



# Students' emotional experiences in learning translation memory systems: A narrative-based study

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**Abstract:** In recent years, a growing number of translation programs have introduced a technology module into their curriculum. Yet students' reflections on their interaction with translation technologies remain largely under-researched. This exploratory study examines students' initial emotional experience in learning and using translation memory (TM) systems after three weeks of direct exposure. Seventy-five postgraduate translation students completed an emotional-narrative task in which they were invited to write either a "love letter" or a "breakup letter" (out of their own choice) to one of the TM systems with which they had experimented. As reflected in the "love letters" (n = 39) and "breakup letters" (n = 36), the students had both positive and negative emotions when learning different TM systems. A thematic analysis shows that the student translators expected the software tools to be learnable, productive, and user-friendly. Based on the emotional patterns and their expectations of TMs, we present a discussion of learning translation technology through discovery and reflection. The emotional-narrative activity in this case was applied as a pedagogical tool to engage students in the discussion of technology, its usage, and the learning experience. It further allowed the teacher to understand the students' perspectives.

**Keywords:** Translator training; translation memory (TM) systems; student emotions; reflective learning.

## 1. Introduction

In recent years, the quality of automated translation products has been continually improved, which has changed the traditional workflow of translation practice. The most prominent recent development is neural machine translation (NMT), launched in late 2016 and soon claimed "human parity" in its top-performing language pairs (Wu et al., 2016; Hassan et al., 2018). In parallel, translation memory (TM) software is also used for productivity-enhancing purposes, which is essentially a database of aligned parallel texts or 'bitexts' in the start and source languages (Bowker & Fisher, 2010; Melby & Wright, 2015; Simard, 2019). It allows users to store and potentially reuse their previous translations in their new translation projects. Enhanced in functionality, TM suites have integrated a wide variety of functions and increasingly incorporated machine-translation feeds, to maximise productivity and streamline the collaboration process (García, 2015; Melby & Wright, 2015).

Technology-driven changes can be observed in aspects of professional translators' work, with post-editing and TM-integrated work modes replacing

the traditional “from-scratch” translation mode to a greater extent (ELIA, 2019; Translators Association of China, 2018).

Changes in pedagogy have also been made to keep pace with technological advances, as many translator-training institutions have integrated translation technology into their coursework structure. It has been reported that TM software tends to be the most widely taught tool with respect to other training items (e.g., terminology management and post-editing skills) in the European (Toudic, 2012; Rothwell & Svoboda, 2018) and Chinese contexts (Wang et al., 2018). Possible reasons could be that TM systems tend to be more sophisticated and professional-oriented compared with raw MT post-editing, and thus novices require special training to acquire the necessary operation skills. In the meantime, some challenges facing translation students in the technology classroom have also been observed (Marshman & Bowker, 2012; Toudic, 2012; Doherty & Kenny, 2014), including technical issues encountered in the hands-on learning process and difficulties experienced in evaluating the quality of automatic translation output. Other obstacles include the inability to find resources to facilitate the software usage and incapacity to choose which software to use based on the limited information about its capabilities and limitations.

Education in the past overstressed the relationship between learners’ cognitive development and academic achievement, overlooking the importance of emotional involvement and hence personal motivation to learn. In recent decades, researchers in this field have thus started to pay greater attention to emotions, with their significance for learning being recognised (Pekrun et al., 2002). Emotions are defined as multifaceted phenomena which involve a set of coordinated psychological processes; they are stimulated by recognisable stimuli (Kleinginna & Kleinginna, 1981; Scherer, 2000). In academic settings, students can experience a diversity of emotions: excitement about learning new contents, pride when goals are met, shame and frustration when efforts fail, boredom experienced in repetitive tasks, or anxiety about coming assessments (Pekrun et al., 2002; Pekrun & Linnenbrink-Garcia, 2012). A set of studies have provided empirical evidence for the critical role emotions play in academic settings, more specifically on how they affect engagement and academic performance. This concerns motivation to continue, concentration, problem-solving strategies, and self-regulation (Fredrickson, 2001; Pekrun, 2011; Pekrun et al., 2012). Other studies highlight the relationship between emotions and academic achievement (e.g., Pekrun et al., 2007; Ramirez-Arellano et al., 2019). It is also reported that students’ emotional states change dynamically during the learning process, which can result in knowledge acquisition in a spiral pattern (Koet et al., 2001). Educational researchers have also attempted to trace the sources of emotions, seeking out factors that trigger emotional responses in the classroom. For instance, Pekrun (2011) contends that emotions are stimulated by proximal antecedents and distal antecedents. Proximal antecedents refer to control appraisal (students’ self-evaluation of the control they have over the learning activities) and value appraisal (self-evaluation of the importance of learning outcome). Distal antecedents include personality and socio-cultural factors outside of the curriculum. Understanding the stimuli of academic emotions can help teachers and curriculum designers better measure students’ wellbeing, identify learning progress and difficulties, and make corresponding interventions to enhance the learning experience.

The integration of TM systems into the translation curriculum inevitably leads to various emotional experiences among students. Psychological research has also shown that humans’ moods, emotions, and feelings can influence their reflex, cognition, and behaviour (Russell, 2003). It is natural to hypothesize that translators’ emotions play a key role in their resistance or adaption to emerging

technologies, which in turn influence their behaviour in human-computer interaction. Hence, translator students' technology-related sentiments could affect the extent to which they accept translation technologies in training and possibly in future employment where language automation technologies will abound. It is thus critical to understand the various emotional experiences of students in the translation-technology classroom.

Translators' emotional experiences in the context of technology usage have attracted some attention in recent years. For instance, Koskinen and Ruokonen (2017) conducted a love and breakup letter experiment that requires participants to personify a technological tool and express their sentiments by writing either a fictive "love letter" or a fictive "breakup letter" to it, so as to trigger emotional responses and elicit sentimental narratives. The love and breakup letter task serves as a useful technique for "getting emotions and feelings out in the open" (Hanington & Martin, 2012; Laughy et al., 2021, p.3) and can help participants express emotional status or feelings they otherwise may struggle to articulate (Gerber, 2011). At the same time, emotional letters can encourage reflective insights that are derived from human-object interactions (Koskinen & Ruokonen, 2017). This method is also considered a form of reflective writing, revealing recognisable stimuli that trigger positive or negative emotions during the user experience. Koskinen and Ruokonen (2017) provide insights into the emotional responses of professionals who have had long-term exposure to certain technological tools in practice (not limited to translation-specific technologies like TM systems and MT), although they do not focus on the specific emotions felt by novice users at the initial learning stage.

In this study, I extend the letter-based narrative task from the professional setting into the translation classroom. I focus on students' emotional responses to TM software, which is one of the most common set of tools in the professional use of translation. The participants were a group of seventy-five Master-level translation students (English-Chinese) enrolled in the postgraduate program in Translation Studies at the University of Melbourne, Australia. All students had had limited informed exposure to TM systems prior to the class, and they had experienced a range of TM systems selected by the course coordinator, all through a discovery learning approach and for a similar length of time (i.e., direct exposure for three consecutive seminars). In this sense, this study is thus more focused than the research reported by Koskinen and Ruokonen (2017). It sets out to address the following research questions:

- 1) What emotions are felt by students when they first learn to use TM systems?
- 2) What are students' expectations of TM software from a user's perspective?

In what follows, the next section reviews the literature on how practitioners, translation teachers and students see technological advances in the field. Section 3 shows the present study's scope, participants, data collection and analysis methods. Following that, Section 4 starts with the emotional value the students assigned to different TM systems and reports their reflections on their experiences as users and learners of TMs. The article ends with a discussion of discovery- and reflection-based learning and implications for translation-technology teachers.

## 2. Background: How translators see technology-driven changes

Practitioners sometimes feel that the post-editing mode, i.e., working with MT-assisted TM systems, increases their control over tasks and improves work efficiency and product quality (O'Brien & Moorkens, 2014; Marshman, 2014). Many practitioners are willing to adopt new technologies on the condition that their expectations can be fulfilled (Koskinen & Ruokonen, 2017). In contrast, negative attitudes towards technologies have also been reported. While some practitioners are more concerned about pay rates or the business practices related to MT/TM usage (Vieira, 2018), others complain about the limitation of tool functionality and have anxiety over the future of the profession (Läubli & Orrego-Carmona, 2017). In this regard, MT systems seem to shake the centrality of human translators to a greater extent than TM systems. Essentially, a TM is integrated into the translation process to assist the human translator, who is still at the centre of this activity, whereas an MT engine performs the translation activity, with human intervention (i.e., pre- or post-editing) needed for quality control reasons (Bowker & Fisher, 2010).

A handful of studies have drawn attention to trainee translators' attitudes towards translation-specific technology (TM systems and MT). A pre- and post-test questionnaire survey of thirty-eight students in three Italian universities (Gaspari, 2001) shows a robust correlation between students' attitudes to MT and their degree of technology exposure: the more knowledge the students have, the less negative their attitudes become. This is consistent with what Çetiner (2018) finds in his study of translation students' attitudes to TM systems (n=66) in Turkey, using a similar data collection method, and what Koponen (2015) discovers from reflective essays written by her students (n=13) at the end of a MT and post-editing course delivered at the University of Helsinki. Pym and Torres-Simón (2016) report that students predominantly see new technology as a threat rather than an aid to their translation practice. Their comparison of questions raised by students in the US and in Austria (n=214) shows that fear of technology is particularly the case for students with less exposure to it (Austria), while the students who had taken the obligatory courses in translation technologies demonstrated more curiosity instead of fear (the US). Many educators thus posit that one primary purpose of their translation technology class is to increase the students' exposure to technology, because extended experience can help reduce anxiety, and thus lead to fewer feelings of alienation from technological advances (Marshman & Bowker, 2012; Guerberof Arenas & Moorkens, 2019). Nevertheless, Koponen (2015, p.10) indicates in her study that the students, after doing post-editing for a semester, still found it difficult either to "trust the MT" or to "feel secure taking responsibility for the final translation".

In their questionnaire survey of translator educators (n=28) and students (n=254) in Canada, Marshman and Bowker (2012) report that students' overall comfort level with technology is higher than that of their teachers. This generational difference regarding technology-related attitudes is in tune with what has been found in the language industry: Novice translators seem to be more open-minded to the idea of adopting translation technologies than are senior translators with ten or more years of experience (Dillon & Fraser, 2006; Katan, 2011). At the same time, Marshman and Bowker (2012, pp.76-78) also emphasise the heterogeneity of the student group, i.e., even though they are quite often viewed as tech-savvy generations, their attitudes towards technologies, comfort level with computers, and basic computer skills vary greatly. More recently, Moorkens (2018) reports that translation students at Dublin City University (n=46) found the state-of-art NMT outperformed the previous paradigm SMT in their post-editing and comparative evaluation task.

The follow-up discussion suggests that the students did not see NMT as a threat to the translation profession, but they were concerned that the continuous improvement in its quality may make human translation obsolete in certain fields. Thus, the considerable variation in attitudes indicates the necessity to further investigate translator trainees' emotional responses to technological advances in the translation field.

### 3. Methodology

#### *3.1 Data collection: The love letter/ breakup letter experiment*

Previous studies have employed various methods when investigating how translators see their experience of using translation technology, such as questionnaire surveys (Dillon & Fraser, 2006; Lagoudaki, 2006), interviews, focus groups (Cadwell, O'Brien, & Teixeira, 2018; Sakamoto, 2019), netnography searches (i.e. analysing online comments) (Läubli & Orrego-Carmona, 2017; Vieira, 2018), and narrative analysis (Koskinen & Ruokonen, 2017; Ruokonen & Koskinen, 2017). A questionnaire survey can be used to collect large-scale structured data, in which the closed-ended questions allows for statistical analysis (Läubli & Green, 2019); however, this method is inadequate to collect in-depth explanatory data, especially about "emotions, opinions and personal experiences" (O'Brien & Saldanha, 2014, p.152), unless followed by corresponding interviews. In contrast, purely qualitative research methods, including interviews and narrative analysis, offer access to individuals' reflections and self-reported attitudes, even though the validity and reliability of the results might be influenced by "research bias effect" (O'Brien & Saldanha, 2014, p.169).

The narrative task in nature seems to be more open-ended than interview and focus group methods, in the sense that participants can be less constrained to construct meanings and assign attitudes to the subject matter. This free-form method allows the researcher to collect rich materials that go beyond initial expectations. Admittedly, this post-task retrospective method allows neither direct access to participants' psychological states nor ethnographic/contextual enquiry during their actual usage (e.g., Désilets et al., 2009; Karamanis et al., 2001). However, emotional letters can reveal holistic reflections as against short-term affects. For these reasons, this task was adopted as the major data-collection instrument, aiming to access translator trainees' emotional responses to TM systems.

The love and breakup letter method was first developed and has been extensively utilised in User Experience (UX) research to capture users' emotional attachments to software platforms, apps, websites, or digital devices, etc. (e.g., Gerber, 2011; Keyte, 2015; Nejar, 2017), which can further be analysed to understand how different users understand product usability and functionality (Norman, 2004; Velazquez & Gul, 2010). The love and breakup letter method has also been applied to educational settings to look into medical students' understandings of empathy education (Laughy et al., 2020; 2021), for instance. To my knowledge, Koskinen and Ruokonen (2017) were the first to use this method to investigate emotional experience in using a variety of tools that are designed specifically for translation activities (such as TM and MT) and general technologies that aid translators to complete their tasks (from search engines, word processing, to hardware such as laptops, mouses, and keyboards). This broad scope endeavoured to capture technology in all forms that translators may encounter in their practices. However, it seems unclear what proportion of the responses in these studies addressed translation-specific technology (TM systems and MT) rather than information technology in general. This distinction

is important to the extent that translation technology is obviously more specific to the translation profession than is information technology in general. Hence, there remains some doubt as to the emotions when practitioners familiarise and work with TM systems.

In addition, the participants in the studies by Koskinen and Ruokonen include senior and junior professional translators at the European Commission, professionals serving the Finnish market, and some MA students from Finland and Ireland. The sampling allows for comparative analysis of self-report data across groups. However, the participants' varied backgrounds seem to imply that they might have different experiences of using translation technology and have been exposed to it to different degrees, which could extensively influence their emotional profiles and understandings of what translation technology is.

To address these gaps, the present study focuses on students' emotional responses to TM software at the initial learning stage. The focus on student users can be justified in several ways. On the one hand, students are novice users of translation technologies in simulated classroom practices; their reflections are comparable to the professional retrospections (e.g., Koskinen & Ruokonen, 2017), in the sense that they also construct meanings and assign emotional values to technological products based on their increasing exposure to the target tools.

On the other hand, unlike professional users, students have limited prior knowledge of the technologies, and their experience of using tools is inextricably intertwined with their learning process. For these reasons, students' narratives not only reflect their sentiments as novice users, but also reflect and document their initial learning experiences and in particular "first impression".

The procedure of data collection is presented as follows: From 14 August to 18 August 2019, seventy-five MA students enrolled in *Translation Studies Workshop* (offered in 2019, semester 2 at the University of Melbourne, Australia) were invited to participate in the letter-based narrative task<sup>1</sup>. More than 90% were native Chinese speakers. Most were incoming students, including 42 students in their first semester of course study and 27 in their second semester; the rest of them were about to finish the coursework (8). None of the students had learned TM in any informed way before taking the subject. *Translation Studies Workshop* was an introductory course that focused on the study of translation processes, with a three-week technological module being embedded at the very beginning. By the end of that module, the students were expected to know how to work with the selected TM systems and, more importantly, to be able to evaluate them and identify the nuances of different systems. As such, a wide range of free-access TM systems were introduced to encourage such comparisons, including those launched during the early 2000s, *Wordfast* and *Omega-T*, and more recently developed ones such as *CaféTran Espresso*, *Google Translator Toolkit* (discontinued in December 2019), *MateCat*, and *Smartcat*. More advanced and professional TM suites such as RWS Trados were covered in another specialised elective course in the curriculum, *Translation Technologies* (offered for the first time in 2020, semester 1).

In these initial three classes (Weeks 1, 2, and 3), the student translators were asked to work in pairs and complete a set of translation tasks by using at least one different TM system each week. Additional TM systems were

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<sup>1</sup> Ethics clearance was received from the Human Research Ethics Committees, Faculty of Arts, University of Melbourne (Ethics Authorization Number 1954388.1). I thank all the participating students, who gave individual permission for their letters to be used in this research. The author observed the three seminars with the permission of the subject coordinator at the time of the study.

provided in class for the more advanced students to explore, as the student group exhibited quite different levels of computer literacy. Following the philosophy of discovery learning, students were encouraged to proactively explore how to complete these tasks using available TM systems at their own pace, although they could also turn to the instructor and tutor for help when needed. The letter-based narrative task is designed as an exploratory class activity at the end of the technology module, which allows us to understand students' initial encounters with the variety of TM systems over a three-week period. The following instructions were given:

Write a 100-word letter to one of the translation memory systems (TM) you have used in translating scenarios (in your L1). Imagine that you are writing to a 'person' you admire (a love letter), or to a person you wish you will never have to see him/her again (a break-up letter). The short letter should cover the following questions:	
<p>If it is a <i>love letter</i>:</p> <ul style="list-style-type: none"> <li>- What is the most helpful tool for your translation work?</li> <li>- What makes you enjoy using it? Which specific aspects of it can you not live without?</li> </ul>	<p>If it is a <i>break-up letter</i>:</p> <ul style="list-style-type: none"> <li>- Which tool do you wish you would never have to use again?</li> <li>- What makes you frustrated while using it? Which specific parts of it do you wish you could get rid of?</li> </ul>

Admittedly, the 100-word length restriction may have some methodological limitations, as it may have prevented the participants from expressing their emotions to the fullest possible extent and reporting their expectations completely. Having students “write a 100-word letter” was given as a general guideline to avoid excessively long essays, because the letter-writing task and the subsequent class activity (i.e., group discussion of technology use, not reported here) had to be completed within one contact hour. The collected emotional letters that exceeded 100 words were not penalised, as they were completed within the time allotted. In addition, to compensate for the 100-word length restriction of this classroom-based activity, an essay assessment was created (1000 words in length, not reported in this study) after class to encourage students' in-depth and critical analysis of TM usage.

The students were nevertheless allowed to choose one TM system as the main object of their personal letter – Koskinen and Ruokonen (2017) and Ruokonen and Koskinen (2017) seem not to have involved comparisons of different platforms or tools. The students were encouraged to write letters in their native language, which would allow them to describe their feelings more precisely. Nonetheless, they were free to choose the language (English or Chinese) they were most comfortable with. The English letters were received from both native speakers and from L2 speakers who demonstrated confidence in making emotional evaluations in English. The Chinese letters presented in this paper were translated into English by the researcher, who is a NAATI-accredited translator.

Once the letter-writing task was completed, students were assigned to groups of three or four and were encouraged to read their letters aloud to their groupmates, where they shared positive/negative feelings and rewarding/disappointing experiences, received the teacher's over-the-shoulder feedback and, most importantly, enjoyed themselves (some letters were full of creativity and playfulness). Each student received individual feedback from the teacher after the class.

### 3.2 Data analysis

The letters were initially divided into “love letters” and “breakup letters”, given the binary nature of the narrative task. Each letter was then categorized into a sub-group based on which TM system was addressed (see Section 3.1)<sup>2</sup>. Each letter is referred to by its numerical index (from 1 to 75), language of writing (Chinese, C; English, E), letter category (“love letters”, L; “breakup letters”, B), and the addressee TM system (see more details below in 4.1). For example, “32CB-O” refers to the 32nd letter I received, which is a breakup letter written in Chinese to the TM platform *Omega-T*.

Using the qualitative analysis software NVivo (Bazeley & Jackson, 2013), the English and Chinese letters were then coded using inductive thematic analysis (Braun & Clarke, 2012; Thomas, 2003). The codes developed bottom-up by the researcher were: easiness to learn, ease of use, productivity, translation quality, interface design, and file compatibility; from which, three themes were further generated: learnability, software performance, and user-friendliness.

## 4. Findings and analysis

Within the 75 fictive letters collected from the students, there were 39 “love letters” and 36 “breakup letters” (see Table 1). I received 16 in English (11 “love letters” and 5 “break-up letters”) and 59 in Chinese (28 love letters and 31 break-up letters).

Table 1: Letters by category and language.

	Love letters	Break-up letters	Total
English	11	5	16
Chinese	28	31	59
Total	39 (52%)	36 (48%)	75

Most of the students (69/75) wrote a letter to one of the TM systems that they had experimented with. Six letters addressing TM in general (i.e., without any specific systems being mentioned in them) were excluded from the comparative analysis across TM systems (Figure 1). In total, six TM systems were addressed, including *CaféTran Espresso* (13), *MateCat* (11), *Smartcat* (13), *Google Translator Toolkit (GTT)* (7), *Wordfast* (11), and *Omega-T* (14). However, their polarised emotional letters were unevenly distributed across different TM platforms. For instance, the “love” to “breakup” ratio for *CaféTran Espresso* was the highest (12:1), while the *Omega-T* platform received far more “breakup letters” than “love letters” (1:13). The distributions of the two categories addressing each of the TM platforms are summarized in Figure 1 below. Based on the “love” to “break-up” ratio, the six platforms potentially form a continuum along which the satisfaction level decreases: *CaféTran Espresso* (12:1) > *Wordfast* (8:3) > *GTT* (5:2) > *MateCat* (6:5) > *Smartcat* (5:8) > *Omega-T* (1:13). The first four platforms received more “love letters” than “break-up letters”, while the last two platforms showed the opposite pattern.

<sup>2</sup> The students explicitly indicated the type of the letter they narrated (i.e., either a “love letter” or “break-up letter”) at the very start. The majority of participants followed the instructions closely by addressing specific TM system(s), while six letters (8%) discussed TM usage in general, without mentioning any specific systems, were excluded from the comparative analysis across TM platforms.



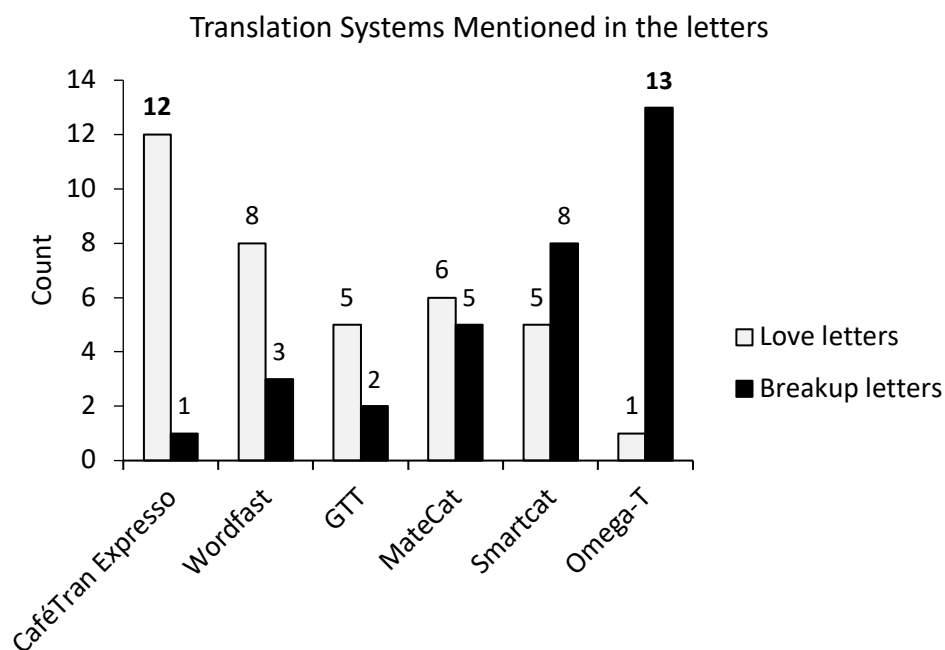


Figure 1: Translation memory platforms mentioned in the narratives, by category.

#### 4.1 Emotional polarity: Love or hate?

In the letters, the students expressed their positive and negative attitudes towards the personified TM platforms based on their initial experiences, e.g., whether they were satisfied or dissatisfied with the software efficiency when performing tasks using the TM systems. The “break-up letters” often complained about the limitations of the TM software, such as confusing interface layouts and unsatisfied performances, which were common reasons for terminating human-machine relationships. Complaints were more often observed when students addressed the relatively older platforms, e.g., *Omega-T* was heavily criticized for its confusing graphic design, complex operation routine, and low-quality output:

32CB-O: “Break up, *Omega-T*!

In theory, you are very versatile as a translation tool and support many operating systems. However, those functions make you too complicated to operate in practice.

For a novice, it is impossible to know how to use you without specific guidance. Learning how to operate you wasted me a lot of time. [...] What is even worse, your machine-translation output is the least reliable one compared with MT output available in other systems. Also, your interface is rather unsatisfactory. You cannot make me happy. It is disappointing that the font is so small and cannot be adjusted.

After a lot of considerations, I have decided to break up with you. I wish you well, but I need to say goodbye.

On the other hand, the “love letters” captured many rewarding and enjoyable experiences with the TM systems, throughout which students regarded the platforms as user-friendly, easy to learn, and convenient to use. They explicitly appreciated the systems for improving the quality and/or efficiency of their translation work. Students tended to show a preference for the recently developed TM systems. Many students expressed their admiration of *CafeTrans Espresso*:

18CL-C: Dear *CafeTrans Expresso*:

I used to be an opponent of machine translation, as I thought it was worthless and not accurate enough. My opinions changed after meeting you.

Your interface is simple and clear. It was love at first sight. You are a practical program that is easy to operate. This is especially important for me as a novice in technology. Your machine translation database is very diverse and can provide reasonable and accurate translations, which saved me a lot of time and greatly improved my efficiency. But what surprised me the most was that I could reuse my own translation memories in your system. [...] I feel empowered by your assistance. Besides, you did not cost me any money at all.

You are a simple and practical system that suits me very well. I hope you can be my main assistant in the future.

It seems that students did not randomly choose a TM system to address when a range of systems was available. In the narratives, students sometimes evaluated the systems explicitly and compared them with one another. They also gave the reasons why using a specific system was more rewarding or frustrating than others. This also demonstrates their rational thinking and critical reflection beyond emotions and sentiments. Moreover, even though the letter task encourages polarised responses, the received letters still embodied eclectic understandings of their interaction with the TM systems. In the example below (26CB-S), the student translator first acknowledges the good interface design of the TM system *Smartcat* before they initiate a breakup mainly because its translation quality is unsatisfactory:

26CB-S: Dear *Smartcat*,

I must admit that you are a lovely translation program. Your interface design is perfect, and you are in my favourite colour, purple. You helped me not only with my translation tasks but also with editing and polishing. But I think we'd better break up because I've never seen such literal and awkward translations. The sentences you translate are a mess, which took me plenty of time doing post-editing in order to make them read smoothly. What a great waste of my short life! Goodbye, I'll throw myself into *MateCat*'s arms. I need more efficient software.

In the breakup letter above, the student translator evaluates the TM system from two aspects: (1) whether the system is easy to learn and use, and (2) whether the product quality is reliable. The *Smartcat* system was satisfying in the first but not the second aspect, and the disappointment clearly outweighed the appreciation. The student states that they would turn to another TM system, *MateCat*, for a committed relationship, probably because *MateCat* can provide more satisfying outcomes. What we have seen in the breakup letter above, aside from a “disheartening” experience, is a trade-off relation between ease of use and usefulness (Venkatesh & Bala, 2008).

In another example we see the student translator deciding to stay with the TM system, *CaféTrans Expresso*, in spite of its minor flaws:

20CL-C: I am fascinated by your clean interface, and you are easy to use. It is simple and natural that we get along. Not to mention that my work efficiency has been greatly improved. Sometimes you have some small problems, such as turning my Chinese characters into blocks, but no one is perfect. Who is perfect?

#### 4.2 Expectations of TM systems

While students articulated their likes or dislikes of particular TM systems, they inevitably drew on the emotional stimuli, i.e., they reflected on their experiences of their ease of interaction with the relevant technology. Therefore, beyond the emotional values assigned to the TM systems, the contents of the letters also tell us what the students expected from the programs as both learners

and novice users, and whether these expectations were met. We discovered three themes functioning as recurring topics in the students' narratives: *learnability*, *software performance*, and *user-friendliness*. It is worth noticing that the themes are not mutually exclusive, and one letter can touch upon more than one theme. In addition, I also identified when each theme was discussed in a positive or a negative tone at the local level (rather than differing at the global level, such as the binary difference between "love" and "breakup" letters). The three themes and their distribution in the letters are summarized in Table 2.

Table 2: Fictional letters by theme and narrative tone (n=75).

Themes	N	Percentage	Feedback Category			
			Positive tone	%	Negative tone	%
T1 Learnability	40	53%	26	65%	14	35%
T2 Software performance	30	40%	19	63%	11	37%
T3 User-friendliness	46	61%	29	63%	17	37%

The 'learnability' theme emerged from 40 (53%) letters that describe the student translators' experience of picking up a new TM system for translation tasks. The 'software performance' theme emerged from 30 (40%) letters where participants discussed the efficiency and output quality in the TM systems. And the 'user-friendliness' theme emerged from 47 (61%) letters where students discussed whether the systems were easy to use in terms of interface design and software compatibility. Reflections of usability issues can potentially reveal the triggers of students' emotional experiences in the translation-technology classroom.

#### 4.2.1 Learnability

Since the student translators are novice users of the TM systems, whether the program is easy to learn becomes an important concern when they start performing tasks using the automated translation software. The term 'learnability' is often defined in terms of initial experiences of the learning curve, and it has been long recognized by software engineers that a learnable system should allow users to rapidly reach a reasonable level of operational proficiency with minimum prior knowledge (Grossman et al., 2009; Nielsen, 1994; Shneiderman et al., 2017). In the letters, students sometimes appreciate the TM systems that were seen as being easy to learn, e.g., "It is extremely important that a software is easy to use, especially for someone like me, who knows nothing about software operations" (4EL-C); "Unlike other translation software or platforms, you are so fluent and easy to operate even though I am a beginner" (13EL-C); "You are easy to use. Although I was late for the class, I found out how to operate you after just a while" (21CL-S).

Some students reported encountering difficulties at the beginning, but in order to conquer the learning curve, they sought assistance from their tutor, peer students, or online resources, e.g., "Although we encountered some problems first, and you didn't let me start easily, with the help of the tutor we successfully started our first cooperation" (24CL-C); "It seemed that 10,000 question marks were spinning in my head. This first-time usage was extremely difficult. Finally, my classmate helped me get through this awful mess" (28 CB-C), and "I was quite anxious before I met you for the first time. So I made some preparations by searching for information about you on the internet. My anxiety was half gone as soon as I started working with you in class" (58CL-G).

However, when the TM system requires serious efforts to pick it up, the students tended to feel depressed and confused, e.g., "We were together for 90

minutes, and you totally drove me crazy” (11EB-S); “You seem to function, but I got stuck at the first stage. So many windows and such a mess. All of the problems were like laughing at me” (5EB-O); “I had a feeling of not knowing where to start” (23CB-O, 28 CB-C). In another scenario, the student felt challenged and helpless when the learning curve lay beyond their self-learning capability, e.g., “For a beginner, it is impossible to know how to use you without any specific guidance. Learning how to operate you wasted me a lot of time” (32CB-O). Negative emotions appeared, especially when the materials that are intended to assist users were found insufficient and complicated, e.g., “I read your user guide at the beginning, which was not helpful at all. Then I searched online for your tutorial videos, which still didn’t target my problems. You are truly hard to operate” (23CB-O); “The manual doesn’t mention how to use your translation memory database at all. Besides, the hotkey instructions are extremely complicated (36CB-O); “Your manual doesn’t cover anything about translation memory database and terminology bank. Then what’s it for?” (74CB-O).

It is also worth noticing that some students experienced time pressure in class because they were daunted by the software’s functionalities, e.g., “I was unable to upload my translation memories, and the MT engine didn’t work in my case. Since I was only given half an hour to finish the translation task in class, I didn’t complete it for this reason. I spent a few hours on this after class but still couldn’t figure it out. Finally, I had to manually translate and adjust the formats in order to finish the weekly assignment. This is just horrible” (66CB-M). Students further commented on negative peer pressure in the classroom. This occurred when their fellow students worked smoothly with the same system, while their own first-time experience was a completely different story, e.g., “I have been trying so hard to upload my TM, but I kept encountering some errors which I didn’t understand. Therefore, I can only use the MT engine. However, my classmates could upload their TM and translate well. After an hour, I gave up” (14EB-S), and “You can’t work with my translation memories generated from *Wordfast*. I tried over and over again, but it still didn’t work. I am heartbroken! However, you helped other girls complete their translation task just in my face!” (42CB-M). The negative emotions that emerged during the initial learning of TM software were reflected in the emotional-narrative task. The task and its follow-up discussion allowed the students to voice their frustrations and concerns to their peers and the teacher, who were potentially able offer useful advice and suggestions. The whole activity functions somehow like a support group in which students were never left alone in front of the technology.

#### 4.2.2 Software performance

The second theme, “software performance,” emerged from the student translators’ discussions about the efficiency and processing accuracy of the TM systems. In human-computer interaction, a software system is expected to attain a high level of productivity if operated correctly (Holzinger, 2005), which means that it should demonstrate a relatively high speed of task performance while at the same time keeping a relatively low error rate (Ferré, Juristo, Windl, & Constantine, 2001). In the case of TM systems, this means that a good TM program should be able to reliably process language input and perform automated translation tasks with a low error rate, so as to reduce the working hours at the post-editing stage. However, TM systems can differ in the processing power supported by the back-end algorithms as well as the range of available translation plug-ins, such as MT engines. In many “love letters” the students praised the TM systems that had improved their translation efficiency, e.g., “You can generate relatively accurate translations, which saves me lots of

effort in post-editing. It greatly improves my work efficiency” (18CL-C); “Having you in my life saves me a lot of time. I can easily access my translation memories every time I translate similar content as long as I translated properly for the first time. All I need to do is just focus on post-editing” (16CL-X).

On the other hand, there are many cases in which the student translators complained about the poor performance of the TM systems. Some students commented that the experience of using those programs was “a waste of time” (5EB-O, 47CB-O, 59CB-C, 60CB-O). Others complained about the low translation quality of the TM systems, which made their post-editing work unfortunately frustrating, e.g., “I’ve never seen such literal and awkward translations. The sentences you translated are a mess, and it takes me plenty of time post-editing in order to make them smooth” (26CB-S); “Your machine translation output is full of errors, and it doesn’t make sense. I had to spend lots of time post-editing it over and over again” (59CB-S). Additionally, in this context, the incoming students admitted that their limited language proficiency complicated the “error-correction” post-editing work, e.g., “Every sentence could be translated automatically, but the output was low quality. I know we were able to edit afterwards, and what we changed goes back to the system. However, we are students who just started the course. So our language skills still need to be improved, and I don’t think we can handle the post-editing work to generate acceptable translations” (67CB-W). One student also complained about the format errors the TM system made while performing translation tasks: “Your output is full of formatting errors, which costs me a lot of time to fix” (60CB-O).

#### *4.2.3 User-friendliness*

The third theme, ‘user-friendliness’, emerged in more than half (63%) of the letters, where the student translators discussed whether the TM systems were developed in a way that effectively smooths the translation workflow. The students put emphasis on both the user-interface (UI) design and the compatibility issue of file transfer across different platforms. The UI design refers to both the visible part of the interface (buttons, colours, menus, etc.) and the information exchange between the user and the system (Ferré et al., 2001). For instance, some students indicated an aesthetic desire for modern and immaculate UI graphics: “Look at those dumb applications or websites. They look like some 1990s creations. Your interface, however, looks extremely aesthetic” (8EL-S); “Your interface looks so 1980s. Aren’t you an old lady from the past?” (19CB-O); “You took 185M storage on my computer and never gave back anything. So many windows and such a mess” (5EB-O).

Further, the student translators expressed an expectation of software compatibility between input and output files, e.g., “Many people show their appreciation of your clear interface. But what I like the most is, beneath your beautiful appearance, your convenience when sharing memories between different systems” (15CL-W); “Your output seems in good quality, but why don’t you let me download my own translation memories, Why?!” (37 CB-G); “I cannot bear that you don’t allow me to download my translation memories, while you take those memories from me as if those are your own. I don’t know what you will do with those memories” (58CB-G).

## **5. Discussion**

The present study has analysed student translator’s emotional responses to TM systems during the early stages of technology learning as well as their expectations of the software platforms. The results indicate that both positive

("love letters", n=39) and negative ("breakup letters", n=36) emotions exist during the initial learning experience when the students are asked to complete translation tasks using TM software in discovery-based classroom activities. Instead of seeing TM technology as an abstract concept, the students expressed their love and hate selectively, depending on which specific TM system they are addressing. For example, some TM systems were criticised more often (e.g., *Omega-T*), while other systems were generally loved by the students (e.g., *CaféTrans Espresso*). Overall, the student translators demonstrated their confidence as users, and they did not show resistance to translation technologies in general. In their previous study using the same method, Koskinen and Ruokonen (2017, p.15) reported that their MA translation students in Finland and Ireland wrote letters to the MT, Google Translate, expressing concerns about the quality of its output, as well as the future of the translation profession and their own career prospects as part of it. The present study has similarly observed students' concerns about the poor quality of TM suggestions and that of the incorporated MT feeds. However, not a single letter here mentioned fear of translation technology or anxiety over job automation. This could be because our students were instructed to focus entirely on specific TM systems rather than on technology in general (as in Koskinen and Ruokonen, 2017), or because the 100-word limit allowed little space to mention socio-economic impacts. At the same time, some students even stated that TM software can bring pleasure to the learning process and make translation fun, e.g., "Thank you for your unique contribution in my study life, which used to be a bit dull" (21CL-S); "Previously I hated the translation process without your company, but when you appeared you lit up my translation world. Working with you is the most relaxing and enjoyable moment in my life" (46CL-M).

With respect to the learnability of technology, the letter narratives collected as part of this study show that over half the student translators (53%, n = 40) expected the TM systems to be easy to learn, so that they can reach a reasonable level of usage proficiency in a short time. By contrast, Koskinen and Ruokonen (2017) report that only seven out of 106 received letters concerned this aspect of usability. They interpreted this finding as indicating that translators use various tools in their professional life and thus encounter no obstacles when migrating from one tool to another or picking up new technologies. Professionals might not consider 'learnability' as a major issue after years of exposure to certain software or tools in the workplace; however, learning curves are explicitly mentioned by the master-level translation students. One possible explanation may be that our students wrote about their initial experiences of technology in the teaching-learning scenario, which perhaps foregrounds learnability-related issues. This learnability challenge was also reported in a previous survey on TM usage (Lagoudaki, 2006), which found that 16 percent of language professionals (e.g., translators, revisors, etc.) found TM systems difficult to use.

From the perspective of translator trainers, the students' needs for learnability require teachers to provide the necessary support materials, especially when designing discovery-based learning activities. Research has shown that discovery-based instruction is better than traditional explicit instruction only when assisted with structural scaffolding, which includes feedback and worked examples (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011; Mayer, 2004). In the present study, we have observed in "breakup letters" that the students expressed a desire for intensive scaffolding when asked to complete translation tasks using the unfamiliar TM systems for the first time. Despite adopting a discovery-based approach, the proportion of teacher-centeredness and student-centeredness should be dynamically adjusted according to the level of difficulty of a technological tool. For instance, extensive intervention is

required when teaching more advanced technological modules (Doherty & Kenny, 2014). As for software engineering, there is sometimes a trade-off between learnability and efficiency, because the range of functionality itself can make cognitive demands to different degrees, and sometimes a powerful system can take time to acquire. However, it is possible for educators to design a series of instruction activities that maximally smoothen the initial learning curve.

The narratives show that student translators are sensitive to software performance and interface design, since they made explicit comparisons between different TM systems. Highly productive platforms are more often praised, and low-productivity systems are more likely to be criticized. This finding is consistent with previous research on the usability of translation tools (Koskinen & Ruokonen, 2017; Marshman, 2014; Marshman & Bowker, 2012). For instance, Marshman (2014) has reported that translator practitioners found technologies helpful because automated tools can improve both the quantity and quality of their work. Koskinen and Ruokonen (2017) found that productive efficiency seemed to be the major concern of translators when working with automated tools. As for students, Marshman and Bowker (2012) report that the motivation to learn technologies is associated with whether technological tools can save working time and/or improve translation quality. After all, the integration of translation technology is basically meant to improve translators' work efficiency and productivity.

At the same time, students' aesthetic desire for a neat UI design cannot be denied, and this should make software developers aware that both back-end algorithms and front-end interface designs can affect the user's satisfaction level, while the latter could be even more important to novice users who make evaluations mostly based on their first impression. As for translator trainers, we should ensure that the teaching materials are constantly updated so that the knowledge and skills delivered in the programs are not substantially outpaced by the development of software tools in the industry. Outdated programs and obsolete systems should be excluded from the teaching syllabus because learning these tools can lead to unnecessarily discouraging experiences (see section 4.2), and it would be a waste of time if these hard-learned skills could not be transferred to future practice once the students finish their studies.

## 6. Conclusion

This study has explored translation students' attitudes towards TM systems and has identified key issues they focus on during the initial TM-learning process. As reflected in the letter-based writing task, translation students experience both positive and negative emotions when learning different TM systems: working with highly-productive and easy-to-use systems is reported as an enjoyable experience (which tends to be the case for the more recently designed TM software, for example *CaféTran Espresso*), while software that is dysfunctional and difficult to use usually leads to students' frustration and aversion with respect to these TM systems. In the present study, translation students neither express fear or dislike of advanced translation technologies, nor anxiety over automation. In terms of usability, students emphasize the learnability, efficiency, and user-friendliness of TM software. These usability issues, especially the learning curve, should be considered not only by software engineers but also by translator educators, who need to provide sufficient scaffolding and instructions when introducing translation technologies.

The letter-based writing task gives students an opportunity to reflect on their learning experience, actively and (potentially) creatively evaluate technological tools as well as their own behaviour in translator-computer

interaction. Beyond the specific skills required to operate software platforms, translator trainers should help novice translators to become self-learners, given the rapid change and evolvement of technological tools; trainers should also emphasize the development of self-regulated learning skills, such as reflective skills and analytical skills, so as to prepare trainees for problem-solving in the future. As show in the present study, the letter narrative task can be a useful tool to reveal emotional intricacies in a discovery-based classroom and to encourage reflective learning.

This study has several implications for the teaching of translation technologies. First, when preparing instructional materials for guided self-discovery learning, teachers should be aware of the difficulty level of the learning object (software or tools) and make plans about the timing and intensity of teaching interventions so as to smoothen the learning curve. Well-prepared materials such as step-by-step guides and video demonstrations can be introduced to entry-level students when needed. Second, the fundamental translation skills (including the language skills) should not be ignored in the technological modules, because they are required at the post-editing stage. Finally, students' reflections on their learning process provide rich resources for educators, who can accordingly adjust course designs and pedagogical approaches in order to achieve better learning effects.

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