

Teaching Translation Memory: A Case Study

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Abstract

This article discusses the strength and weakness of teaching translation memory (TM) in the translation course offered at National Kaohsiung First University of Science and Technology (NKFUST). There are two tracks of TM teaching: the use of TM tools to teach translation and learning of TM skills. In this paper, TM-relevant concepts and one TM tool, TRADOS, are described before the teaching objectives, teaching content and class activities of a TM course at NKFUST are introduced. Based on the results of a questionnaire-based survey, the pedagogical implications of TM teaching are discussed. Although the assessment of the pedagogical effectiveness of TM teaching at NKFUST cannot be generalized, this article offers some guidelines for future modification of the existing TM programs.

Key Words: TM program, TRADOS, questionnaire-based survey

INTRODUCTION

Student translators need to become proficient in the use of translation technology. Computer-assisted translation (CAT) tools, such as translation memory (TM) and terminology management systems, have been employed by companies like IBM, Microsoft, Oracle, SAP, Sun, Lion Bridge and Berlitz. For this reason, translation teaching at universities must be modified to incorporate a TM component. Students should be required to stay abreast of the latest developments in translation technology. However, the teaching of TM tools cannot, and is not intended to, replace conventional translation courses; rather, it is expected to complement those courses.

The literature review reveals two teaching tracks in TM. One is the use of TM databanks or corpuses. These TM tools store source language and target language texts in parallel form and are useful for word lookup, translation search, and information retrieval. Appropriate bilingual pairs, generated as the result of terminology or word query through the use of a TM-driven concordancer, provide a good translation source for student reference. Further, the ability to consult the TM databank promotes student understanding of specialized subject matter and improves the quality of their translations.

Some studies related to this track are Bowker (1998), Hirci (2004), Laviosa (2004), Leung (2004), Lin (2004), Maglie (2004), Munday (2004), Saridakis and Kostopoulou (2004) and Zanettin (1998). These studies used bilingual sources of information to teach students the appropriate equivalents of specialized terms and expressions.

In 1998, Zanettin asked a group of native Italian undergraduate translator trainees at the Scuola Superiore di Lingue Moderne per Interpreti e Traduttori (SSLMIT) in Forli to translate a newspaper article about the Olympic Games into English by using an Italian-English comparable corpus of newspaper articles. Two additional translations were produced without the help of the corpus. In comparison, the Italian-to-English translation that had used the corpus had superior fluency and accuracy (Laviosa, 2002).

In a pilot study, Bowker (1998) compared one translation of English articles on optical scanners that had been completed with the use of a bilingual dictionary and conventional lexicographic and non-lexicographic reference materials to a translation that had been carried out with a bilingual dictionary and a 1.4 million word specialized monolingual corpus. The findings revealed that the corpus-aided translations had a higher quality “in respect of subject field understanding, correct term choice and idiomatic expression” (Laviosa, 2002, p.105). These examples indicate that some translation programs have used TM databanks to improve student understanding of specialized subjects and improve their translations of specialized documents.

The second track of TM teaching stresses the technical use of the TM system through practice. In many TM programs, student translators learn about the main functions of a TM system, including automatic establishment of the TM databank, the automatic retrieval of translation, a bilingual concordancer, the compilation of term bases, and the support of web page translation. In addition, some graduate programs introduce students to theories of TM research and development. Most TM programs follow this paradigm of technical training and have been implemented at such institutions as the University of Leeds, Dublin City University, and the Monterey Institute of International Studies (see Appendix A and LISA website).

Shuttleworth's (2002) paper “Combining MT and TM on a Technology-Oriented Translation Masters: Aims and Perspectives” declared that the program in Scientific, Technical and Medical Translation with Translation Technology at the Imperial College of Science, Technology and Medicine emphasized the theory and use of translation memory systems, including IBM TranslationManager, TRADOS, STAR Transit and SDLX. In a paper presented at the 6th EAMT Workshop, Kalantzi reported on the state of teaching MT and CAT tools in Greece. Kalantzi administered a questionnaire and found when taught at all, CAT tools were limited to TM technical input (Kalantzi, 2002).

The TM course implemented at NKFUST integrates TM-based translation consultation and its technical application. This study evaluates this TM course. Student responses to a questionnaire provided the data for analysis. The findings brought to light the problems and challenges that TM teaching is facing. Since TRADOS was used in the TM course at NKFUST, the following section will introduce it. Then, objectives, teaching materials and class activities of the TRADOS-based TM course will be introduced. After a report on the results from a survey of students in the course, the implications of the survey's results will be discussed. In short, the assessment of this TM course will provide guidelines for the modification of existing TM courses.

TM AND TRADOS

The introduction of advanced translation technologies has boosted the growth of translation in local industries. The TM system, one of the most useful and popular translation technologies, should be integrated into the translation program and therefore needs to be introduced to translator trainees. The TM tool cannot replace automatic word lookup, automatic textual translation, and text-to-speech service as a machine translation (MT) system does. The TM system is mainly used for automatic storage and retrieval of translation segments from the TM databank through fuzzy or exact matching. Thus, this TM tool is best used to process a huge volume of texts with highly repetitive contents in specific domains such as software/hardware, heavy equipments, aeronautics, and the automotive industry (Torrejon & Rico, 2002). Noticeably, when a TM system is purchased, either in a freelance or a professional version, it is totally “zero” (nothing) in the memory databank. Human translators have to develop the databank or term base. For this reason, TM systems assist human translation.

In the TM course at NKFUST, students used TRADOS for practice. TRADOS is acclaimed as one of the better known, more sophisticated TM systems. TRADOS technologies have empowered professional translators, translation companies, government agencies, and multinational organizations by speeding the delivery and improving the quality of multilingual content. TRADOS Company was founded in 1984 by Jochen Hummel and Iko Knyphausen in Stuttgart to provide translation services for IBM. In March 2001, TRADOS launched TRADOS 5.5. The TRADOS 5.5 system contains the following components: WorkSpace, XTranslate, Translator's WorkBench, MultiTerm, ExtraTerm, TagEditor, and WinAlign. The TRADOS 5.5 Freelance package does not include XTranslate, ExtraTerm and only supports five

languages instead of sixty-five languages. It is also not network-enabled. The latest products are TRADOS 6.5/7.0 for Language Service Provider (LSP) and TRADOS 6.5/7.0 Freelance. The author used TRADOS 6.5 Freelance in the TM course.

Some comments on the TRADOS website have described its benefits. Steve McClure, program vice president in IDC's Software Research Group, stated that the TRADOS TM server processes tasks on translation memory databases with speed and accuracy, enabling global enterprises and multinational enterprises and multinational organizations to translate large volumes of high language quality content quickly and inexpensively. The Director of Johnson Controls Ltd. praised the competitive advantages of TRADOS, claiming that the software is allowing the company to streamline the process of localizing content at lower cost. More than 3,500 corporations have employed TRADOS technologies, including Microsoft, IBM, Deutsche Bank, Wal-Mart, Sony, Oracle, HP, John Deere, Kelly Services, Cisco, Konica, and Merrill Lynch. In light of their many benefits, some TM systems that were initially used by large companies have been commercialized and adopted by freelance translators. Many universities have introduced graduate and undergraduate TM programs to prepare their students for the workplace.

THE TM COURSE IMPLEMENTED AT NKFUST

The elective TM course offered at NKFUST was open to fourth-year students in the English Department. The class size was capped at twenty students because NKFUST had purchased twenty TRADOS accounts. Each student was allowed to use one dongle (the password equivalent used by TRADOS) to run the program. Students worked on TRADOS workstations. The main textbook was a guidebook on MT (machine translation) and TM written by Chung-ling Shih (unpublished so far). The students were also encouraged to consult a Chinese book, *Computer-Assisted Translation: MT & TM*, (Shih, 2003). An English book, *Computers and Translation: A Translator's Guide* (Somers, 2003), was also recommended for student reference. The materials for TM exercises are authentic technical documents with highly repetitive content. The materials from TM exercises could be extracted from the primary textbook, but the printed data was digitalized prior to the TM class and posted on the class website.

The main objectives of the course followed the KASA (knowledge, awareness, skill and attitude) framework (Graves, 2000). Students were expected to acquire knowledge relevant to a TM system, including its advantages, disadvantages, and possibility of profits from TM implementation in business and industry. They were

expected to be aware of the importance of the use of TM technology, and to learn about the capabilities and limitations of TM systems. Lastly, students will have developed a favorable attitude toward TM technology after completing the TM course. In short, TM-relevant information acquisition, awareness of TM's relevance to translation industries, the use of TM skills and developing a positive attitude toward TM were the objectives of this course.

To achieve these objectives, the content of this course falls into three areas: theoretical introduction, hands-on training, and applications. The first hour of the weekly three-hour class was spent on the theoretical study of TM concepts, TM tools, appropriate texts for TM use and the applications of TM in industries. In the second hour, the instructor showed the students how to run the TRADOS program. The students spent the remaining hour on translation tasks and concepts. At the end of each class, students e-mailed their finished translation assignments to the instructor. Table 1 shows the three areas of the TM course.

Table 1
Three Teaching Areas of the TM Course

Areas (hours)	Topics
Theory (First hour)	TM vs. MT A comparison among three TM systems Overview of substantial profits of TM use in IT companies and translation industry TM systems and localization Implementation of TM training for the purposes of language and translation learning
Techniques (Second hour)	TRADOS Workbench (automatic databank buildup) TRADOS Fuzzy and Exact Matching TRADOS Bilingual Concordance (key words search) TRADOS WinAlign (alignment of SL and TL texts) TRADOS TagEditor (webpage translation without the need for typesetting) TRADOS MultiTerm (termbase and glossary buildup)
Application (Third hour)	Use of TRADOS WinAlign to explore the issue of translation equivalence between SL (source language) and TL (target language) texts. Use of Bilingual Concordance to learn different meanings of the same word used in different contexts as shown in the concordance output. Use of TagEditor to translate the webpages without any typesetting Use of MultiTerm to build various termbases in different domains or subject matters.

The students were not interested in learning theory, so the instructor modified the teaching content after the midterm. During the first hour, students' translation assignments were critiqued and some suggestions were made to improve translation performance through the use of lexical coherence, restoration of the implicit information and syntactic shift. The use of these strategies improves the readability and accuracy of translation. The other two hours were left for hands-on practice with TRADOS. Students practiced each function of TRADOS for two or three consecutive hours in order to become proficient. With practice, students were able to remember all of the technical steps.

In this course, the instructor played the role of a source person and task designer. The instructor designed some translation tasks to train the students in TRADOS-relevant technical skills. Among the assigned tasks were "Identification of Varied Translation Equivalence Modes Through Alignment Editing," "A Query for Technical Reference Through the Use of a Concordancer," "Textual Upgrade by Retrieving From a TM Databank" and "Collocational Query Through the Use of a Concordancer."

The identification of varied translation equivalence (TE) modes depends on the student's correction of errors in the WinAlign-generated alignments. TRADOS WinAlign automatically aligns source language and target language texts. Students were asked to edit the inaccurate alignments that were generated as the result of the linguistic divergences between Chinese and English. The process of editing assignments required students to identify strong TE, fair TE, weak TE and very weak TE.

In addition, students were asked to use the concordance output to learn the collocational usage of some lexical items. For example, after we typed in the word *offer* in the TM-driven Concordancer, the mini-size TM databank that contains 300 words would produce a concordance output. The output shows that the word *offer* is frequently used as a verb (translated as 聘請 and 支付) and a noun (translated as 聘請). The collocations of *offer* include *letter of offer*, *decline this offer*, *offer you a position* and *offer you a salary...per month*, and their Chinese translations are respectively 聘書、無意斯職、茲聘請、月薪為。 These tasks represent those used in this TM course.

THE QUESTIONNAIRE-BASED SURVEY AND FINDINGS

At the end of this course, a questionnaire was administered to the students. The purpose of the survey was to evaluate whether the objectives of this TM course had been met. In the questionnaire, the author presented the research hypothesis that this

TM course had benefited the students in four areas: technical skills, cost-effectiveness of data retrieval, improved translation performance and affective contribution of visual cues. Based on these hypotheses, the author designed a questionnaire of 20 Yes-No questions and two open-response questions. The questions are evenly distributed under four categories: technical operation, benefits of TM use, translation competence and affective contribution of visual tools. The questions of technical operation concern student experience with TM use. Benefits of TM use refer to saving time during word lookup. The questions of translation competence explore whether students enhance their translation proficiency after TM use. Affective contribution aims to investigate the visual effects of TM tools upon translator trainees. All these questions in the questionnaire attempt to verify the instructor's hypotheses. The questionnaire is included in Appendix B.

Participants

At the end of the TM course, a total of 20 questionnaires were delivered to the undergraduate students who took the elective TM course. Seventeen of the respondents were majors in English and the remaining three were majors in Electronic Engineering, International Trade and French. Their average age was 22 and they had an average of 12 years of English language study. Their intermediate English proficiency was adequate for completing all of the English-to-Chinese translation assignments. Because they had taken the course as an elective, most of them were interested in computer and information technologies. However, they had never learned TM or TRADOS before. This was their first experience with TRADOS. Before they filled out the questionnaire, they were reminded that not all of the answers were related to the assessment of their translation performance, so that they could feel free to respond candidly.

Results of Yes-No Questions

The total number of responses under each category and the total percentages were calculated. The differences among the total numbers under the three types of responses (agree, no attitude, disagree) were also calculated. The results of student responses to the questions are shown in Tables 2-6.

Table 2 indicates that student responses to Q5 (Concordance use) show the highest percentage of agreement. The lowest percentage is shown in student response to Q1 (WinAlign use).

Table 2
Descriptive Statistics on Responses to Questions in Part A

	Agree		Neither Agree Nor Disagree		Disagree	
	<i>n</i>	Percentage	<i>n</i>	Percentage	<i>n</i>	Percentage
Q1 (WinAlign use)	10	50%	6	30%	4	20%
Q2 (Workbench use)	15	75%	3	15%	2	10%
Q3 (TagEditor use)	16	80%	4	20%	0	0%
Q4 (MultiTerm use)	15	75%	5	25%	0	0%
Q5 (Concordance use)	20	100%	0	0%	0	0%

Table 3 shows that students had 100% positive responses to Q1 (development of TM databanks), Q3 (retrieval of similar translations) and Q5 (terminological consistency). However, less than half of the students (40%) had positive responses to Q4 (consultation of specialized terms).

Table 3
Descriptive Statistics on Responses to Questions in Part B

	Agree		Neither Agree Nor Disagree		Disagree	
	<i>n</i>	Percentage	<i>n</i>	Percentage	<i>n</i>	Percentage
Q1 (Development of TM databanks)	20	100%	0	70%	0	0%
Q2 (Compilation of bilingual TM databanks)	15	75%	5	25%	0	0%
Q3 (Retrieval of similar translations through the use of fuzzy or exact matching functionalities)	20	100%	0	0%	0	0%
Q4 (Consultation of technical or specialized terms)	8	40%	5	25%	7	35%
Q5 (Terminological consistency)	20	100%	0	0%	0	0%

Table 4 indicates that the highest percentage of agreement is presented by student response to Q1 (acquisition of domain-specific knowledge), while the lowest percentage is shown by student response to Q4 (acquisition of the translation equivalence concept).

Table 4
Descriptive Statistics on Responses to Questions in Part C

	Agree		Neither Agree Nor Disagree		Disagree	
	<i>n</i>	Percentage	<i>n</i>	Percentage	<i>n</i>	Percentage
Q1 (Acquisition of domain-specific knowledge)	20	100%	0	0%	0	0%
Q2 (Comparison of student and professional translations)	15	75%	5	25%	0	0%
Q3 (Learning of linguistic divergences between SL and TL)	18	90%	2	10%	0	0%
Q4 (Acquisition of the translation equivalence concept)	9	45%	3	15%	6	30%
Q5 (Improved translation performance)	18	90%	2	10%	0	0%

Table 5 reveals that students had 100% positive responses to Q2 (easy check) and Q3 (fewer missing translations). They also had quite positive responses to Q1 (anxiety reduction) and Q4 (easy access to suggested translations), reaching agreement percentages of 80% and 90%, respectively.

Table 5
Descriptive Statistics on Responses to Questions in Part D

	Agree		Neither Agree Nor Disagree		Disagree	
	<i>n</i>	Percentage	<i>n</i>	Percentage	<i>n</i>	Percentage
Q1 (Anxiety reduction)	16	80%	4	20%	0	0%
Q2 (Easy check)	20	100%	0	0%	0	0%
Q3 (Fewer missing translations)	20	100%	0	0%	0	0%
Q4 (Easy access to suggested translations)	18	90%	2	10%	0	0%
Q5 (The effect of visual cues)	11	55%	6	30%	3	15%

Results of the Open-Ended Questions

Students were asked to note down their responses to the two open-ended questions, either in Chinese or English. Written answers were transcribed in a matrix under the categories of TM learning experience and expectations concerning this TM course. Table 6 summarizes the student reflections on TM learning and expectations.

Table 6
Written Responses to Open-Ended Questions

Number of Respondents (Percentages)	TM Learning Experience	Expectations Concerning the TM Course
20 (100%)	The instructor called student attention to some translation mistakes in student assignments and this helped students prevent similar mistakes again.	The instructor can post student translation mistakes on the website as a warning to all students. Use left justified text; it is easier to read when there is the same amount of space between words.
5 (25%)	The instructor's demonstration of TRADOS went too quickly, so that students could not remember the steps.	The instructor should make students practice each step immediately after demonstrating each step.
5 (25%)	The workload in each class was too heavy; students could not complete the translation assignment within one or two hours.	The assignment load should be reduced.
20 (100%)	Students could manage the TM system well by practicing the functionalities of TRADOS.	More TM-specific tasks can be designed for student practice.
18 (90%)	Students will be less anxious when they collaborate on translation assignments with their partners.	Collaborative learning is encouraged, but some students are allowed to work alone if that is their preference.
18 (90%)	Writing reflections on TM learning in the translation assignment was useful for students to review what they learned.	Taking notes on TM learning experience was limited to a few sentences.
20 (100%)	Authentic translation materials, including diverse types of user manuals, are useful for translation practice.	The instructor could ask students to collect authentic translation materials for practice.

Table 6 clearly shows that a majority of students were positive toward the TM course. A few students complained that they could not keep up with the instructor's demonstration of TM skills and that there were too many translation assignments.

DISCUSSION AND IMPLICATIONS

Based on the above data, the pedagogical effectiveness of the TM course in four areas is discussed as follows.

Technical Operation of TM Tools

The result of student responses to Part A questions showed that the majority of students thought that the TM-driven Concordance was the easiest function to learn while the fewest students agreed that TRADOS WinAlign was easy to use. This finding shows that the procedures for developing a TM databank with the help of WinAlign are too complicated for students to remember. The solution to this complicated way of developing a TM databank is the use of Translator's Workbench. We could directly copy and paste TL sentences below SL sentences on the window of TRADOS Translator's Workbench to compile a TM databank. However, it is inefficient when a huge databank needs to be compiled. In this situation, the use of WinAlign is preferable, because it can align thousands of SL and TL sentences within seconds. More than half of the students (75%-80%) were satisfied with TermBase and TagEditor.

Cost-Effective Benefits of TM Systems

The answers to Part B of the questionnaire indicated that all students agreed that the use of the Translator's Workbench to compile the TM databank was cost-effective. They found that the terminological consistency resulting from the use of shared TM databanks saved time and work when several outsourced translators had to complete a huge translation project. These responses showed that students understood that the use of TM implementation had improved the quality and quantity of their translations.

However, less than half of the respondents believed that the consultation of specialized term bases was more convenient than the use of online dictionaries. This demonstrated that the use of TRADOS TermBase to compile customized term banks was time- and labor-consuming, so students preferred looking words up in online dictionaries. It is not cost effective to compile the customized term bank and use it only once or twice, but translators are more likely to use it when they develop a long-term relationship with a steady client and need to consult the customized term

base regularly to ensure terminological consistency.

Improving Translation Performance Through the Use of Databanks and Term Bases

Student responses to Part C showed that all students agreed that the use of the TM databank and the concordance output enabled them to obtain appropriate translations for reference, so that their translation could be improved. This exactly echoes the positive survey result of corpora use in translation learning, as noted in the introduction to this paper. In addition, a majority of students thought that editing the inappropriate WinAlign-produced alignments helped them see the linguistic divergence between SL and TL texts. They found that this knowledge was helpful in building their competence.

Editing the alignments between SL and TL sentences initiated students' self-learning that led to self-discovery of varied modes of translation equivalence. In some cases students had to split one SL sentence into two sentences in order to make it correspond to one TL sentence; at other times they had to join two sentences. The entire editing process allowed students to identify and see the differences in linguistic structures between SL and TL sentences. Although the use of TM databanks, the concordance outputs and the alignment editing process improved the quality of student translations, more than half of the respondents disagreed that awareness of the translation equivalence (TE) concept helped them carry out translation in a more communicative way. This implies that the acquisition of the TE concept could not improve their translation style and the textual coherence. In short, the knowledge of TE, acquired through the editing of alignments produced through TRADOS WinAlign, does not seem to be a crucial contributor to the development of student translation competence.

However, there was indeed an obvious improvement in the student translations of terminology. For example, before students consulted the term base that contained 300 words on the laws of Mainland China, many students mistranslated “人民民主參政的政權” as “*people's rights to participate in politics,*” “*freedom of franchise,*” or “*the political power allowing people to participate in democracy.*” The main reason for these variations is that the source text was extracted from a law book published by the People's Republic of China, *The Basic Teaching Curriculum on Law: Law and Cases* (Wang, 2003). The political system to which the term refers does not exist in Taiwan, so all students used their knowledge of politics to decode the term. Having consulted the term base, all students agreed upon the translation as “*the State power of the people's democratic dictatorship.*” Furthermore, having used the term base, seven students used a high percentage of similar or identical terms in their translations. This empirical evidence ensures the function of terminological consistency, a necessary

requirement for reducing the amount of time spent on the final editing of a huge translation project.

The Affective Contribution of TM Databank and Visual Tools

Of the five questions in Part D of the questionnaire, only 11 students (55%) believed that the visual cues of aligning lines, generated through the use of TRADOS WinAlign, could help them easily learn the TE concept. Three students (15%) disagreed. This revealed that the students had overlooked the visual effect of linking between SL and TL sentences as shown in the editing interface when they fully concentrated on the modification of inappropriate alignments between SL and TL sentences. Nevertheless, the majority of students, ranging from 90% to 100%, believed that there was a positive effect from the visual cues that had been presented on the interface of Concordance output. In addition, it was agreed that the color bars, as shown on the interface of Translator's Workbench, helped students distinguish SL from TL sentences; the color tags, as shown on the interface of TagEditor, prevented students from translating the inappropriate parts on the web page and ruining the original format. Furthermore, students agreed that the colored key words as shown on the concordance output enabled them to catch the message. Everything that students learn could come through their senses because the initial stage of cognitive processing requires perception (Buttler-Pascoe & Wiburg, 2003). Since visual cues produce perceptions of similarities, differences and stressed points, they motivate and enhance the effectiveness of students' TM-assisted translation learning.

Overall Responses to and Expectations of the TM Course

Student reflections on the two open-response questions clearly reveal that they are generally satisfied with the pedagogical approach, the materials used and the curriculum content. However, five students (25%) complained that the instructor's demonstration of TRADOS was too fast for them to keep up with the operational process. In addition, they suggested that the load of TM-relevant assignments be reduced so that they could complete the assignments within class time. These students (25%) were less adept at translation and had less computer literacy. This warns the instructor that students with lower computer literacy should not be paired. The collaborative learning in pairs is intended to allay student anxiety, but inappropriate pairing defeats the purpose.

All of the students (100%) liked the collaborative way of learning TRADOS, but two students preferred to work alone because they were prone to argue about the translations with their partners. Their requests to work alone were honored, and a collaborative approach should be encouraged because of its psychological and

pedagogical advantages. According to Hewitt (1993), the collaborative approach provides good teaching models by “reinforcing comprehension in jointly reconstructing the meaning of text” (p.29). Sainz (1994) claimed that a collaborative approach helped adult students “process information through multiple channels, enabling them to become productive learners” (p.14). These scholars have endorsed the collaborative approach and this endorsement ensures its continuous use in the TM classroom.

Students were unanimously satisfied with the materials used in this TM class. It must be noted that materials chosen for the TM course were limited in type. Only technical texts that have highly-repetitive contents and that require constant upgrades are suitable for an introductory course. Insofar as some students wanted to find digital translation materials for an exchange, they had to understand that only texts conforming to the above criteria could be selected.

All students (100%) thought that repeated practice of a specific TM skill allowed them to internalize what they were learning. Repetitive practice enabled students to review what they had learned in the previous class. In addition, all students (100%) thought that writing down their reflections on TM functions helped them clarify what they had learned. This corresponds to Colina’s (2003) remarks that “annotated translations, including reflections and thoughts on the translation tasks, facilitate evaluation of learning and translation processes more than the mere evaluation of products” (p.70). When students noted down their thoughts, they understood their strengths and weaknesses in handling a translation. Furthermore, writing their reflections helps students see the benefits and limitations of TM. However, the TM instructor still needs to review students’ translations and to pinpoint their errors. In order to become a highly qualified translator, students must learn not only TRADOS-specific skills but also the translation strategies that will improve their competence.

In summary, this TM course gives students ample hands-on practice with the TRADOS system. Students can gain a mastery of post-TM editing and translation skills through participation in a variety of TM-relevant tasks. The use of collaborative learning has allayed student anxiety and fear of TM. Furthermore, the use of TM databanks and concordance outputs for information retrieval and translation consultation have improved students’ translation performance and stimulated their interest in learning TM.

CONCLUSION

The evolution of the translation profession has proven that the incorporation of TM components into existing university translation programs is imperative. A TM course offered at universities would teach students how to use TM tools. The survey that was administered to TM students in this study justified learning this translation technology.

Taking courses in TM at college, the students who enter local industries after graduation will not need the company to pay for their training. Those who are already proficient in TM will have more opportunities to work in modern local translation industry than those who are not. In short, since TM technology has an important place in the working environment of professional translators, translation programs should consider offering TM-relevant courses.

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APPENDIX A

Technology-Enabled Translation Programs Abroad

Universities	Courses	Teaching Components
University of Leeds, U.K.	Computers and the Translators (MA level)	Terminology management, translation memory, machine translation Weekly hands-on use of commercial systems: TRADOS, Passolo, Alchemy Catalyst, Déjà vu, WordFast, Star Transit (TM); Systran, Reverso, Compendium, Sharp (MT) (22hours; 11 weeks)
Dublin City University, Ireland	Translation Technology (post-graduates/MA level)	TM module An introduction to the basic concept of TM The use of TRADOS Workbench tool The use of TRADOS WinAlign tool (48 contact hours)
Monterey Institute of International Studies, U.S.A.	Computer-Assisted Translation (MA level)	Examination of the types of tools, including machine translation, translation memory, online dictionaries, desk-top publishing systems (four months)
Imperial College of Science, Technology and Medicine, UK	Scientific, Technical and Medical Translation with Translation Technology	The theory of TM and MT Intensive hands-on training in MT and TM tools, including IBM TranslationManager, TRADOS Translator's Solution, Star transit and SDLX (one academic year)

APPENDIX B

The Questionnaire for the Pedagogical Effectiveness of the TM Course

Dear Students:

This questionnaire is used only to help the researcher learn about your responses to this TM course. Please provide accurate and complete responses. All of your responses will be kept confidential and will never be graded and disclosed. Please fill out the questionnaire frankly. Thanks for cooperation!

Sincerely Yours,
Sophia Shih

Part I: Student Profile

Gender: _____

Age: _____

Your previous major: _____

Have you learned the TM technology in the translation class? _____

Part II: Student Responses to the TM Course

1: agree; 2: neither agree nor disagree; 3: disagree

A. Technical Operation

1 2 3

- _____ 1) TRADOS WinAlign is easy to learn and friendly to use technically.
_____ 2) TRADOS Translator's Workbench is easy to learn and friendly to use technically.
_____ 3) TRADOS TagEditor is easy to learn and friendly to use technically.
_____ 4) TRADOS TermBase is easy to learn and friendly to use technically.
_____ 5) TRADOS Concordance is easy to learn and friendly to use technically.

B. Benefits of TM Use

1 2 3

- _____ 1) The use of Translator's Workbench for automatic development of the TM databank is quite cost-effective for future translation retrieval.
_____ 2) The use of WinAlign to align available SL and TL texts is an economical way to compile the bilingual TM databank.
_____ 3) It is cost-effective to retrieve similar translation segments from the

TM databank for editing through the use of fuzzy or exact matching functionality embedded in Translator's Workbench.

- _____ 4) It saves time to consult technical or specialized terms directly from the established term base rather than from the online or printed dictionary.
- _____ 5) Terminological consistency resulting from the consultation of shared TM databanks and term bases reduces time for the general editor to edit the translations completed by several co-translators.

C. Translation Competence

1 2 3

- _____ 1) The use of established TM databanks and term bases for informational consultation helps one acquire professional knowledge in a specific domain prior to translation.
- _____ 2) The retrieved translations on the concordance output helps students compare their translations with the professional translations.
- _____ 3) Editing the inappropriate WinAlign-produced alignments enables students to learn the linguistic divergences between SL and TL sentences and this linguistic knowledge is helpful for the enhancement of students' translation competence.
- _____ 4) Repeated practice with alignments editing helps one acquire the translation equivalence (TE) concept and henceforth to tackle the translation in a more communicative and target-oriented way.
- _____ 5) Students' translation performance greatly improved after consulting TM databanks and concordance outputs.

D. Affective Contribution

1 2 3

- _____ 1) The use of TM databanks or concordance outputs helps novice translators reduce anxiety because they can consult the suggested translations retrieved from the TM databank and term bases.
- _____ 2) The color bars that mark SL and TL sentences on the window of Translator's Workbench allow student translators to easily check whether they complete their translations.
- _____ 3) The use of TagEditor helps translators easily distinguish what needs to be translated from what does not need to be translated because TagEditor seals up all graphic codes and html tags.
- _____ 4) The search terms with appropriate translations are colored (yellow)

on the concordance output, so that translators could easily catch the suggested translations.

_____ 5) The visual cues of aligning lines, as shown on the window of WinAlign, help translators easily and clearly acquire the translation equivalence concept.

Part III: Questions and Answers

1. How would you evaluate this TM course in the areas of the teaching approach, translation materials and translation tasks?
2. What are your expectations for this TM course?

翻譯記憶教學：個案研究

摘要

本文旨在探究高雄第一科技大學實施翻譯記憶教學之優缺點。作者首先說明翻譯記憶 (Translation Memory/TM) 之概念，並介紹 TRADOS 翻譯記憶工具。其次，作者略述高科大所進行翻譯記憶課程之教學目標、教學內容及課堂活動。最後，作者針對翻譯記憶課程所作之問卷調查結果，加以分析及探討。雖然本文只針對高科大翻譯記憶課程進行個案研究，並不能代表所有翻譯記憶課程之實施成效，但是問卷調查之結果可提供一些具體方針，作為日後改善並修正目前翻譯記憶教學之參考。

關鍵詞： 翻譯記憶課程 翻譯記憶工具 問卷調查