via web searching during three tasks over the course of an academic year. In the following, I will summarise the key findings by answering the research questions presented in Section 1.2, Chapter 1. The aims of the present study are reiterated in the following:

(1) To examine students' translation problems as well as their problem-solving and decision-making behaviours in three separate tasks throughout a one-year postgraduate translation degree

(2) To investigate students' (metacognitive) self-reflection as assisted by translation process research methods

(3) To explore students' competence formation related to web searching

One of the main findings (in relation to Aim 1) is that unsuccessful problem solving seems to derive from students' misconceptions or misjudgments of what their translation problems actually are in the first place. This is particularly evident in many students' mistranslations of 'greenery lines' and 'curry favor upon' in Task 1, as 'greenery lines' and 'curry favor upon' were mistaken to be a term or a fixed expression. In other words, a mistranslation could hardly be avoided if the nature and attribute of the translation problem are misjudged. This seems to point to a pedagogical need to emphasise **the importance of diagnosing or analysing what the problems are before starting to solve them**. Coupling this with the finding that most students seemed to have a good idea of whether their solution to a problem was successful or not (based on their metacognitive reflection in cue-based retrospective interviews), students should be advised to go back to re-diagnose their problem, particularly when they sensed an unsuccessful attempt or struggled to solve a translation problem.

The second finding indicates that although some students claimed that using some web resources to comprehend the ST segments was successful in their reflection (e.g. 'medina' and 'covered street market' in Task 2), translation shifts or mistranslations were still found due to their misinterpretation or misuse of online information. This is probably because students sometimes developed a particular reliance on a single (type) of web resource, which is very similar to Shih's finding (2017). Again, this finding suggests that in translator training, assignments could be designed in such a way that they specifically require students to analyse their unsuccessful solutions or unsuccessful web searching events and reflect on how they can ensure that they perform better next time.

The third finding shows that many students were able to manage their uncertainty well (as shown in their TAPs and interviews), or rather were able to tolerate a certain amount of uncertainty when they were making choices or trying to narrow down one single translation solution among different translations of ST proper nouns (e.g. Myrtle Beach in Task 3). This is similar to Angelone and Shreve's finding (2011) that professional translators tended to display better uncertainty management in their problem-solving behaviours. The difference here is that this phenomenon is not exclusively found in professional translators' behaviours.

Another important finding (in relation to Aim 2) is that students' cross-checking of unconventional web resources such as **online images** and **online maps** (e.g. *Google Maps*) may be helpful in solving particular types of translation problems in particular text types; in the instance of the present study, it is tourism texts. The usefulness of these resources may be directly linked to the fact that students were asked to translate tourism texts and often found themselves in need of locating and cross-checking the translations of ST proper nouns with geographical significance. However, the significance of this finding is not so much about the fact that online

images or online maps were used, but about the value of the cue-based retrospective interview as **a (metacognitive) self-reflection tool for honing students' instrumental competence (i.e. web searching skills)**. It is clear to see that some students truly benefited from reflecting on their translation behaviours via re-visiting their on-screen behaviours.

Meanwhile, the present study shows that the cue-based retrospective interview prompted students to justify the usefulness of online images and online maps, and this further demonstrates their development of strategic (metacognitive) competence in relation to instrumental competence or web searching.

Pertaining to the second research question of Aim 2 about students' self-evaluation of their translation performance, a finding shows that students' general ratings of their own translation performance across the three tasks were on the rise. The main reason for their increased ratings was found to be linked to **their gradual awareness of improvement in web searching skills**. As web searching seemed to directly help them to tackle ST-comprehension problems and to choose suitable translations of ST proper nouns, students were able to locate suitable search results more efficiently. Some students learned to apply extra-linguistic knowledge gained from online encyclopedias to better understand the ST information and choose suitable translations. This demonstrates that students' extra-linguistic competence and ST-analytic and communicative competence were very much internalised in the vortices of experience and learning (Kiraly 2015) during their web searching events.

In terms of students' comments on their translation performance and their cognitive behaviours, there is evidence that a positive self-concept as a translator was gradually built via metacognitive reflection. For instance, some students reflected on why they deliberately changed their web searching approach from checking-while-translating to checking-before-translating, as they thought that this approach was more effective. This shows not only their enhanced self-concept as a result of this web searching approach but also a gradual formation of professional translator competence (i.e. translation expertise).

One of the last findings (in relation to Aim 3) shows that students gradually moved away from dictionary-based (web) resources and machine translators to other web-based resources to solve their translation problems across the three tasks. This displays students' instrumental competence formation as exemplified by their gradual progress in web searching skills. Another finding indicates that students checked for more subject and instrumental knowledge needed for translation (e.g. in *Google Maps* for geographical knowledge) rather than wanting to find TT equivalents only.

In summary, the present study demonstrates the significance of triangulating TA, screen recording and cue-based retrospective interviews as a set of metacognitive self-reflection tools for developing students' instrumental competence and their web searching skills in particular.

7.2 Pedagogical Implications

This section summarises the pedagogical implications of this research project from both the students' and the researcher's point of view.

From the students' point of view, the three research methods (i.e. TA, screen recording and a cue-based retrospective interview) acted as **self-learning tools** to assist them in identifying what their translation problems were, why these problems occurred, what solutions they used to tackle these problems and how successful these solutions were. The students also thought that the retrospective interview provided an opportunity for them to spot their weaknesses in solving translation problems and then realise what should be improved in the future. This confirms Pym's (2009) view of the pedagogical value of translation process research. Pym found that his postgraduate translation students used his 'lousy' process-based experiments to discover their own improvement in translation (also see the finding reported in Section 7.1.2 that students can use an assignment to analyse their unsuccessful solutions or web searching events for later improvement).

From the researcher's point of view, however, the three research methods serve as not only data-collection tools to investigate students' translation behaviours but also **pedagogical tools** or more specifically, a type of pedagogical intervention, to enable students to reflect on and evaluate their translation problems, solutions and performance. Largely based on the research data, the researcher also argues that the combination of the three research methods used as self-reflection tools not only helps students to acquire instrumental competence but also makes them become better translators because of the enhancement to their self-concept derived from their improvement in web searching.

7.3 Recommendations for Future Research

In terms of the methodology of the present study, some recommendations are provided for future research in what follows.

The first recommendation is related to **the limitation of using the TA method in the present study**. In the field of translation process research, data produced by the latest digital tools, such as eye-tracking and key logging software, are often dubbed as 'hard data' as they are deemed to be more scientifically objective. This is why hard data has played an important role in translation process research in the past decade. This is in contrast to the 'soft data', i.e. the TA method and verbal reports, which forms a large part of the present study. The potential limitation of the TA method was discussed in Section 3.1.1.2, Chapter 3 and will not be repeated here. Thus, future studies will benefit from combining both 'hard data' (as collected by Translog and eye-tracking) and 'soft data' so that more fruitful results can be produced.

Secondly, it is about **the inclusion of other groups of subjects for different study purposes**. The present study of course focuses on the TC development of Chinese translation students on a one-year postgraduate programme, particularly with reference to their web searching behaviours. In terms of these behaviours, surprisingly little is known about not only students' behaviours but also those of professionals. Therefore, students and professionals' web searching behaviours can be studied and compared, particularly when one aim is to examine the expertise involved in such behaviours.

In addition, in terms of longitudinal TC development, investigating undergraduate translation students may be preferable, as it offers a considerably longer period of time. If it is for studying translation universals, then subjects with different cultural and linguistic backgrounds could be considered. In other words, similar research projects could be tailored based on their specific research focus to refine and improve the findings of this research project so that our understanding of translators' behaviours can be further enhanced.

References

Alcina, A. et al. (2007). Translation Technology Skills Acquisition. *Perspectives: Studies in Translatology, vol. 15, no. 4*, 230-44.

Alves, F. (2005). Bridging the Gap Between Declarative and Procedural Knowledge in the Training of Translators: Meta-Reflection Under Scrutiny. *Meta, vol. 50, no. 4.*

Adab, B. (2000). Evaluating Translation Competence. In Schäffner, C. and Adab, B. (eds.), *Developing Translation Competence.* John Benjamins: Amsterdam/Philadelphia, 215-28.

Angelone, E. (2013). The impact of process protocol self-analysis on errors in the translation product. In Baer, B. J. and Maier, C. S. (eds.), *Translation and Interpreting Studies Special Issue, Describing Cognitive Processes in Translation: Acts and events, vol. 8, no. 2.* John Benjamins: Amsterdam/Philadelphia, 253-71.

Angelone, E. (2012). The Place of Screen Recording in Process-oriented Translator Training. *RITT, no. 14*, 41-55.

Angelone, E. and Shreve, G. M. (2011). Uncertainty Management, Metacognitive Bundling in Problem-solving, and Translation Quality. In O'Brien, S. (ed.), *Cognitive Explorations of Translation: Continuum Studies in Translation.* Continuum: London, 108-30.

Angelone, E. (2010). Uncertainty, uncertainty management, and metacognitive problem solving in the translation task. In Shreve, G. M. and Angelone, E. (eds.), *Translation and Cognition.* John Benjamins: Amsterdam, 17-40.

Barkhudarov, L. (1993). The problem of the unit of translation. In Zlateva, P. (ed.), *Translation as Social Action: Russian and Bulgarian Perspectives.* Routledge: London and New York, 39-46.

Bell, R. T. (1991). *Translation and Translating.* Longman: London.

Beeby Lonsdale, A. (1996). *Teaching Translation from Spanish to English: Didactics of Translation Series, no. 3.* University of Ottawa Press: Ottawa.

Bernardini, S. (2001). Think-aloud Protocols in Translation Research: Achievements, Limits, Future Prospects. *Target, vol. 13, no. 2*, 241-63.

Bowles, M. A. and Leow, R. P. (2005). Reactivity and type of verbal report in SLA research methodology: Expanding the scope of investigation. *Studies in Second Language Acquisition, vol. 27, no. 3*, 415-40.

Bransford, J. D. and Stein, B. S. (1993). *The Ideal Problem Solver: A Guide for Improving Thinking, Learning, and Creativity, 2nd ed.* W. H. Freeman: New York.

Catford, J. C. (1965). *A Linguistic Theory of Translation: an Essay in Applied Linguistics.* Oxford University Press: London.

Chang, C.- C. and Schallert, D. L. (2007). The impact of directionality on Chinese/English simultaneous interpreting. *Interpreting, Vol. 9, No. 2*, 137-76.

Cozma, M. (2012). Perceptions of Cultural Competence: The Trainees' Perspective. *Professional Communication and Translation Studies, vol. 5, no. 1-2*, 67-74.

Charmaz, K. (2001). Grounded Theory. In Emerson, R. M. (ed.), *Contemporary field research: Perspectives and formulations*. Waveland Press: Prospect Heights, 335-52.

Daems, J. et al. (2016). The Effectiveness of Consulting External Resources During Translation and Post-Editing of General Text Types. In Carl, M., Bangalore, S., and Schaeffer, M. (eds.), *New Directions in Empirical Translation Process Research: Exploring the CRITT TPR-DB*. Springer International Publishing: London, 111-34.

Dancette, J. (1997). Mapping Meaning and Comprehension in Translation: Theoretical and Experimental Issues. In Danks, J. H., Shreve, G. M., Fountain, S. B., and McBeath, M. K. (eds.), *Cognitive Processes in Translation and Interpreting. Applied Psychology: Individual, Social, and Community, Issues 3*. Sage: Thousand Oaks, 77-103.

Davidson, J. E. and Sternberg, R. J. (2003). *The Psychology of Problem Solving*. Cambridge University Press: New York.

Duncker, K. (1945). On problem solving. *Psychological Monographs, vol. 58, no. 5*, i-113.

Edwards, R. and Holland, J. (2013). *What Is Qualitative Interviewing*. Bloomsbury: London and New York.

Ehrensberger-Dow, M. and Massey, G. (2013). Indicators of translation competence: Translators' self-concepts and the translation of titles. *Journal of Writing Research, vol. 5, no. 1*, 103-31.

Ehrensberger-Dow, M. and Künzli, A. (2010). Methods of accessing metalinguistic awareness: a question of quality. In Göpferich, S., Alves, F., and Mees, I. M. (eds.), *New Approaches in Translation Process Research, Copenhagen Studies in Language, vol. 39*. Samfundslitteratur Press: Copenhagen, 113-32.

Ehrensberger-Dow, M. and Perrin, D. (2009). Capturing Translation Processes To Access Metalinguistic Awareness. *Across Languages and Cultures, vol. 10, no. 2*, 275-88.

EMT (2009). *Competences for professional translators, experts in multilingual and multimedia communication.* European Commission: Brussels.

Englund Dimitrova, B. and Tiselius, E. (2009). Exploring retrospection as a research method for studying the translation process and the interpreting process. In Mees, I. M., Alves, F., and Göpferich, S. (eds.), *Methodology, Technology, and Innovation in Translation Process Research: A Tribute to Arnt Lykke Jakobsen, Copenhagen Studies in Language, vol. 38.* Samfundslitteratur Press: Copenhagen, 109-34.

Englund Dimitrova, B. (2005). *Expertise and Explicitation in the Translation Process.* John Benjamins: Amsterdam.

Englund Dimitrova, B. (2002). Training and educating the trainers: A key issue in translators' training. In Hung, E. (ed.), *Teaching Translation and Interpreting 4: Building Bridges.* John Benjamins: Amsterdam/Philadelphia, 73-82.

Enríquez Raído, V. (2014). *Translation and Web Searching.* Routledge: New York and London.

Enríquez Raído, V. (2011). Developing Web Searching Skills in Translator Training. *redit, número, vol. 6*, 57-77.

Ericsson, K. A. and Simon, H. A. (1998). How to study thinking in everyday life: Contrasting think-aloud protocols with descriptions and explanations of thinking. *Mind, Culture, and Activity, vol. 5, no. 3*, 178-86.

Ericsson, K. A. and Simon, H. A. (1993). *Protocol Analysis: Verbal Reports as Data*. MIT Press: Cambridge.

Ericsson, K. A. and Simon, H. A. (1987). Verbal reports on thinking. In Færch, C. and Kasper, G. (eds.), *Introspection in Second Language Research, vol. 24-53*. Multilingual Matters: Clevedon/Philadelphia.

Ericsson, K. A. and Simon, H. A. (1980). Verbal reports as data. *Psychological Review, vol. 87, no. 3*, 215-51.

Fraser, J. (2000). The Broader View: How Freelance Translators Define Translation Competence. In Schäffner, C. and Adab, B. (eds.), *Developing Translation Competence*. John Benjamins: Amsterdam/Philadelphia, 51-62.

Fraser, J. (1996). The Translator Investigated: Learning from Translation Process Analysis. *The Translator, vol. 2, no. 1*, 65-79.

Fraser, J. (1994). Translating Practice into Theory: A Practical Study of Quality in Translator Training. In Picken, C. (ed.), *ITI Conference Proceedings 7*. Institute of Translation and Interpreting: London, 130-41.

Galán-Mañas, A. and Hurtado Albir, A. (2015). Competence assessment procedures in translator training. *The Interpreter and Translator Trainer, vol. 9, no. 1*, 63-82.

Gerloff, P. (1988). *From French to English: A Look at the Translation Process in Students, Bilinguals, and Professional Translators.* PhD Thesis. University Microfilms International: Ann Arbor.

Gerloff, P. (1986). Second Language Learners' Reports on the Interpretive Process: Talk-aloud Protocols of Translation. In House, J. and Blum-Kulka, S. (eds.), *Interlingual and Intercultural Communication: Discourse and Cognition in Translation and Second Language Acquisition Studies.* Gunter Narr: Tübingen, 243-62.

Göpferich, S. et al. (2011). Exploring Translation Competence Acquisition: Criteria of Analysis Put to the Test. In O'Brien, S. (ed.), *Cognitive Explorations of Translation: Continuum Studies in Translation.* Continuum: London, 57-85.

Göpferich, S. (2010). The translation of instructive texts from a cognitive perspective: novices and professionals compared. In Göpferich, S., Alves, F., and Mees, I. M. (eds.), *New Approaches in Translation Process Research, Copenhagen Studies in Language, vol. 39.* Samfundslitteratur Press: Copenhagen, 5-55.

Göpferich, S. (2009). Towards a model of translation competence and its acquisition: the longitudinal study *TransComp.* In Göpferich, S., Jakobsen, A. L., and Mees, I. M. (eds.), *Behind the mind: Methods, models and results in translation process research, Copenhagen Studies in Language, vol. 37.* Samfundslitteratur Press: Copenhagen, 11-37.

Göpferich, S. and Jääskeläinen, R. (2009). Process Research into Translation Competence: Where are we, and where do we need to go. *Across Languages and Cultures, vol. 10, no. 2*, 169-91.

Göpferich, S. (2007). *Research Project TransComp: The Development of Translation Competence.* Available: http://gams.uni-graz.at/fedora/get/container:tc/bdef:Container/get.

Hansen, G. (2008). The Dialogue In Translation Process Research. *Translation and Cultural Diversity: Selected Proceedings of the XVIII FIT World Congress*. Foreign Languages Press: Shanghai, 1-13.

Hansen, G. (2006). Retrospection methods in translator training and translation research. *Journal of Specialised Translation, no. 5*, 2-41.

Hansen, G. (2003). Controlling the process: Theoretical and methodological reflections on research into translation process. In Alves, F. (ed.), *Triangulating Translation: Perspectives in Process Oriented Research*. John Benjamins: Amsterdam/Philadelphia, 25-42.

Hansen, G. (1997). Success in Translation. *Perspectives: Studies in Translatology, vol. 5, no. 2*, 201-10.

Harris, R. (1998). *Introduction to Decision Making*. Available: http://www.virtualsalt.com/crebook5.htm.

Holton, D. and Clarke, D. (2006). Scaffolding and Metacognition. *International Journal of Mathematical Education in Science and Technology, vol. 37, no. 2*, 127-43.

Hönig, H. G. (1995). *Konstruktives Übersetzen*. Stauffenburg: Tübingen.

Hymes, D. (1967). Why linguistics needs the sociologist. *Social Research, vol. 34, no. 2*, 634-47.

House, J. (1981). *A Model for Translation Quality Assessment, 2nd ed.* Gunter Narr: Tübingen.

Jääskeläinen, R. (2011). Back to Basics: Designing a Study to Determine the Validity and Reliability of Verbal Report Data on Translation Processes. In O'Brien, S. (ed.), *Cognitive Explorations of Translation: Continuum Studies in Translation*. Continuum: London, 15-29.

Jääskeläinen, R. (2009). Looking for a working definition of 'translation strategies'. In Mees, I. M., Alves, F., and Göpferich, S. (eds.), *Methodology, Technology, and Innovation in Translation Process Research: A Tribute to Arnt Lykke Jakobsen, Copenhagen Studies in Language, vol. 38*. Samfundslitteratur Press: Copenhagen, 375-87.

Jääskeläinen, R. (2002). Think-aloud protocol studies into translation: An annotated bibliography. *Target, vol. 14, no. 1*, 107-36.

Jääskeläinen, R. (1999). *Tapping the Process: An Explorative Study of the Cognitive and Affective Factors Involved in Translating*. PhD Thesis. University of Joensuu: Joensuu.

Jääskeläinen, R. (1993). Investigating Translation Strategies. In Tirkkonen-Condit, S. and Laffling, J. (eds.), *Recent Trends in Empirical Translation Research*. University of Joensuu: Joensuu, 99-120.

Jääskeläinen, R. and Tirkkonen-Condit, S. (1991). Automatised Processes in Professional vs. Non-professional Translation: A Think-Aloud Protocol Study. In Tirkkonen-Condit, S. (ed.), *Empirical Research in Translation and Intercultural Studies*. Gunter Narr: Tübingen, 89-110.

Jääskeläinen, R. (1987). *What Happens in a Translation Process: Think-aloud Protocols of Translation*. Savonlinaa School of Translation Studies: University of Joensuu.

Jakobsen, A. L. (2003). Effects of Think Aloud on Translation Speed, Revision and Segmentation. In Alves, F. (ed.), *Triangulating Translation: Perspectives in Process Oriented Research*. John Benjamins: Amsterdam, 69-95.

Jarvella, R. J. et al. (2002). Towards characterizing translator expertise, knowledge and know-how: some findings using TAPs and experimental methods. In Riccardi, A. (ed.), *Translation Studies: Perspectives on an Emerging Discipline*. Cambridge University Press: New York, 172-97.

Kim, R. H. (2006). Use of Extralinguistic Knowledge in Translation. *Meta, vol. 51, no. 2*, 284-303.

Kiraly, D. C. (2015). Occasioning translator competence: Moving beyond social constructivism toward a postmodern alternative to instructionism. *Translation and Interpreting Studies, vol. 10, no. 1*, 8-32.

Kiraly, D. C. (2000). *A Social Constructivist Approach to Translator Education: Empowerment from Theory to Practice*. St. Jerome: Manchester.

Kiraly, D. C. (1997). Think-Aloud Protocols and the Construction of a Professional Translator Self-Concept. In Danks, J. H., Shreve, G. M., Fountain, S. B., and McBeath, M. K. (eds.), *Cognitive Processes in Translation and Interpreting. Applied Psychology: Individual, Social, and Community, Issues 3*. Sage: Thousand Oaks, 137-60.

Kiraly, D. C. (1995). *Pathways to Translation: Pedagogy and Process*. Kent State University Press: Kent/Ohio.

Krings, H. P. (2001). *Repairing Texts: Empirical Investigations of Machine Translation Post-editing Processes (Koby, G. S., Shreve, G. M., Mischerikow, K., and Litzer, S. trans.)*. The Kent State University Press: Kent, Ohio, and London.

Krings, H. P. (1987). The Use of Introspective Data in Translation. In Færch, C. and Kasper, G. (eds.), *Introspection in Second Language Research*. Multilingual Matters: Clevedon, 159-76.

Krings, H. P. (1986). Translation problems and translation strategies of advanced German learners of French (L2). In House, J. and Blum-Kulka, S. (eds.), *Interlingual and Intercultural Communication: Discourse and Cognition in Translation and Second Language Acquisition Studies*. Gunter Narr: Tübingen, 263-76.

Kussmaul, P. (1997). Comprehension processes and translation. A think-aloud protocol (TAP) study. In Snell-Hornby, M., Jettmarová, Z., and Kaindl, K. (eds.), *Translation as Intercultural Communication*. John Benjamins: Amsterdam/Philadelphia, 239-48.

Kussmaul, P. (1995). *Training the Translator*. John Benjamins: Amsterdam.

Lesznyák, M. (2007). Conceptualizing Translation Competence. *Across Languages and Cultures, vol. 8, no. 2*, 167-94.

Leech, G. (2006). *A Glossary of English Grammar*. Edinburgh University Press: Edinburgh.

Lee-Jahnke, H. (2005). New Cognitive Approaches in Process-Oriented Translation Training. *Meta, vol. 50, no. 2*, 359-77.

Li, S.- Q. 李淑琴 (2001). 語境—正確翻譯的基礎—英語專業八級考試 (2000 年) 英譯漢試卷評析 (Context and Translation: Comments on the TEM-8 (2000) English-to-Chinese Translation). *Chinese Translators Journal, vol. 22, no. 1*, 42-46.

Lörscher, W. (1996). A Psycholinguistic Analysis of Translation Processes. *Meta, vol. 41, no. 1*, 26-32.

Lörscher, W. (1992). Process-Oriented Research into Translation and Implications for Translation Teaching. *TTR, vol. 5, no. 1*, 145-61.

Lörscher, W. (1991). *Translation Performance, Translation Process, and Translation Strategies: A Psycholinguistic Investigation*. Gunter Narr: Tübingen.

Massey, G. and Ehrensberger-Dow, M. (2011). Technical and Instrumental Competence in the Translator's Workplace: Using Process Research to Identify Educational and Ergonomic Needs. *ILCEA, vol. 14*, 1-12.

Martínez Melis, N. and Hurtado Albir, A. (2001). Assessment in Translation Studies: Research Needs. *Meta, vol. 46, no. 2*, 272-87.

Molina, L. and Hurtado Albir, A. (2002). Translation Techniques Revisited: A Dynamic and Functional Approach. *Meta, vol. 47, no. 4*, 498-512.

Mondahl, M. and Jensen, K. A. (1996). Lexical Search Strategies in Translation. *Meta, vol. 41, no. 1*, 97-113.

Montafej, J. and Nemati, A. (2014). Investigating Translation Competence and its Sub-competencies through Different Viewpoints and Proposing PACTE Group Model as the Best One. *International Journal of Language Learning and Applied Linguistics World (IJLLALW), vol. 5, no. 1*, 9-25.

Montgomery, H. (1989). From cognition to action: the search for dominance in decision making. In Montgomery, H. and Svenson, O. (eds.), *Process and Structure in Human Decision Making*. John Wiley & Sons: New York, 23-49.

Muñoz Martín, R. (2010). On Paradigms and Cognitive Translatology. In Shreve, G. M. and Angelone, E. (eds.), *Translation and Cognition*. John Benjamins: Amsterdam, 169-87.

Napier, J. (2004). Interpreting omissions: A new perspective. *Interpreting, vol. 6, no. 2*, 117-42.

Neubert, A. (2000). Competence in Language, in Languages, and in Translation. In Schäffner, C. and Adab, B. (eds.), *Developing Translation Competence*. John Benjamins: Amsterdam/Philadelphia, 3-18.

Newell, A. and Simon, H. A. (1972). *Human problem solving*. Prentice-Hall: Englewood Cliffs, N. J.

Newmark, P. (1988). *Approaches to Translation*. Prentice-Hall: Hertfordshire.

Nida, E. A. (2001). *Contexts in Translating*. John Benjamins: Amsterdam.

Nida, E. A. (1964). *Towards a Science of Translation: With Special Reference to Principles and Procedures Involved in Bible Translating*. Brill: Leiden.

Nord, C. (1992). Text Analysis in Translator Training. In Dollerup, C. and Loddegaard, A. (eds.), *Teaching Translation and Interpreting: Training Talent and Experience*. John Benjamins: Amsterdam/Philadelphia, 39-48.

Nord, C. (1991). *Text Analysis in Translation*. Rodopi: Amsterdam.

O'Neal, C. (2006). *Using Wikipedia in the Classroom: A Good Starting Point*. Available: http://www.edutopia.org/using-wikipedia-classroom.

Orozco, M. and Hurtado Albir, A. (2002). Measuring Translation Competence Acquisition. *Meta, vol. 47, no. 3*, 375-402.

Ou, Y.- Y. 歐陽燕 (2005). 長句的邏輯翻譯法 (Logic Analysis and Synthesis of Syntactic Translation). *Journal of Xi'an International Studies University, vol. 13, no. 2*, 78-80.

PACTE (2011). Results of the validation of the PACTE translation competence model: Translation problems and translation competence. In Alvstad, C., Hild, A., and Tiselius, E. (eds.), *Methods and Strategies of Process Research: Integrative Approaches in Translation Studies*. John Benjamins: Amsterdam, 317-43.

PACTE (2005). Investigating Translation Competence: Conceptual and Methodological Issues. *Meta, vol. 50, no. 2*, 609-19.

PACTE (2003). Building a Translation Competence Model. In Alves, F. (ed.), *Triangulating Translation: Perspectives in Process Oriented Research*. John Benjamins: Amsterdam, 43-66.

PACTE (2000). Acquiring Translation Competence: Hypotheses and Methodological Problems of a Research Project. In Beeby Lonsdale, A., Ensinger, D., and Presas, M. (eds.), *Investigating Translation: Selected Papers from the 4th International Congress on Translation, Barcelona, 1998*. John Benjamins: Amsterdam/Philadelphia, 99-106.

Pym, A. (2009). Using process studies in translator training: self-discovery through lousy experiments. In Mees, I. M., Alves, F., and Göpferich, S. (eds.), *Methodology, Technology, and Innovation in Translation Process Research: A Tribute to Arnt Lykke Jakobsen, Copenhagen Studies in Language, vol. 38*. Samfundslitteratur Press: Copenhagen, 135-55.

Pym, A. (2003). Redefining Translation Competence in an Electronic Age: In Defence of a Minimalist Approach. *Meta, vol. 48, no. 4*, 481-97.

Pym, A. (1993). *Epistemological Problems in Translation and its Teaching*. Caminade: Teruel.

Pavlović, N. and Jensen, K. T. H. (2009). Eye tracking translation directionality. In Pym, A. and Perekrestenko, A. (eds.), *Translation Research Projects 2*. Tarragona: Intercultural Studies Group, 93-109.

Ransdell, S. (1995). Generating Thinking-Aloud Protocols: Impact on the Narrative Writing of College Students. *The American Journal of Psychology, vol. 108, no. 1*, 89-98.

Romainville, M. (1994). Awareness of cognitive strategies: the relationship between university students' metacognition and their performance. *Studies in Higher Education, vol. 19, no. 3*, 359-66.

Rubin, H. J. and Rubin, I. S. (2005). *Qualitative Interviewing: The Art of Hearing Data, 2nd ed*. Sage: Thousand Oaks.

Saldanha, G. and O'Brien, S. (2013). *Research Methodologies in Translation Studies*. St. Jerome: Manchester.

Séguinot, C. (1996). Some Thoughts about Think-aloud Protocols. *Target, vol. 8, no. 1*, 75-95.

Séguinot, C. (1991). A Study of Student Translation Strategies. In Tirkkonen-Condit, S. (ed.), *Empirical Research in Translation and Intercultural Studies.* Gunter Narr: Tübingen, 79-88.

Séguinot, C. (1989). The translation process: an experimental study. In Séguinot, C. (ed.), *The Translation Process.* H. G. Publications: Toronto, 21-53.

Shei, C.- C. 解志強 (2010). *翻譯與網路資源: 理論, 標準, 實務 (Translation and Web Resources: Theory, Practice, and Norm)*. Win-Join Company: Taipei.

Shih, Y.- Y. (2017). Web search for translation: an exploratory study on six Chinese trainee translators' behaviour. *Asia Pacific Translation and Intercultural Studies, vol. 4, no. 1*, 50-66.

Shih, Y.- Y. (2006). *Translator's revision process: global revision approaches and strategic revision behaviours*. PhD Thesis. Newcastle University: Newcastle upon Tyne.

Shreve, G. M. (2009). Recipient-orientation and metacognition in the translation process. In Dimitriu, R. and Shlesinger, M. (eds.), *Translators and their readers: in homage to Eugene A. Nida*. Les Editions du Hazard: Brussels, 255-70.

Shreve, G. M. (1997). Cognition and the Evolution of Translation Competence. In Danks, J. H., Shreve, G. M., Fountain, S. B., and McBeath, M. K. (eds.), *Cognitive Processes in Translation and Interpreting. Applied Psychology: Individual, Social, and Community, Issues 3*. Sage: Thousand Oaks, 120-36.

Sun, S.- J. and Shreve, G. M. (2014). Measuring translation difficulty: An empirical study. *Target, vol. 26, no. 1*, 98-127.

Sun, S.- J. (2011). Think-Aloud-Based Translation Process Research: Some Methodological Considerations. *Meta, vol. 56, no. 4*, 928-51.

Svenson, O. (1992). Differentiation and consolidation theory of human decision making: a frame of reference for the study of pre- and post-decision processes. *Acta Psychologica, no. 80*, 143-68.

Sykes, J. B. (1989). *The Translator's Handbook, 2ⁿᵈ ed.* Aslib: London.

Szczepaniak, R. (2007). *The Role of Dictionary Use in the Comprehension of Idiom Variants*. Max Niemeyer Verlag: Tübingen.

Tirkkonen-Condit, S. (2000). Uncertainty in translation processes. In Tirkkonen-Condit, S. and Jääskeläinen, R. (eds.), *Tapping and Mapping the Processes of Translation and Interpreting: Outlooks on Empirical Research*. John Benjamins: Amsterdam/Philadelphia, 123-42.

Tirkkonen-Condit, S. and Jääskeläinen, R. (eds.) (2000). *Tapping and Mapping the Processes of Translation and Interpreting: Outlooks on Empirical Research*. John Benjamins: Amsterdam/Philadelphia.

Tirkkonen-Condit, S. (1989). Professional Versus Non-professional Translation: A Think-aloud Protocol Study. In Séguinot, C. (ed.), *The Translation Process*. H. G. Publications: Toronto, 73-85.

Toury, G. (1995). *Descriptive Translation Studies and Beyond*. John Benjamins: Amsterdam/Philadelphia.

Wakabayashi, J. (2003). Think-alouds as a pedagogical tool. In Baer, J. and Koby, G. S. (eds.), *Beyond the Ivory Tower: Rethinking Translation Pedagogy. American Translators Association Scholarly Monograph Series, vol. XII*. John Benjamins: Philadelphia, 61-82.

Wang, J.- W. (2005). *Another Look at Reactivity in L2 Think-aloud Protocols: A Replication Study*. MA Thesis. Michigan State University: East Lansing.

Wilss, W. (1996). *Knowledge and Skills in Translator Behavior*. John Benjamins: Amsterdam/Philadelphia.

Wilss, W. (1989). Towards a Multi-facet Concept of Translation Behavior. *Target, vol. 1, no. 2*, 129-49.

Zheng, B.- H. (2014). The role of consultation sources revisited: An empirical study of English-Chinese translation. *Perspectives: Studies in Translatology, vol. 22, no. 1*, 113-35.

Zheng, B.- H. (2008). *Choice-making in the Process of English-to-Chinese Translation: An Empirical Study*. PhD Thesis. Nanyang Technological University: Singapore.

Appendix 1: Task 1 ST and Translation Brief

Translation Brief

This tourism article (418 words) extracted from *Traveler's Digest* introduces Luxor in Egypt about its geography and historical buildings. This article aims to attract people who would like to travel in Luxor but have no prior knowledge of history and geography about it. Imagine that you work for *Traveler's Digest* as a translator and need to promote Luxor to the Chinese-speaking tourists through translating this article into Chinese as the target language. Please also translate the title of the article in your translation. Make sure of a coherent and readable translation for the target readers.

This article can be found at: http://www.travelersdigest.com/4467-visiting-the-ancient-city-of-luxor/.

Visiting the Ancient City of Luxor

At one time, 4,000 years ago, the ancient city of Luxor was one of the greatest cities in the world. The golden-era of Thebes, as Luxor was then known, lasted for thousands of years and its grandeur rivaled even that of Athens or Rome. Roughly 700 kilometers south of Cairo, Luxor, like most Egyptian cities, sits on the River Nile. The longest river in the world, a small patch of greenery lines the shores of the River Nile as it snakes through the Sahara Desert and its waters are the only reason civilization ever flourished here.

In Luxor it creates quite the contrast, as the city itself is rather green with its suburbs dominated by small farming plots, but travel just a few minutes outside of the city and one could be forgiven for thinking that the massive sand dunes and mountains of the Sahara were endless.

The Luxor Temple is in the center of the city and its giant sandstone columns covered in hieroglyphs offer an imposing first impression of the city. The complex is even more impressive at night, when it's possible to visit the illuminated ruins and admire the small statues of the Avenue of Sphinxes without the crowds that throng the site in the day.

The hieroglyphs that adorn every inch of the temple contain the spiritual knowledge of ancient Egypt. The decline of the Egyptian civilization and religion happened rather quickly and so rapid was the displacement of hieroglyphics by the Greek alphabet that the meanings of the hieroglyphs were lost even to the modern Egyptians themselves.

Outside of Luxor, on the west side of the River Nile, the Valley of the Kings beckons to be explored. The official burial site of the Egyptian pharaohs for over 500 years, elaborate underground burial chambers that were constructed to safeguard the mummified remains of the kings of Egypt line the valley.

Leaving the Valley of the Kings a small trail climbs the mountain and leads hikers on a 45-minute trek through the desert to its payoff of stunning panoramic views of the Mortuary Temple of Hatshepsut. This temple was built by Queen Hatshepsut, Egypt's first female ruler, to curry favor upon her death with the sun god Amon Ra, and it sits just across the mountain from her tomb in the Valley of the Kings.

Though there are always more wonders to discover, the gist of it is that a trip to Luxor is an unforgettable journey into ancient Egypt that should not be missed.

Appendix 2: Task 2 ST and Translation Brief

Translation Brief

This tourism article (422 words) extracted from *Traveler's Digest* introduces an African city Marrakech in Morocco about its urban views and market. This article aims to attract people who would like to travel in Marrakech but have no prior knowledge about this city. Imagine that you work for *Traveler's Digest* as a translator and need to promote Marrakech to the Chinese-speaking tourists through translating this article into Chinese as the target language. Please also translate the title of the article in your translation. Make sure of a coherent and readable translation for the target readers.

This article can be found at: http://www.travelersdigest.com/3902-the-sights-and-souks-of-marrakech/.

Visiting the Sights and Souks of Marrakech

Marrakech is a city from another time and visiting its walled medina is an incredible experience of twisting lanes lined with spice markets, souks and vendors, with a few palaces and mosques interspersed among the maze.

Travelers staying in the medina will be further challenged once their taxi drops them off at the Jemaa el-Fnaa Square and it's left up to them to find their way to their accommodation on the pedestrian-only lanes of the city.

The ideal lodging choice in the city is at one of its many riads, which is basically a sort of guest house that's centered around a central courtyard. Though not every riad is luxurious, an unassuming door on a hectic street can lead to a tranquil and wonderful accommodation experience.

Moroccan mint tea is the order of the day, as travelers sit on the cushions around the courtyard or take in the views from the roof. Some of the high-end riads even have plunge pools in the courtyard. The rooms can be fantastic as well, as most are individually decorated and have a unique style.

The gigantic Jemaa el-Fnaa Square is at the center of the medina. In the day the square is active with storytellers, street performers and fruit vendors, but at night the square transforms into a huge cooked-food market, as hundreds of vendors set up tables and tents.

Also within walking distance from Jemaa el-Fnaa are the famed souks of Marrakech. Basically one big covered street market; the streets of the souks intersect with one another and form a lively and incredible place to shop. Each stall has its own special offering of spices, sweets, carpets and everything else and the experience in the souks is intense to say the least. Don't forget to haggle before purchasing anything, though, as the prices certainly have wiggle room.

Elsewhere in the medina, the El Badi Palace is an impressive collection of ruins dating back to the 16th century. Wandering around its passageways and inside its giant inner courtyard, it's easy to appreciate the grandeur of the sultans that once lived here.

The El Bahia Palace is another attraction in the medina and it is better preserved than El Badi, as it was built in the 19th century and has been immaculately preserved. The palace and its tiled courtyard, once home to the sultan's harem, is now the exclusive domain of tourists.

In the end Marrakech presents a special blend of charm, history and beauty that is sure to inspire even the most well-traveled of visitors.

Appendix 3: Task 3 ST and Translation Brief

Translation Brief

This tourism article (421 words) extracted from *Traveler's Digest* introduces a coastal city Myrtle Beach in South Carolina, America. This article aims to attract people who would like to travel in Myrtle Beach but have no prior knowledge about it and its surroundings. Imagine that you work for *Traveler's Digest* as a translator and need to promote Myrtle Beach to the Chinese-speaking tourists through translating this article into Chinese as the target language. Please also translate the title of the article in your translation. Make sure of a coherent and readable translation for the target readers.

This article can be found at: http://www.travelersdigest.com/4452-visiting-myrtle-beach-and-the-grand-strand/.

Visiting Myrtle Beach and the Grand Strand

The Grand Strand is a 60+ mile stretch of sandy beach that is one of the premier beach destinations in all of the United States. Every summer millions of tourists hit its shores to enjoy the refreshing waters, explore the coastal sand dunes and spend time at one of its many golf courses.

The crown jewel of the Grand Strand is the city of Myrtle Beach, which is the epicenter of all the action. Here high-rise condos and hotels line the sand, and the city is practically overrun with families on holiday. Accordingly, there are a huge amount of restaurants and family attractions to entertain visitors. A good example of Myrtle

Beach's dichotomy is that it's probably one of the few places in the world that has an equal amount of both 18-hole golf courses and miniature golf courses. But just because Myrtle Beach gets the lion's share of visitors doesn't mean there's not a lot else to see in the Grand Strand area.

To the north, the city of North Myrtle Beach is a quieter alternative to the hustle and bustle of Myrtle Beach, as the high-rises are replaced by beach homes and smaller oceanfront motels. At the end of the Grand Strand, at Little River, there are some marshes that can be explored by canoe or kayak, which is a good way to get off the beaten path a bit.
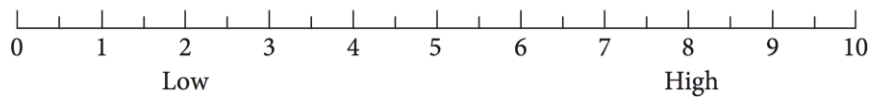
Just across the state line, a bit further north, travelers can find even more peace and quiet at the Brunswick Plantation and Golf Resort. Situated on 1,700 private acres, this resort offers luxury condo rentals, three golf courses and a couple of swimming pools. But though it seems a world away from the tourist-laden Grand Strand, it's actually only a 20-minute drive.

If we travel south from Myrtle Beach instead of north we'll run into a host of different attractions. The small town of Georgetown packs an outsized punch when it comes to historic attractions. Its central historic district dates back to the 18th century – when the area was bustling with plantations – and is incredibly well preserved. The historic buildings along the waterfront have mostly been converted into restaurants or bars and are a great place to stop in for a bite.
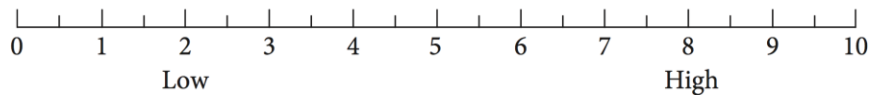
On the way to Georgetown from Myrtle Beach travelers will pass through Pawleys Island, which is a small, sandy island that was a popular resort destination in the 19th century. Today it has a quiet pace that makes it ideal for cycling or lounging on the sand.
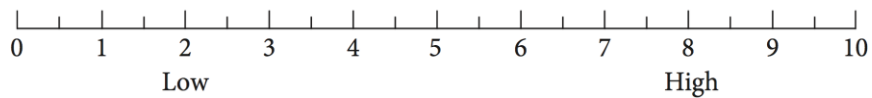
Appendix 4: NASA-Task Load Index (TLX)

1. Mental Demand: How much mental and perceptual activity was required (e.g. thinking, deciding, remembering, searching, etc.)? Was the task easy or demanding, simple or complex, exacting or forgiving?
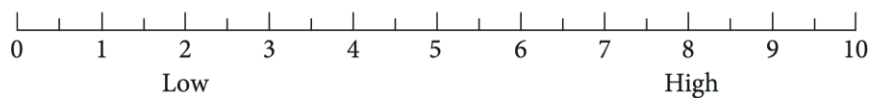
```
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
 0     1     2     3     4     5     6     7     8     9    10
       Low                                     High
```

2. Physical Demand: How much physical activity was required (e.g. pushing, pulling, etc.)?

```
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
 0     1     2     3     4     5     6     7     8     9    10
       Low                                     High
```

3. Temporal Demand: How much time pressure did you feel due to the rate or pace at which the task or task elements occurred?

```
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
 0     1     2     3     4     5     6     7     8     9    10
       Low                                     High
```

4. Effort: How hard did you have to work (mentally and physically) to accomplish your level of performance?

```
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
 0     1     2     3     4     5     6     7     8     9    10
       Low                                     High
```

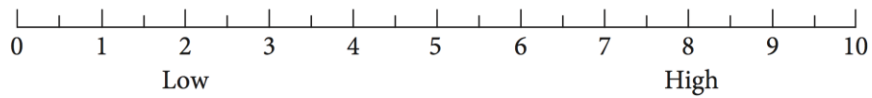5. Performance: How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your performance in accomplishing these goals?

```
|  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |
0     1     2     3     4     5     6     7     8     9     10
      Low                                 High
```
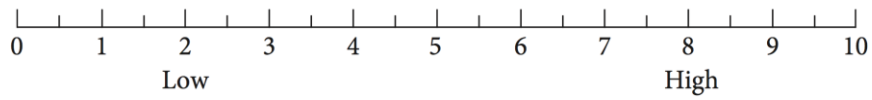
6. Frustration Level: How insecure, discouraged, stressed and annoyed versus secure, gratified, content, relaxed and complacent did you feel during the task?

```
|  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |  ,  |
0     1     2     3     4     5     6     7     8     9     10
      Low                                 High
```

Appendix 5: TAP Group Training Handout

1. An Introduction to Think-aloud Protocols (TAPs):

Think-aloud protocols (TAPs: 有聲思維資料) have been used to ask translators to say aloud their thoughts in their mother tongue while they are translating a text. Through TAPs, we can analyse how translators comprehend the source text, what translation problems they face and what solutions they adopt to tackle those translation problems.

2. The Application of TAPs in Translation Process Research:

TAPs have been frequently applied in translation process research since the 1980s. This method is recognised as a better way to examine translators' problem-solving and decision-making processes because it can record translators' verbal reports in detail. Recently, TAPs have been combined with screen recording to get more data about translators' resource-checking behaviours.

It may not be easy to do thinking-aloud (TA) for the first time, but practice makes perfect. You will become more familiar with verbalising your thoughts in this way after a few attempts. You can even practice TA in your own translation assignments.

Now let's try. Take a deep breath, ready and go!

TA Practice:

Brushing your teeth with a strawberry and baking-soda mixture – which "The Dr. Oz Show" and YouTube videos have touted as a natural, cheap, easy, do-it-yourself way to brighten teeth – does not actually whiten teeth, and may even weaken them, new research shows.

In the past, lemons had also been advocated as tooth-whitening agents. However, researchers very soon discovered that the high concentration of citric acid in lemons made their juice acidic enough to potentially erode teeth.

"Strawberries also contain a high concentration of citric acid, with trace amounts of malic acid, depending on the ripeness and storage conditions," said lead study author So Ran Kwon, a tooth-whitening researcher at the University of Iowa. "However, I assume that malic acid is not well-known to the public, so that created some kind of a myth that it is different from citric acid, possibly working better and being safer."

This article can be found at: http://www.livescience.com/48472-teeth-whitening-methods-really-work.html.

TAP Sample: (*<xxx>: ST reading; [xxx]: online dictionary; ○xxx○: word/term meaning in a dictionary)

(1) <Brushing your teeth with a strawberry and soda-baking mixture>

什麼是<strawberry and soda-baking mixture>呀？是草莓與蘇打混合物嗎？我來查一下[線上字典] <soda-baking>是什麼意思？

(2) <which "The Dr. Oz Show" and YouTube videos have touted as a natural, cheap, easy, do-it-yourself way to brighten teeth>中間這個插入句好長, 應該怎麼把它拆開呢？ 這個插入句怎樣與後面的<does not actually whiten teeth>結合呢？

(3) <the high concentration of citric acid in lemons made their juice acidic enough to potentially erode teeth> citric acid 是什麼酸呀？

我查了一下[線上字典], 它的意思是○檸檬酸○。

3. How do you feel about this practice? What should we keep in mind when doing TA?

Appendix 6: Participants' Demographic Questionnaire

1. Full Name: _____

2. Gender: M/F

3. Age: _____

4. Background of Undergraduate Study:

  □ BA/BSc in _____

  □ Other degrees, please specify: _____

5. English Proficiency Level: (multiple choices)

  □ IELTS: _____

  □ TOEFL (iBT): _____

  □ TOEIC: _____

  □ College English Test Band 4 and Band 6 (CET): _____

  □ Others, please specify: _____

6. Have you ever practiced translation in a translation-related course during your undergraduate study? □ Yes □ No

  If yes, please specify what text-type(s): (multiple choices)

  □ Journalism (news articles, commentaries, columns, etc.)

  □ Business, economics, or finance (economic articles, statistical data, etc)

  □ Legal (legal cases, regulations, provisions, etc.)

  □ Literature (prose, poetry, novels, etc.)

  □ Medical, technology, engineering, or science

  □ Tourism (tourism articles, reviews, blogs, etc.)

  □ Manuals, handbooks, instructions or specifications

  □ Subtitles

  □ Others, please specify: _____

7. How long have you practiced translation in this course: _____ academic year(s)

Appendix 7: Warm-up Exercise

Translation Brief

This article (263 words) extracted from *Traveler's Digest* provides the information about traveling in Mongolia. Imagine that you work for *Traveler's Digest* as a translator and have to introduce Mongolia to those Chinese-speaking tourists who haven't been there through translating this article into Chinese as the target language. Please also translate the title of the article in your translation. Make sure of a coherent and readable translation for the target readers.

Mongolia Travel Guide

It doesn't get more rugged and remote than Mongolia. The country is sparsely populated, with only 2 million people living in an area 2.5 times the size of France. It occupies a space between northern China and desolate Siberia. The geography of the country is steppes and one part Gobi Desert. It's hard not to think of Genghis Khan when imagining the Mongolian steppes and to this day, Mongolians remain predominantly nomadic. The capital and only large city in the country is Ulaanbaatar.

Most travelers arrive to Mongolia via the Trans-Siberian Railway. This train stretches all the way from Moscow, across Russia, through Mongolia and into Beijing. The total distance of the trip is almost 6,000 miles. In Mongolia the train stops at Sainshand in the Gobi Desert and at Ulaanbaatar. It is an overnight trip from Beijing to Ulaanbaatar and a two day trip from Ulaanabaatar to the first destination in Siberia, Irkutsk.

More than 40% of Mongolians live in large tents called gers (sometimes known as yurts). Most gers are occupied by nomads and located on the steppes. The nomads relocate seasonally to find the best grazing for their livestock and as such the ger provides them with much needed mobility. A great way for tourists to experience Mongolia and its lifestyle is to stay in a ger camp. Activities at the camps include archery, horseback riding and overland trips to visit real life nomads. Because Mongolia is at a high elevation and far removed from major sources of light pollution, it is one of the world's best places for stargazing.

Appendix 8: Translation Marking Guidelines

Score	Description of Translation Quality
90-110	**Excellent translation** The translation faithfully reflects all the original passage with only one or two minor lexical errors. It adequately reflects the style and tone of the original passage. The translation is elegant (appropriate choice of words, a variety in sentence patterns).
70-90	**Good translation with few inaccuracies** The translation reflects almost all the original passage with relatively few significant errors in comprehending individual words, phrases, sentences or ideas. The translation is readable (generally clear, smooth and cohesive).
50-70	**Passable translation with some inaccuracies** The translation adequately reflects most of the original passage with occasional errors in comprehending individual words, phrases, sentences or ideas. The translation is, for the most part, readable.
30-50	**Inadequate translation with frequent inaccuracies** The translation only reflects about half of the original passage with frequent errors in comprehending individual words, phrases, sentences or ideas. The translation is, in some parts, unreadable.
10-30	**Poor translation** The translation reflects less than half of the original passage. Almost all sentences contain errors in comprehending individual words, phrases, sentences or ideas. The translation is, for the most part, unreadable.