University Students' Perceived Benefits and Difficulties Related to Corpus-Assisted Translation

Shih-Ping Cheng

Studies have demonstrated that corpora can assist translation teaching and learning in numerous ways; however, students' use of corpus-assisted translation is rarely discussed in the literature. The present study investigated students' perceived benefits and difficulties when a student-centered, corpus-assisted translation approach was employed. A case study involving 29 Taiwanese university students was conducted to investigate how the students responded to the curriculum. The corpora employed in the curriculum were the Sinorama Bilingual Corpus and British National Corpus, and the corpus tools that were employed were TotalRecall and Tango. Questionnaires, student group interviews, student online feedback, pre-tests and post-tests, and query log analysis were employed to verify the results. The results indicate that intermediate-level students preferred TotalRecall over Tango because they relied on the Chinese translations of the bilingual corpus to comprehend the query results. In addition, the results indicate that lower-level students had major problems with grammar and that all students had difficulty with synthesizing the query results. The findings indicate that students can benefit from corpus-assisted translation with respect to their accuracy, word choice (vocabulary use and collocation), grammar, and spelling when they complete a translation cloze test. Corpus tools can enable them to develop the abilities to independently identify solutions to translation problems and to construct knowledge while translating. The majority of the students reported positive perceptions toward the corpus-assisted translation. The findings provide evidence that the student-centered, corpus-assisted translation approach enabled the students to acquire the ability to independently identify solutions to translation problems.

Keywords: corpus-assisted translation, bilingual concordancer, constructivism, translator training

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探究大學生使用語料庫輔助翻譯時得到的幫助及面臨之困難

鄭詩萍

語料庫應用於翻譯的教與學在許多研究中皆證實有多面向的幫助，然而，少有研究探討學生如何使用語料庫輔助其翻譯。因此，本研究旨在探討於課堂中實施以學生為中心之語料庫輔助翻譯教學法時，學生所認知到的幫助和困難分別為何？研究對象為 29 名臺灣大學生，並採用個案研究法。選用以英國國家語料庫（British National Corpus）所建置的 Tango 單語語料庫，及光華雜誌內容所建置的 TotalRecall 雙語語料庫，研究工具為問卷、團體訪談、線上回饋、前後測，以及語料庫查詢紀錄分析。研究結果顯示，中等英文程度的學生偏好 TotalRecall 雙語語料庫，勝過 Tango 單語語料庫，因學生依賴雙語語料庫中的中文例句翻譯來理解查詢結果。研究結果亦證實，程度較低的學生在歸納語料庫例句的文法時，仍然面臨較大的問題。研究分析結果顯示，學生在使用語料庫輔助他們完成克漏字翻譯任務時，在翻譯的正確率、用字選詞（字彙／搭配詞）、文法、拼字等面向皆受益於語料庫所提供的相關資訊。語料庫工具也能夠幫助他們培養獨立解決翻譯問題的能力，並建構翻譯知識，並且大部分的學生對於語料庫輔助翻譯抱持正面的態度。研究結果證實，以學生為中心的語料庫輔助翻譯教學法，在不同程度上，可以幫助學生透過查詢語料庫，建立他們獨立解決翻譯問題的能力。

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Introduction

English is neither a home language nor a second language in Taiwan; the majority of learners often have confusions in language usage and collocation combinations when they use spoken or written English. Most of the Applied English Departments in Taiwanese universities offer compulsory or elective translation courses. Translating into students' native language is always easier than translating into a foreign language, i.e., English in this study. Therefore, the problem of misuse in vocabulary and collocation gets even worse in translation classes where the students are required to translate from Chinese into English.

Since a traditional grammar translation approach is commonly adopted by many translation teachers, the researcher hopes to introduce a corpus-assisted translation approach as an innovative approach to teaching translation. Using corpora as an aid to translation has been widely discussed by several scholars in the Western world. Possamai (2009) states that the use of corpora has shed light on the field of translation over the past decade, and computer software has made analysis of the corpus data possible. Corpora, therefore, have been utilized in various translation-related fields. Numerous research and teaching experiments have been conducted to prove the usefulness of corpus as an important resource in translation production and translator training. Scholars believe that corpus and bilingual concordancers are useful resources in teaching and learning translation (Bowker, 1998; Gao, 2011; Kenning, 2010; Possamai, 2009; Rodríguez-Inés, 2009, 2010; Tseng, 2009; Wang, 2011; Xiao & Yue , 2009; Zanettin, 1998, 2002).

The literature offers much evidence about the value of corpus-assisted approaches to translation but few studies have been conducted into the use of a student-centred corpus-assisted translation approach. There are also few studies on the use of the approach with students. Therefore, the researcher is interested to investigate how

the approach will work with Taiwanese university students of intermediate English level, and how the students use corpus tools to learn translation. This research aims to find out the following two perspectives regarding the implementation of the approach: the benefits students receive when using corpora to assist them to translate, and the difficulties they come across in which process.

Using Corpora in Language Learning

The development of the student-centred corpus-assisted translation approach can be traced back to the rise of using corpora in language learning. Because of the developments in technology and computers, it has become possible to have simple access to large language databases containing hundreds of millions of words, and electronic corpora allow computer software to analyze the data (Baker, 1995; O'Keeffe et al., 2007). With the rise of using corpora in language learning, the value of corpora has been widely discussed in relevant studies (Kenning, 2010; Possamai, 2009; Xiao & Yue, 2009; Zanettin, 2001). Reppen and Simpson (2002) stated that one of the most significant contributions of corpus linguistics is that it reveals the patterns of language use in various settings, and supplies a powerful instrument in analyzing authentic language.

Corpora have gradually become accepted and are used in language teaching and learning. Using the data contained in a corpus as an aid in language learning has been described as "data-driven learning" (DDL). Boulton (2011) stated that Tim Johns was the first person that suggested the idea of "data-driven learning" more than 20 years earlier. The DDL methods has improved language teaching and learning in terms of changing the roles of teachers in classrooms, namely from active instructor to passive facilitators to the students (Chambers, 2010). With the implementation of DDL, language learning has become more innovative and interesting because it contains a component of discovery (Gilquin & Granger, 2010).

Corpus-Assisted Translation

More than a decade ago, corpora were introduced to assist translation production and translator training. Rodríguez-Inés (2010) defines a parallel corpus as one which contains the original language texts of one designated language and their translated target language texts in one or more other languages, which have been aligned with each other. Baker (1995) asserted that parallel corpora have made the most significant contribution in Translation Studies by supporting the shift of focus from prescriptive to descriptive translation studies. Baker also contends that parallel corpora allow an evidence-based model to be established to help novice translators by demonstrating how translation problems are solved in actual practice. Corpora, therefore, have been utilized in various translation-related studies.

Researchers incorporated corpus to facilitate translation learners fulfil translation tasks. Kenning's (2010) study found that translators use comparable and parallel corpora to solve the problems they encounter in translation by searching for knowledge and ideas in them, and they have been used as a major tool for training translators in many current programs. Corpora have become an important resource of great value to translators and translator training. Xiao and Yue (2009) note that the significance of corpora, corpus linguistic skills and applications have been proved by a growing number of research papers showing that they are helpful to translation assessment, translator training and facilitating the generation of translation texts.

Using Corpus in Teaching and Learning Translation

Scholars contend that corpora can increase the language awareness of translation trainees and are useful to learning translation in many different ways (Gao, 2011; Gilquin & Granger, 2010; Tseng, 2009; Wang, 2011; Zanettin, 2001). Wang (2011) argues that the utilization of corpus can improve the language

awareness of translation trainees because of the excessive amount of authentic language data stored. Zanettin (2001) conducted an experiment with college students in translating newspaper article from Italian, students' mother tongue, to English with help from a comparable corpus of English and Italian, and a concordancer. Zanettin found that trainees' understanding of languages and relevant cultures can be increased when they apply comparable corpora and concordancer in translation activities.

The results from research experiments by Gao (2011) and Tseng (2009) correspond with Zanettin's (2001) findings. Gao (2011) undertook a pilot study with 21 subjects of upper-intermediate English level in investigating the effectiveness and use of CERT parallel Chinese-English Concordancer in completing a translation task from Chinese into English. Results of the experiment revealed that students made significant improvements in the post-test, and were positive towards the effectiveness of using bilingual concordancer to help them learn translation. In Tseng's (2009) study, he investigated the usefulness of the Sinorama Bilingual Corpus and the TotalRecall bilingual concordancer to the learning of Chinese-English translation for 42 high school students. Results showed that students found TotalRecall to be effective in helping them improve their collocation and vocabulary in the given translation post-test; however, they received limited help in the aspects of syntax and grammar.

In addition, scholars argue that corpora are better translation aids than dictionaries because they provide authentic language reference that dictionaries often do not contain, and help translators solve translation problems and confirm hypotheses (Kenning, 2010; Possamai, 2009; Rodríguez-Inés, 2009, 2010; Zanettin, 1998, 2002).

Rodríguez-Inés (2009) devised a student-centred task-based approach to help the students with their development of strategies in a translation course. Zanettin

(2002) and Kenning (2010) both affirmed the values of parallel corpus in assisting students solve translation problems in providing answers and evidences to their translation questions. Possamai (2009) stated that parallel corpus can also help students check their hypotheses of terms when translating.

To sum up, the application of corpora in translation classrooms have improved the way translation teachers teach and translation students are trained (Gao, 2011; Rodríguez-Inés, 2009, 2010; Zanettin, 2001). Several scholars have conducted teaching experiments to prove the value of corpora as an important resource in assisting translators and translation trainees to produce translation of better quality in various ways (Bowker, 1998; Gao, 2011; Rodríguez-Inés, 2010; Tseng, 2009; Zanettin, 1998). Bowker (1998) conducted a pilot research with her translation trainees in comparing the translations produced from using conventional tools and a specialized monolingual corpus, and found that translations produced with aids from the corpus demonstrated better performance in professional knowledge, term choice and idiomatic expressions.

Constructivism

Constructivism suggests that knowledge is constructed by learners, and it can also be influenced by the context to which the learners belong (Lichtman, 2013). "Constructivism is a philosophical view on how we come to understand or know" (Savery & Duffy, 1996, p. 135). Constructivism is a theory of learning which claims to help students to become more independent, confident, and autonomous. Three relevant aspects of constructivism include zone of proximal development (ZPD), scaffolding, and problem-based learning (PBL).

Vygotsky's (1978) theory of ZPD contends that learners need people and artefacts to help them achieve their goals as they progress and learn more. Berk and Winsler (1995) explained that the ZPD is the hypothetical zone where dynamic

activities take place in one's learning (p. 171). Lantolf (2000) argued that mediation is the core concept of the ZPD theory since learners are mediated by their teachers and fellow learners when making progress. The ZPD theory explains how learning happens and how mediation can help "novices" to become "experts." Therefore, Vygotsky's theory of ZPD can be applied in justification of the student-centred corpus-assisted translation approach. Through peer sharing, teacher demonstration and enquiring examples in the corpus, learners construct their knowledge of translation skills and metacognitive strategies for making use of corpus tools to assist them translate.

Liou et al. (2006) state that corpus tools are better than dictionaries. The comparisons between dictionaries and concordancers are listed in Table 1.

Table 1

Comparison Between a Bilingual Dictionary and Bilingual Concordancer

Tool	Bilingual Dictionary	Bilingual Concordancer
Search Unit	Keyword search	Keyword or phrase search
Display Results	Displays results bilingually	Displays results of bilingual alignment with keyword highlighted
Number of Examples	Provides limited example sentences in limited contexts	Provides numerous examples in various contexts
Rank Results	No ranking available	Ranks the results of queries by frequency
Highlights	No highlight available	The translation counterpart of the query is highlighted, and citations with the same translation counterpart are shown in clusters

Note. Adapted from "Corpora processing and computational scaffolding for a web-based English learning environment: The CANDLE Project," by H. C. Liou, J. S. Chang, H. J. Chen, C. C. Lin, M. L. Liaw, Z. M. Gao, J. S. R. Jang, Y. Yeh, T. C. Chuang, & G. N. You, 2006, *CALICO Journal*, *24*(1), pp. 80-81. Copyright 2006 by Computer Assisted Language Instruction Consortium.

Besides bilingual concordancer, a collocation concordancer such as Tango also provides useful information of language reference to learners when they are translating from Chinese to English. Liou et al. (2006) argue that "Using Tango, learners can discover idioms, phrasal verbs, compounds, fixed phrases, and grammatical patterns fully supported with evidence from authentic texts" (p. 81). It can be observed that corpora are better translation aids than dictionaries because they provide authentic language reference that dictionaries often do not contain, and help translators solve translation problems and confirm hypotheses (Kenning, 2010; Possamai, 2009; Rodríguez-Inés, 2009, 2010; Zanettin, 1998, 2002). Therefore, it can be asserted that corpus tools provide better reference than dictionaries for translation learners.

Besides TotalRecall and Tango, Linguee (https://cn.linguee.com/) is another emerging bilingual corpus that provides bilingual definitions of the searched keywords and their bilingual example sentences, the service covers 24 language pairs. Linguee provides definitions and sample sentence translation pairs of English and 24 other languages, including Chinese, German, French, Spanish, Russian, Japanese, Portuguese, Italian, Dutch, Swedish, etc. However, the Chinese translations provided in Linguee is in Simplified Chinese, which does not meet the needs of the current study. That is the reason why it is not chosen as the bilingual corpus tool for the experiment.

In corpus-assisted translation classrooms, students are trained to solve translation problems by enquiring corpus tools. Corpus-assisted translation turns the translation questions into a problem-solving process—A series of corpus enquiry procedures. Therefore, using corpus tools as a scaffold for translation learners is a useful way to help them overcome their difficulties.

De Grave et al. (1999) interpret the role of an instructor in PBL as being to scaffold the learning of the students. It is the responsibility of the teacher to ensure

that the students are familiar with the metacognitive strategies necessary for using corpus tools to solve translation problems, namely the problem-solving process. Therefore, the importance of problem-solving approach becomes evident in corpus-assisted translation classrooms.

To summarize, corpora play a significant role in translator training. The value of using corpora in translation classrooms is well supported by research findings in the existing literature. Within a constructivist theory of learning, corpus tools are of great value to translation learners because they act as scaffold in the learning process. The student-centred corpus-assisted translation approach helps students to construct their translation skills, corpus enquiry strategies, and abilities in solving translation problems independently.

Research Questions

In order to investigate translation students' use of the two corpus tools, the research questions addressed in this study are as follows:

1. What are the difficulties and problems students encounter when using corpus tools to assist them in undertaking lexical translation tasks?
2. What are the benefits the students receive through using corpus tools to assist them in undertaking lexical translation tasks?

Methodology

In order to answer these research questions, the appropriate research strategy adopted was empirical enquiry (Williams & Chesterman, 2011). A case study was carried out of the student-centred corpus-assisted translation approach, using mixed methods. Both quantitative and qualitative research methods are adopted to generate the data, and triangulate the results in order to present the multiple aspects of the research.

The research design of the study was a one-group pre-test post-test experiment. Five instruments were chosen to collect data, including questionnaires, student group interviews, students' online feedback, pre-test and post-test, and query log analysis.

Midterm and final questionnaires were administered to find out students' attitudes towards learning translation. In order to probe deeply into how students think of using corpus tools to learn translation, student group interviews were conducted at the end of the semester. For the students' online feedback, the participants were asked to express feedback towards the translation course throughout the semester.

In addition, a pre-test and a post-test were conducted at the beginning and end of the semester to evaluate the usefulness of corpus tools to the students' translation performance. In the post-test, the students' query logs were automatically recorded on the AWETS (Automatic Web-Based English Testing System) website (http://140.112.185.57/~kein/login.php), a private website designed by Dr. Z. M. Gao. It records the keywords and tool students selected for each search. The purpose was to analyze the students' query strategies.

The Chosen Corpus Tools for this Research

TotalRecall bilingual concordancer and Tango collocation concordancer were selected as the corpus tools to aid student participants in learning translation. These tools were developed by Liou, H. C., Chang, J., Yeh, Y., Liaw, M., Lin, C., Chen, H., You, G., Chuang, C., and Gao, Z. under the CANDLE (Corpora And NLP for Digital Learning of English) Project in 2003 (http://candle.fl.nthu.edu.tw/newcandle/Home_E.asp) (Liou et al., 2003).
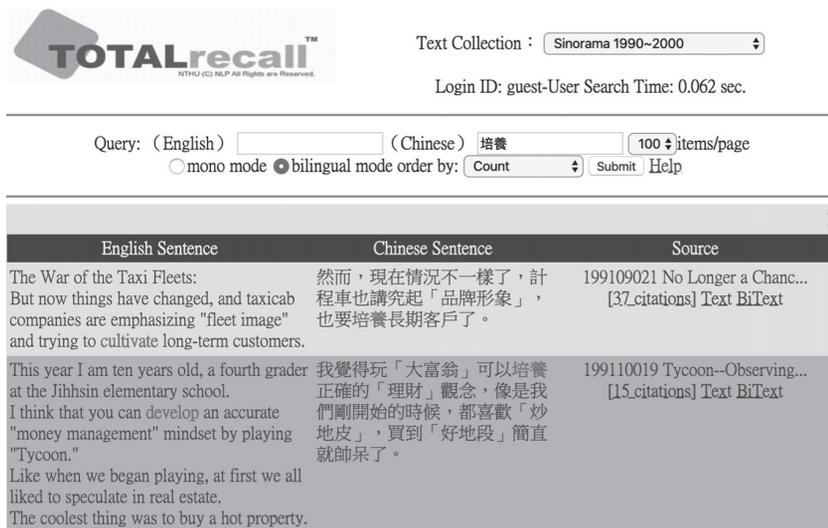
TotalRecall

TotalRecall is a bilingual concordancer that contains Chinese and English bilingual corpora—Sinorama corpus and the meeting records of Hong Kong Legislative

Council. There are 7.95 million Chinese characters and 5.63 million English words in the Sinorama Bilingual Corpus. For the bilingual corpus of the meeting records of Hong Kong Legislative Council, there are 18.15 million Chinese characters and 11.9 million English words. The Sinorama magazine articles encompasses topics of economics, society, environmental issues, art, culture, and education about Taiwan. The strength of TotalRecall is that it is very easy to operate because the users can simply type any Chinese or English keyword regardless of the length or number of characters with the click of a button "submit." Example of query is shown in Figure 1.

Figure 1

Query Snapshot of TotalRecall Bilingual Concordancer With the Example of Peiyang 培養 (Develop)

Note. From http://candle.cs.nthu.edu.tw/totalrecall/totalrecall/totalrecall.aspx?funcID=1

Tango

Tango is a monolingual collocation concordancer that provides access to collocation combinations. The corpus that is selected for the present research is BNC, which contains 100 million words and covers newspapers, magazine articles, novels, and so

on from Great Britain. The collocation types available include VN, VPN, VNP, and AN. Search keywords are highlighted in the results with their collocation combination words, frequencies, and example sentences. They provide valuable reference information of the best collocation choice for the query keyword to the users. Information of syntax, grammar and usage of the collocation combinations are shown in the example sentences of the search results. Example of query is shown in Figure 2.

Figure 2

Query Snapshot of Tango Collocation Concordancer With the Example of "Develop" and Collocation Type. VNP (Verb + Noun + Preposition)

Note. From http://candle.fl.nthu.edu.tw/collocation/

Both TotalRecall and Tango have their strengths and limitations. It is therefore important to make the best use of both corpus tools by capitalizing on their strengths and using them complementarily.

Participants

This research is based on 29 students who majored in English in the Foreign Language Department of a private university in Northern Taiwan. The research participants are full-time students who elected the translation module taught by the researcher, Corpus-assisted Translation, as part of their program requirements. They were invited to participate in this research voluntarily. The majority of the student participants were third-year students. The English proficiency level of the student participants could be observed and classified according to the English scores they received on the College Entrance Examination, which ranged from seven to 11 based on a scale from one to 15. Therefore, the participants' competency is classified as intermediate level.

Procedure

The purpose of adopting the student-centred corpus-assisted translation approach was to help students construct knowledge by solving translation problems by themselves. There were six weeks of training with two hours each week. Students were guided in using corpus tools to help them translate.

Stage 1: Training on query strategies.

The focuses of each training session were listed as the following:

Session 1: Introducing BNC (British National Corpus) & Tango

Session 2: Demonstrating query strategies in Tango

Session 3: Introducing & demonstrating making queries in TotalRecall

Session 4: Query strategies for Tango and TotalRecall in translation cloze exercises

Session 5: Training on query strategies, e.g., use English/Chinese phrases to

narrow down search results

Session 6: Training on observing grammar patterns from the search results and apply results to answer translation questions

Stage 2: Hands-on practice by incorporating query strategies.

To summarize, the design of the curriculum is to help the students get familiar with using the corpus tools, and train them to use the corpus tools to assist them translate. The students are guided with enquiry skills demonstrated by the teacher and are then allowed to explore the corpus tools on their own. After they become familiar with the corpus tools, the teacher trains the students with query strategies to use the two corpus tools to translate the Chinese words or phrases into English, and check the collocation combinations of the English equivalents for the translated text. The students are trained with corpus query strategies to assist them translate gradually, and are encouraged to discuss their strategies with each other. The teacher often asks the students to share voluntarily about how they explore the corpus tools step by step with their classmates. Through the process of hands-on practice, it is hoped that the students acquire query strategies to solve translation problems.

When the students have problems in undertaking translation tasks in class, the teacher does not answer the questions right away. Instead, she would ask the student some guiding questions and allow the students to think about some possible solutions. If the student really has no idea about the solutions, the teacher would ask the whole class for volunteers to share their thoughts. The purpose of doing so is to help the students solve translation problems independently and inspire one another with different ways of enquiring the corpus tools. With the training of the student-centred corpus-assisted translation approach, it is hoped that the students eventually could construct their own strategies in corpus-assisted translation.

Stage 3: Performance evaluation.

Since the English competency of the students was at the intermediate level,

they were not competent enough to produce good quality English sentences in their translation, and it would be difficult to analyze the data collected. Therefore, the students were asked to do a translation cloze test for the pre-test and post-test. In the tests, Chinese sentences and their English translations were given; the Chinese sentences had words or phrases underlined, with the equivalent words or phrases missing (as blank spaces) in the English translations. The students were asked to translate those (underlined) Chinese phrases to fill in the blanks in the English sentences, and the translated words or phrases had to fit into the English sentences both in terms of lexical choice and collocation combination.

Results

Both qualitative and quantitative methods are applied to analyze the collected data of the five research instruments for the study. Evidence of the students' perceptions towards the approach will be reported in accordance with the structure of the two research questions. By observing how the students use corpus tools to assist them translate, results are collected and analyzed to provide evidence that corpus-assisted translation certainly has a positive impact on the students' learning outcomes. Besides, the difficulties and problems faced by the students in the process will also de discussed.

What Are the Difficulties and Problems Students Encounter When Using Corpus Tools to Assist Them in Undertaking Lexical Translation Tasks?

For all the student participants, corpus-assisted translation is something completely new. They started learning from scratch how to use corpus tools to help them translate. As a result, various problems and difficulties may occur in the process. In answering the first research question, the analyses will be investigated

from the following three perspectives: problems with TotalRecall and Tango, score distribution and error analysis of the test responses, and students' perceived difficulties and problems.

Problems With TotalRecall and Tango

The problems that the students encountered when using TotalRecall and Tango are investigated by looking at the students' responses in the final questionnaires. The students were asked to explain the pros and cons of the tools respectively. The problems with TotalRecall and Tango were organized into six categories respectively as shown in Table 2 and Table 3.

Table 2

Problems With TotalRecall

Problems with TotalRecall	Insufficient data	No keyword highlight	No collocation analysis	Not user friendly	No problem found	No response	Total
Responses	4	6	5	5	2	5	27
Students	S7, S13, S15, S17	S6, S9, S14, S20, S28, S29	S8, S16, S18, S23, S24	S10, S11, S19, S25, S26	S2, S21	S1, S5, S12, S22, S27	

Table 3

Problems With Tango

Problems with Tango	Insufficient query option	System often freezes	Not easy to make enquiries	Insufficient data	Lack of bilingual alignment	No response	Total
Responses	8	5	5	7	2	3	30
Students	S9, S10, S12, S15, S20, S21, S25, S28	S2, S5, S17, S18, S19	S2, S13, S16, S23, S24	S7, S8, S11, S17, S23, S26, S27	S6, S14	S1, S22, S29	

Some of the problems that appear in TotalRecall also appear in Tango. Four students stated that there is insufficient data in TotalRecall, whereas seven students mentioned the same problem with Tango. Five students responded that they think TotalRecall is not user friendly, while five students also said they think it is not easy to make enquiries in Tango. No keyword highlighted and no collocation analysis were non user friendly features of TotalRecall . However, two students responded that they think there is not any problem with TotalRecall. For Tango, students responded that there are insufficient query options for them to select the parts of speech about which they want to enquire, there is a lack of bilingual alignment, and the system often freezes.

To demonstrate the students' query process and the difficulties they encountered, a snapshot of TotalRecall is shown as follows in Figure 3 that shows the limited query results when enquiring the keyword *zhaohui* 召回 , which means "to recall something." There is only one bilingual pair of results with sample Chinese and English sentences that contain the keyword after submitting the query.

Score Distribution and Error Analysis of the Test Responses

In the following analysis, a comparison of score distribution to all the test questions was made in order to find out the kind of difficulties the students have when making use of the corpus tools. In Table 4, the frequency and percentage of the score distribution is listed for comparison between the pre-test and post-test, as is the difference in percentage and the improvement rates.

Figure 3

TotalRecall Query Snapshot of the Keyword Zhaohui 召回

Note. From http://candle.cs.nthu.edu.tw/totalrecall/totalrecall/totalrecall.aspx?funcID=1

Table 4

Distribution of Response Scores and Improvements in the Pre-Test and Post-Test

Response Score	Pre-Test Frequency	Pre-Test Percent	Post-Test Frequency	Post-Test Percent	Difference %	Improve- ment Rate
0	131	18.1	83	11.4	-6.6	-37%
0.5	0	0	0	0	0.0	0%
1.0	14	1.9	16	2.2	0.3	14%
1.5	5	0.7	1	0.1	-0.6	-80%
2.0	30	4.1	26	3.6	-0.6	-13%
2.5	11	1.5	3	0.4	-1.1	-73%

(continued)

Table 4

Distribution of Response Scores and Improvements in the Pre-Test and Post-Test (continued)

Response Score	Pre-Test Frequency	Pre-Test Percent	Post-Test Frequency	Post-Test Percent	Difference %	Improve-ment Rate
3.0	114	15.7	167	23.0	7.3	46%
3.5	14	1.9	8	1.1	-0.8	-43%
4.0	253	34.9	413	57.0	22.1	63%
Missing	153	21.1	8	1.1	-20.0	-95%
Total	725	100	725	100		

It is obvious that there is a sharp decrease for scores of 0 and missing answers in their frequencies. In contrast, there is a big increase for scores of 3.0 and 4.0 in frequency. These changes show improvements of the students in their performances in the post-test. However, there is something interesting for discussion for the improvements of score 3.0 from 114 (15.7%) responses in the pre-test to 167 (23%) in the post-test. There is a difference of 7.3% in percentage, and the improvement rate for the frequency was 46%.

Score 3.0 represents that the students used the correct word, but chose the wrong grammatical form in their answers. As shown in Figure 4, there was a decrease of missing answers (score 0) in the post-test.

Figure 4

Comparison of Response Score Distribution for the Pre-Test and Post-Test
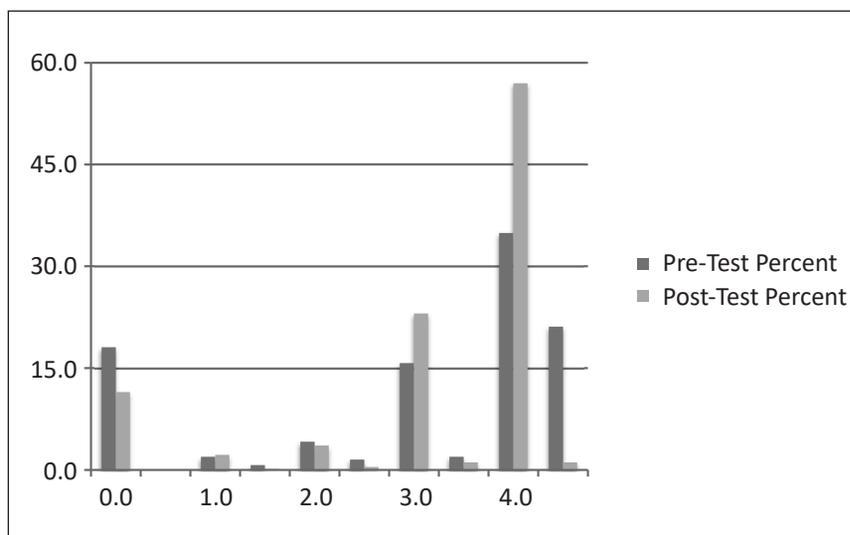
Due to this decrease (score 0), it is observed that the students were motivated to find references and fill out the answers in the post-test with help from enquiring in the corpus tools. Some of the student participants (S4, S12, S16, S18, S24) responded in the group interviews that making queries in the corpus tools helped them to increase their willingness in learning translation.

Students' Perceived Difficulties and Problems

In this part of the analysis, the students' perceived difficulties and problems in the process of enquiry are investigated by analyzing responses from the group interviews. Responses relevant to this topic throughout the interview were selected, coded and organized into eight categories as shown in Table 5.

Table 5

Students' Perceived Difficulties and Problems in Corpus-Assisted Translation

Category	1	2	3	4	5	6	7	8	
Problems	Not user friendly	Lack of keyword highlight	System often freezes	Cannot find desired information	Insufficient query option	Insufficient Chinese data	Problem with word use and constructing sentence	Other problems	Total
Responses	2	2	6	8	8	3	1	4	34
Students	S16, S23	S6, S8	S3, S6, S9, S15, S16, S17	S6, S7, S8, S13, S15, S16, S17, S19	S4, S6, S8, S9, S11, S13, S17, S20	S2, S8, S16	S13	S16, S17, S21, S24	
Appeared in questionnaire responses	Yes	Yes	Yes	Yes	Yes				

Five of the eight categories (category 1, 2, 3, 5, 6) are related to the design of the corpus tools, and the other three categories (category 4, 7, 8) are relevant to the students' query strategies.

Regarding students' query strategies, responses extracted from the specified students in Table 5 showed that six problems emerge from these three categories (category 4, 7, 8) relevant to query strategies, which include: Students cannot find desired information (4), problems with word use and constructing sentences (7), did not know how to choose the most suitable word from the query results (8), not familiar with the corpus tools (8), had troubles recognizing the part of speech for the words (8), cannot figure out the desired answers easily from the query results (4). This evidence shows that the students still have many problems with query strategies of corpus-assisted translation. Although training and practice had been provided to the students in class, more help should be given to students in order to solve their individual problems. The data from the questionnaires and group

interviews shows similar problems, and triangulates the results of the students' difficulties and problems in corpus-assisted translation.

What Are the Benefits the Students Receive Through Using Corpus Tools to Assist Them in Undertaking Lexical Translation Tasks?

Grade Improvements in the Post-Test

This analysis focused on the student participants' grade performance in the pre-test and post-test of the study. Score comparisons were made to compare the students' grade performance before and after using corpus tools to assist them translate. The analyses include comparing the average score improvement between the two tests and the average improvement rate, as well as statistical analysis of the two tests. The results of the average score improvements are presented in Table 6; the average improvement rate was 49.3%. For the statistical analysis, Paired-Samples T Test was conducted with the SPSS program to test whether the results of the pre-test and post-test scores of every participant show any statistical significance. The student participants' improvements can be observed from the Mean score of the post-test grade (Mean=77.8), which improved substantially when compared with the pre-test (Mean=52.1), and the decrease in the value of Standard Deviation in the post-test further supports the evidence in students' progress as in Table 7. One of the participants' grades remained the same in both tests, but all other 28 participants made satisfactory improvements. Therefore, the results of the two-tailed test show that there is statistical significance (p= 0.023, Sig. [2-tailed]= 0.000) as in Table 8 and Table 9.

Table 6

Average Pre-Test and Post-Test Grade and Improvement Rate

Average Pre-Test Score	Average Post-Test Score	Average Grade Difference	Average Improvement Rate
52.1	77.9	25.7	49.3%

Table 7

Results of Paired-Samples T Test (1)

Paired Samples Statistics				
	Mean	N	SD	Std. Error Mean
Pair 1　Pre-Test Grade	52.138	29	14.7169	2.7329
Post-Test Grade	77.862	29	9.8161	1.8228

Table 8

Results of Paired-Samples T Test (2)

Paired Samples Correlations			
	N	Correlation	Sig.
Pair 1　Pre-Test Grade & Post-Test Grade	29	.420	.023

Table 9

Results of Paired-Samples T Test (3)

Paired Samples Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1　Pre-Test Grade- Post-Test Grade	-25.7241	13.8439	2.5707	-30.9901	-20.4582	-10.006	28	.000

Areas of Improvement After Using the Corpus Tools

In a previous section, a comparison of score distribution in the pre-test and post-test was made to find out the difficulties the students had when using the corpus tools. In this part of the analysis, a summary of score distribution is made to further summarize the improvements made by the students. Table 10 is a summary of the statistics in Table 4 by adding up the frequency and percentage of the score distributions.

Table 10

Summary of Score Distribution for the Pre-Test and Post-Test

	Pre-Test Frequency Sum	Pre-Test Percent Sum	Post-Test Frequency Sum	Post-Test Percent Sum	Difference %
0 & Missing	284	39.0	91	12.6	-26.6
0.5~2 points	49	7.0	43	5.9	-0.8
2.5~4 points	392	54.1	591	81.5	27.4
Total	725	100	725	100	

The value in the category of 0 and Missing show that there is an increase in the students' motivation in responding to the questions; they try to answer as many questions as they can. It also shows that there is a decrease in wrong answers (score 0). Score 0.5~2.0 were not discussed in the analysis of score distribution because the numbers were all relatively low. The summary of scores 2.5~4.0 shows an overall improvement in correct word choice (vocabulary use/collocation), grammar, and spelling by 27.4%. Therefore, results from the analyses show that the benefits students receive in corpus-assisted translation are in the areas of motivation, accuracy rate, correct word choice (vocabulary use/collocation), grammar, and spelling.

Improvements of the Two Question Types in the Post-Test

This analysis focuses on the students' grade improvement for the two question types in the pre-test and post-test. Question type one refers to the collocation questions (13 questions), and type two refers to the vocabulary usage questions (12 questions). Table 11 shows comparisons of the students' grade improvement before and after using the corpus tools. The results indicate that corpus tools are helpful in both of the question types. Statistics show that the participants have made significant improvements in the post-test after using the corpus tools to assist them translate. However, the improvement rate of vocabulary usage is slightly higher than collocation by ten precent. Therefore, it can be observed that the corpus tools are slightly more helpful to the students in their ability in vocabulary usage than in collocation in this case study.

Table 11

Improvements of the Two Question Types in the Post-Test (N=29)

Type 1 Collocation			
Item	# of Questions	Pre-Test	Post-Test
Score Sum	13	790	1142
Full Score	13	1508	1508
Accuracy %		52.4	75.7
Improvement %			23.4
Improvement Rate			44.6

Table 11

Improvements of the Two Question Types in the Post-Test (N=29) (continued)

Type 2 Vocabulary Usage			
Score Sum	12	723	1116
Full Score	12	1392	1392
Accuracy %		51.9	80.2
Improvement %			28.3
Improvement Rate			54.5
All Question Summary			
Total Score	25	1512	2258
Full Score	25	2900	2900
Accuracy %		52.1	77.9
Improvement %			25.7
Improvement Rate			49.3

Students' Perceived Benefits of Corpus-Assisted Translation

In the previous two analyses, improvements in the post-test grade and areas of improvement after using the corpus tools were illustrated with examples. The third analysis investigates students' perceived benefits from their point of view based on group interviews. There were 37 responses relevant to this topic, which were organized into six categories as shown in Table 12.

Table 12

Students' Perceived Benefits of Corpus-Assisted Translation

Benefits	Corpus tools are better than bilingual dictionaries	Helpful to collocation combinations	Increased accuracy of translation	Solving translation problems independently	Methods of constructing knowledge in translation	Others	Total
Responses	10	4	6	8	6	3	37
Students	S2, S3, S4, S6, S14, S20, S21, S22, S23, S24	S3, S8, S14, S24	S3, S4, S6, S8, S9, S25	S4, S10, S11, S12, S13, S14, S15, S16	S3, S6, S20, S21, S22, S24	S5, S16, S21	

The findings from the group interviews show that the students' perceived benefits from corpus-assisted translation are that the corpus tools provide the students with better assistance and reference than dictionaries, are helpful to collocation combinations, increased the accuracy of their translation, helped them to solve translation problems independently, and to construct their knowledge in translation. Also, most of the responding students mentioned that the corpus tools are very helpful to their vocabulary, grammar and collocation, as well as the usefulness they received from the numerous example sentences provided. The corpus tools help them to keep filtering the information until they find the desired answers. The results of this analysis triangulate with the results of previous analyses regarding the benefits of corpus-assisted translation. Therefore, evidence shows how corpus-assisted translation can be very useful to the students' learning of translation.

Discussion

What Are the Difficulties and Problems Students Encounter When Using Corpus Tools to Assist Them in Undertaking Lexical Translation Tasks?

Results from the students' score distribution and error analysis showed that the students had problems with grammar and difficulties in making the correct word choice for the desired answer from the bilingual alignments of search results.

Regarding the students' problems with TotalRecall and Tango (cf. Table 2 and Table 3), the students commented on the pros and cons of TotalRecall and Tango from their experiences. Apart from the problem of "not user friendly" and "not easy to make enquiries," all the other problems are relevant to the design of the corpus tools. While the students think the corpus tools are not user friendly, the reason can be due to the system design, or students' problems in enquiring the corpus tools. It can be that the responding students are not familiar with the query strategies, or the students have insufficient English competency to analyze and synthesize the query results when making enquiries and undertaking translation tasks.

For all the other problems, the design of the corpus tools is also very important to the students because it has a big impact on how well the students can make use of the corpus tools. The design can also cause students to face problems or difficulties in the process of enquiries, and determine whether the students would enjoy using the corpus tools or not.

The results in Table 5 are based on group interviews and revealed the students' perceived difficulties and problems in corpus-assisted translation, which was organized into eight categories. Five of them are related to the design of the corpus tools, and the other three categories are relevant to the students' query strategies.

The findings in the group interviews triangulated with the results in the questionnaires. There are five repeated problems as noted in Table 5. Of the five repeated problems in the questionnaires and group interviews, there is only one problem that is related to query strategy—cannot find desired information. The other problems are related to the design of the corpus tools.

The query strategy problem was further explained by the students in the group interviews with further details. Evidence shows that the students still have many problems with the query strategies and synthesizing query results, and with figuring out their desired answers when using corpus tools to assist them translate. Although training and practice in query strategies had been provided to the students in the classes, more help should be given to some of the students in order to solve their individual problems with query strategies in corpus-assisted translation. On the other hand, when the students complained about the insufficiency of the corpus tools and all the other problems, it is necessary to step back and think about whether the students are capable of using the corpus tools with appropriate query strategies.

The results of the above three analyses show that students have major problems with grammar, word choice, and word use. The students think there are a number of problems with TotalRecall and Tango, while some of the problems are relevant to the students themselves and to whether they can manage to make use of the corpus tools properly, and draw desired answers from the tools. The group interview results show that the students have problems with query strategies and synthesizing the query results.

There are two suggested solutions to the common query problems addressed by the students. First of all, if the students were not familiar with the corpus interface, here are some suggestions.

Unfamiliar with the corpus interface

1. Students can seek help from teachers or peers

2. Teachers can provide recorded corpus tutorials from classes

3. Teachers can also provide recorded official tutorials from corpus developers (available on YouTube)

4. Students can seek further help from teachers by making appointments

Secondly, if the students could not find desired query results from the corpus tool, they can try to follow the following steps.

Students could not find desired query results (with Chinese keywords)

1. Use Chinese synonyms to search again

2. Use Chinese-English dictionary to find the English definition of the Chinese keywords

3. Switch to English keyword search

What Are the Benefits the Students Receive Through Using Corpus Tools to Assist Them in Undertaking Lexical Translation Tasks?

The results from the analysis "Benefits the students receive in corpus-assisted translation" show significant improvements in the post-test and positive feedback from the students. Since the students were not allowed to use any tool to help them translate in the pre-test, and were allowed to use the corpus tools and the Yahoo online bilingual dictionary in the post-test, it can be assured that the improvements indicate the usefulness of the corpus tools to the students' translation. The average pre-test score of all the research participants was 52.1 out of 100, and the average post-test score was 77.9 out of 100. The average score improvement was 25.7 points for each student, and the average improvement rate was 49.3%. The results of the two-tailed test show that there is statistical significance (p= 0.023, Sig. [2-tailed] = 0.000) as shown in Table 8 and Table 9. The results from the Paired-Samples T Test show evidence of significant improvement for all the students in

the post-test comparing to the pre-test. The amount of progress made by the students proves that the benefits the students receive in corpus-assisted translation are substantial.

Furthermore, evidence from the analyses in Table 4 shows that the benefits students receive in corpus-assisted translation are in the areas of motivation, accuracy rate, correct word choice (vocabulary use/collocation), grammar, and spelling when they were using the corpus tools to help them undertake the translation cloze test. Part of the results is consistent with the findings in Gao's (2011) research experiment. Gao found evidence that using the bilingual concordancer helped the students with their lexical choice, collocations, phrasing and word forms in their translation tasks. Among these, lexical choice, collocation and word forms are consistent with correct word choice (vocabulary use/ collocation) and grammar in the current research. However, findings on improvements in the students' motivation, accuracy rate, and spelling were not mentioned in the literature.

In the third analysis for this research question, evidence was found on the students' perceived benefits in group interviews (cf. Table 12). The findings show that most students mentioned that the corpus tools are very helpful to their vocabulary, grammar and collocation, as well as the usefulness they received from the numerous example sentences provided. Furthermore, the results of this analysis triangulate with the results of the previous two analyses regarding the benefits of corpus-assisted translation. Therefore, strong evidence is collected to show how corpus-assisted translation can be very useful to the students' learning of translation.

The findings are in line with scholars' arguments that corpora are better translation aids than dictionaries (Kenning, 2010; Possamai, 2009; Rodríguez-Inés, 2009, 2010; Zanettin, 1998, 2002). Liou et al. (2006) also explained why corpus tools are better than dictionaries, and act as a scaffold to help learners (pp. 78, 91). The corpus tools have

helped the students to construct their translation skills and knowledge, and cultivate the students in becoming independent learners that can solve translation problems by themselves. They become cognitive learners and know better what they are learning. This is exactly what a student-centred corpus-assisted translation approach is aiming for in the students. It is encouraging to see the learning outcomes of the approach from the students, which means the approach is really helping the students to learn what they should learn in such an approach.

Limitations of the Study

The two selected corpus concordancers were not updated anymore since the CANDLE project had ended several years ago, and the funding from the Ministry of Science and Technology had suspended. Despite the fact that they are not updated anymore, they are still representative bilingual and monolingual corpus concordancers in Taiwan with corpus data presented in traditional Chinese characters. Therefore, they have been adopted as suitable corpus tools for the current study.

Conclusion

This study has confirmed the value and usefulness of the student-centred corpus-assisted translation approach after implementing the approach in a translation class. Besides, there is another important finding in the present study. While all the scholars advocate the value of corpus tools to the trainees' learning of translation, there are some difficulties in corpus-assisted translation that are seldom discussed.

The findings in the study provide a different perspective by revealing the difficulties faced by students of intermediate English level when they use the corpus tools to assist them translate. They have more difficulties in making use of the corpus tools and receive less benefit than the students of a higher English level. Therefore,

extra training on grammar usage and corpus query strategies are needed for these students. This is something that teachers need to keep in mind when implementing the approach. This is one of the important findings in the present study.

To sum up, the results are in line with the literature review, and prove that corpus-assisted translation is not only helpful to the students' production of translation, but also useful in enhancing their language awareness. The present study adopted a student-centred teaching approach and used the corpus tools as scaffolds to help the trainees become cognitive learners of translation, and guided them to construct knowledge of translation through the process of enquiring in the corpus tools by themselves. As a result, the student-centred corpus-assisted translation approach has successfully helped the students to acquire the abilities to solve translation problems independently by consulting the corpus tools, and thus become autonomous learners.

Suggestions for Future Research

It is suggested that the following two features of corpus tools should be considered when selecting corpus tools in future research—An English monolingual corpus of larger scale and a Chinese and English parallel translation corpus. Combination of the two featured corpus tools should be able to help students solve the various problems they encounter in translation tasks more effectively.

Other than corpus tools, researchers or teachers are also advised to incorporate other language resources to compliment corpus tools in facilitating students retrieve English terminologies of certain Chinese terms. The potential options include bilingual dictionaries, thesaurus, NAER Web of Words (https://terms.naer.edu.tw/search/). Besides, web translation resources are also useful tools to check translations of Chinese terms, such as Google translate and DeepL translator (https://www.deepl.com/translator). After receiving advice from Google translate and DeepL, students can further check the uses and collocations of the terms in the selected

corpus tools. With the help from various other resources, students will be able to undertake translation tasks more efficiently and accurately. With the use of these tools, they complement the limitations of corpus size when students practice corpus-assisted translation.

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Appendix A

Scoring Rubric for All the Response Answers in the Pre-Test and Post-Test

Table A1

No.	QUESTION	Answer 1	Score	Answer 2	Score	Answer 3	Score	Answer 4	Score
e.g.	If you ____violate____ a traffic law, such as drinking and driving, you may not drive for some time.	break	4	disobey	4	breaking	3	ignore	2
1	Chinese is a language with many ____regional____ differences. People living in different areas often speak different dialects.	local	4	localized	4	provincial	2	area	2
2	A menu serves to ____ inform____ customers about the varieties and prices of the dishes offered by the restaurant.	tell	4	show	0	announce	0	notice	0
3	The baby polar bear is being ____intensively____ studied by the scientists. Every move he makes is carefully observed and documented.	closely	4	frequently	2	extensively	2	tightly	2
4	After his superb ____ performance____, the musician received a big round of applause from the appreciative audience.	performing	3	show	2	playing	4	display	0
5	The water company inspects the pipelines and ___ monitors____ the water supply regularly to ensure the safety of our drinking water.	checks	4	detects	0	looks	0	measures	0
6	This year's East Asia Summit meetings will focus on critical ____issues____ such as energy conservation, food shortages, and global warming.	subjects	4	discussions	0	events	0	problems	4

Table A1

No.	QUESTION	Answer 1	Score	Answer 2	Score	Answer 3	Score	Answer 4	Score
7	Having fully recognized Mei-ling's academic ability, Mr. Lin ____strongly____ recommended her for admission to the university.	completely	0	extremely	0	especially	2	greatly	2
8	The weatherman has warned about drastic temperature change in the next few days, and suggested that we ___check___ the weather on a daily basis and dress accordingly.	find out	4	check out	4	depend	0	examine	2
9	Many people think cotton is the most comfortable ____fabric___ to wear in hot weather.	cloth	4	clothes	2	clothing	4	material	4
10	Because of the engine problem in the new vans, the auto company decided to ____recall____ them from the market.	retrieve	2	back	0	call	0	recollect	0
11	In team sports, how all members work as a group is more important than how they perform ____individually____.	personally	4	personality	0	personnel	0	themselves	4
12	Despite her physical disability, the young blind pianist managed to overcome all _____obstacles____ to win the first prize in the international contest.	barriers	4	challenges	4	blocks	2	difficulties	4
13	Each of the planets in the ____solar____ system circles around the sun in its own orbit, and this prevents them from colliding with each other.	sun	3	universal	0				
14	Professor Wang is well known for his contributions to the ____field___ of economics. He has been recruited to help the government with its financial reform programs.	territory	2	realm	4	area	4	aspect	0

Table A1

No.	QUESTION	Answer 1	Score	Answer 2	Score	Answer 3	Score	Answer 4	Score
15	Most earthquakes are too small to be noticed; they can only be detected by ____sensitive____ instruments.	acute	4	delicate	0	high-tech	0	intensive	2
16	With Wikileaks releasing secrets about governments around the world, many countries are worried that their national security information might be ____disclosed____.	revealed	4	discovered	4	divulged	4	escaped	0
17	I'm afraid we can't take your word, for the___evidence____ we've collected so far is not consistent with what you said.	proof	2	facts	2	information	4		
18	You'll need the store receipt to show proof of ____purchase___ if you want to return any items you bought.	purchasing	3	buy	3	buying	4	consuming	0
19	Spending most of his childhood in Spain, John, a native speaker of English, is also ____fluent____ in Spanish.	fluently	3	good	2	well	0		
20	No one knows how the fire broke out. The police have started an ____investigation____ into the cause of it.	survey	0	examination	4	research	0	search	0
21	When there is a ____heavy____ rain, you have to drive very cautiously so as to avoid traffic accidents.	big	0	strong	0	hard	0	torrential	4
22	This math class is very demanding; I have to ____spend____ at least two hours every day doing the assignments.	take	4	use	2	cost	0		

Table A1

No.	QUESTION	Answer 1	Score	Answer 2	Score	Answer 3	Score	Answer 4	Score
23	One can generally judge the quality of eggs with the naked eye. Good eggs must be____externally____ clean, free of cracks, and smooth-shelled.	superficially	0	apparently	4	facially	0	obviously	4
24	The scientist ____ modified____ his speech to make it easier for children to understand the threat of global warming.	revised	4	amended	4	changed	4	altered	4
25	The Internet has surpassed newspapers as a medium of mass communication. It has become the main _____source_____ for national and international news for people.	origin	2	resource	2				

Table A2

No.	QUESTION	Answer 5	Score	Answer 6	Score	Answer 7	Score
e.g.	If you ____violate____ a traffic law, such as drinking and driving, you may not drive for some time.	ignorance	1	dismiss	0	follow	0
1	Chinese is a language with many ____regional____ differences. People living in different areas often speak different dialects.	distriction	0	territory	1		
2	A menu serves to ____inform____ customers about the varieties and prices of the dishes offered by the restaurant.	advice	3	notify	4	offer	0
3	The baby polar bear is being ____intensively____ studied by the scientists. Every move he makes is carefully observed and documented.	dedicatedly	0	intimately	0	intently	4
4	After his superb ____performance____, the musician received a big round of applause from the appreciative audience.						
5	The water company inspects the pipelines and ___monitors____ the water supply regularly to ensure the safety of our drinking water.	supervises	0	tests	4	watches	2
6	This year's East Asia Summit meetings will focus on critical ____issues____ such as energy conservation, food shortages, and global warming.	opinions	0	strategies	0	themes	4

(continued)

Table A2

No.	QUESTION	Answer 5	Score	Answer 6	Score	Answer 7	Score
7	Having fully recognized Mei-ling's academic ability, Mr. Lin _____strongly_____ recommended her for admission to the university.	highly	4	intensely	0	largely	0
8	The weatherman has warned about drastic temperature change in the next few days, and suggested that we ___check___ the weather on a daily basis and dress accordingly.	inspect	0	see	0	watch	4
9	Many people think cotton is the most comfortable _____fabric___ to wear in hot weather.	textile	2	texture	0	things	0
10	Because of the engine problem in the new vans, the auto company decided to _____recall_____ them from the market.	recycle	0	remove	2	return	0
11	In team sports, how all members work as a group is more important than how they perform _____ individually_____.	by personal	0	in individual	0	they own self	0
12	Despite her physical disability, the young blind pianist managed to overcome all _____ obstacles_____ to win the first prize in the international contest.	hamper	0	hardship	3	hinderance	3
13	Each of the planets in the _____solar_____ system circles around the sun in its own orbit, and this prevents them from colliding with each other.						
14	Professor Wang is well known for his contributions to the _____field___ of economics. He has been recruited to help the government with its financial reform programs.	domain	4	part	0	profession	2
15	Most earthquakes are too small to be noticed; they can only be detected by _____sensitive_____ instruments.	keen	2	smart	0	sense	1
16	With Wikileaks releasing secrets about governments around the world, many countries are worried that their national security information might be _____disclosed_____.	known	2	leaked	2	leaked out	1
17	I'm afraid we can't take your word, for the___ evidence_____ we've collected so far is not consistent with what you said.						
18	You'll need the store receipt to show proof of _____purchase___ if you want to return any items you bought.	ticket	0				
19	Spending most of his childhood in Spain, John, a native speaker of English, is also _____fluent_____ in Spanish.						

(continued)

Table A2

No.	QUESTION	Answer 5	Score	Answer 6	Score	Answer 7	Score
20	No one knows how the fire broke out. The police have started an ____investigation____ into the cause of it.						
21	When there is a ____heavy____ rain, you have to drive very cautiously so as to avoid traffic accidents.	downpour	1				
22	This math class is very demanding; I have to ____spend____ at least two hours every day doing the assignments.						
23	One can generally judge the quality of eggs with the naked eye. Good eggs must be____ externally____ clean, free of cracks, and smooth-shelled.	physically	2	visually	4	appeared	3
24	The scientist ____modified____ his speech to make it easier for children to understand the threat of global warming.	corrected	4	edited	4	fixed	0
25	The Internet has surpassed newspapers as a medium of mass communication. It has become the main _____source_____ for national and international news for people.						

Table A3

No.	QUESTION	Answer 8	Score	Answer 9	Score	Answer 10	Score	Answer 11	Score
e.g.	If you ____violate____ a traffic law, such as drinking and driving, you may not drive for some time.								
1	Chinese is a language with many ____regional____ differences. People living in different areas often speak different dialects.								
2	A menu serves to ____inform____ customers about the varieties and prices of the dishes offered by the restaurant.								
3	The baby polar bear is being ____intensively____ studied by the scientists. Every move he makes is carefully observed and documented.	detailed	0						

Table A3

No.	QUESTION	Answer 8	Score	Answer 9	Score	Answer 10	Score	Answer 11	Score
4	After his superb ____ performance____, the musician received a big round of applause from the appreciative audience.								
5	The water company inspects the pipelines and ___monitors____ the water supply regularly to ensure the safety of our drinking water.								
6	This year's East Asia Summit meetings will focus on critical ____issues____ such as energy conservation, food shortages, and global warming.	topics	4						
7	Having fully recognized Mei-ling's academic ability, Mr. Lin ____strongly____ recommended her for admission to the university.	powerfully	0	rigorously	0	vigorously	2		
8	The weatherman has warned about drastic temperature change in the next few days, and suggested that we ___ check___ the weather on a daily basis and dress accordingly.	look up	0						
9	Many people think cotton is the most comfortable ____fabric___ to wear in hot weather.								
10	Because of the engine problem in the new vans, the auto company decided to ____recall____ them from the market.								
11	In team sports, how all members work as a group is more important than how they perform ____ individually____.								

Table A3

No.	QUESTION	Answer 8	Score	Answer 9	Score	Answer 10	Score	Answer 11	Score
12	Despite her physical disability, the young blind pianist managed to overcome all _____ obstacles____ to win the first prize in the international contest.	obstruction	1	problems	2				
13	Each of the planets in the ____solar____ system circles around the sun in its own orbit, and this prevents them from colliding with each other.								
14	Professor Wang is well known for his contributions to the ____field___ of economics. He has been recruited to help the government with its financial reform programs.	region	2						
15	Most earthquakes are too small to be noticed; they can only be detected by ____sensitive____ instruments.	sophisticated	4						
16	With Wikileaks releasing secrets about governments around the world, many countries are worried that their national security information might be ____ disclosed____.	let out	0	released	2	revealed	4	shown	0
17	I'm afraid we can't take your word, for the___ evidence____ we've collected so far is not consistent with what you said.								
18	You'll need the store receipt to show proof of ____purchase___ if you want to return any items you bought.								

(continued)

Table A3

No.	QUESTION	Answer 8	Score	Answer 9	Score	Answer 10	Score	Answer 11	Score
19	Spending most of his childhood in Spain, John, a native speaker of English, is also ____fluent____ in Spanish.								
20	No one knows how the fire broke out. The police have started an ____ investigation____ into the cause of it.								
21	When there is a ____ heavy____ rain, you have to drive very cautiously so as to avoid traffic accidents.								
22	This math class is very demanding; I have to ____ spend____ at least two hours every day doing the assignments.								
23	One can generally judge the quality of eggs with the naked eye. Good eggs must be____externally____ clean, free of cracks, and smooth-shelled.	appearance	3	outside	1				
24	The scientist ____ modified____ his speech to make it easier for children to understand the threat of global warming.	redraft	3	rewrite	3				
25	The Internet has surpassed newspapers as a medium of mass communication. It has become the main _____source_____ for national and international news for people.								

Note. Scores: 4 points: Correct collocation/vocabulary; 3 points: Correct collocation/vocabulary, but **incorrect form**; 2 points: Acceptable collocation/vocabulary yet **not the best equivalence**; 1 point: Acceptable collocation/vocabulary & **incorrect form**; 0 point: **Wrong** collocation/vocabulary/misspelling.

Appendix B

Frequency Comparison of the Midterm and Final Questionnaires

Table B

Question		Midterm %	Final %
When undertaking Chinese-English translation tasks ...			
1. I often do not know how to solve translation problems.	I strongly disagree	0	0
	I disagree	7.4	14.8
	I have no comment	18.5	18.5
	I agree	70.4	55.6
	I strongly agree	3.7	11.1
2. I often do not know how to translate terminologies.	I strongly disagree	3.7	0
	I disagree	14.8	3.7
	I have no comment	3.7	7.4
	I agree	59.3	74.1
	I strongly agree	18.5	14.8
3. I often do not know how to distinguish between collocation usages.	I strongly disagree	0	0
	I disagree	7.4	7.4
	I have no comment	18.5	22.2
	I agree	66.7	51.9
	I strongly agree	7.4	18.5
4. I often do not know how to choose the most appropriate word/ phrase to express the meaning of the source language.	I strongly disagree	0	0
	I disagree	3.7	18.5
	I have no comment	0	7.4
	I agree	77.8	55.6
	I strongly agree	18.5	18.5
5. I am very confident in the accuracy of my Chinese-English translation.	I strongly disagree	11.1	11.1
	I disagree	66.7	40.7
	I have no comment	14.8	37.0
	I agree	3.7	11.1
	I strongly agree	3.7	0
6. I am very confident in the accuracy of the grammar in my translated English text.	I strongly disagree	14.8	11.1
	I disagree	63.0	48.1
	I have no comment	18.5	37.0
	I agree	0	3.7
	I strongly agree	3.7	0

(Continued)

Table B

Question		Midterm %	Final %
When undertaking Chinese-English translation tasks ...			
7. I am very confident in the accuracy of the terminology in my translated English text.	I strongly disagree	22.2	3.7
	I disagree	55.6	77.8
	I have no comment	18.5	14.8
	I agree	3.7	3.7
	I strongly agree	0	0
8. I am very confident in the accuracy of the collocation usage in my translated English text.	I strongly disagree	14.8	3.7
	I disagree	59.3	66.7
	I have no comment	22.2	18.5
	I agree	3.7	11.1
	I strongly agree	0	0
9. I would acquire knowledge related to Translation spontaneously in my free time.	I strongly disagree	11.1	0
	I disagree	14.8	18.5
	I have no comment	33.3	48.1
	I agree	40.7	33.3
	I strongly agree	0	0
When undertaking Chinese-English translation tasks (in-class practice or assignments) ...			
10. I am capable of acquiring the information that I need by making enquiries in Corpora.	I strongly disagree	N/A	0
	I disagree		0
	I have no comment		18.5
	I agree		74.1
	I strongly agree		7.4
11. I often use Corpora to check the words/ phrases that I cannot translate.	I strongly disagree	N/A	0
	I disagree		0
	I have no comment		33.3
	I agree		63.0
	I strongly agree		3.7
12. Checking terminologies in Corpora can help me to use terminologies accurately in the translated text.	I strongly disagree	N/A	3.7
	I disagree		14.8
	I have no comment		14.8
	I agree		51.9
	I strongly agree		14.8

(Continued)

Table B

Question		Midterm %	Final %
13. Checking grammar of words/ phrases in Corpora can help me to use grammar accurately in the translated text.	I strongly disagree I disagree I have no comment I agree I strongly agree	N/A	0 3.7 22.2 66.7 7.4
14. Checking collocation of words/ phrases in Corpora can help me to use collocation accurately in the translated text.	I strongly disagree I disagree I have no comment I agree I strongly agree	N/A	0 0 3.7 81.5 14.8
15. After checking collocation usage in Corpora, now I know how to find accurate collocation usage.	I strongly disagree I disagree I have no comment I agree I strongly agree	N/A	0 0 14.8 70.4 14.8
16. After checking collocation usage in Corpora, I think my capability of using collocation has been greatly improved.	I strongly disagree I disagree I have no comment I agree I strongly agree	N/A	0 0 25.9 59.3 14.8
17. Making enquiries in Corpora does not do any help in solving translation problems that I encounter when undertaking translation tasks.	I strongly disagree I disagree I have no comment I agree I strongly agree	N/A	18.5 66.7 7.4 3.7 3.7
18. I often cannot find the reference answers that I need when making enquiries in Corpora.	I strongly disagree I disagree I have no comment I agree I strongly agree	N/A	0 48.1 37.0 14.8 0
19. Enquiring Corpora with translation problems can motivate my interest in learning translation greatly.	I strongly disagree I disagree I have no comment I agree I strongly agree	N/A	0 0 37.0 48.1 14.8

(Continued)

Table B

Question		Midterm %	Final %
20. Enquiring Corpora with translation problems makes me enjoy the translation practice in class even more.	I strongly disagree	N/A	0
	I disagree		0
	I have no comment		29.6
	I agree		55.6
	I strongly agree		14.8
21. Enquiring Corpora with translation problems can increase my confidence in the accuracy of my translated text greatly.	I strongly disagree	N/A	0
	I disagree		0
	I have no comment		11.1
	I agree		74.1
	I strongly agree		14.8
22. I will continue using Corpora in the future to help me solve translation problems.	I strongly disagree	N/A	0
	I disagree		0
	I have no comment		11.1
	I agree		66.7
	I strongly agree		22.2