Using Technologies for Creative-Text Translation

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The role of awareness and attitude

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Introduction

While recent developments in machine translation (MT) have raised hopes of its potential for literary translation (Toral and Way 2018), there are signs that the post-editing of machine translation can lead to homogenization and normalization (Farrell 2018), which would be problematic for creative text types. Modern translation environments such as Trados Studio and Lilt attempt to solve these issues by offering custom machine translation systems and by including interactivity and adaptivity. Finding out whether or not these features do indeed offer sufficient support for literary translation is the main research objective of the MUTUALIST project, where we aim to study the impact of adaptive translation environments on individual translator style for Dutch literary translation. Before conducting experiments in which we measure the actual impact of such tools on the translation product and the translator's experience, however, we must first understand the factors at play in literary translators' potential use of technology. To understand these, we must gain insight into literary translators' awareness of translation technology as well as their attitude towards technology generally. Past surveys with translators (not focused on literary translation) have shown that "non-adoption of translation tools was more a function of translators' lack of awareness of, and familiarity with, these tools than an active rejection decision based on thorough knowledge of the tools and their functionality" (Fulford and Granell-Zafra 2005, 12). Likewise, translator attitude towards technology has been shown to influence translators' interactions with technology (Bundgaard 2017). We therefore conducted a survey among literary translators working from or into Dutch in order to answer the following key questions:

- To what extent are literary translators aware of modern developments in translation technology?
- To what extent do literary translators make use of (translation) technology?
- What reasons do literary translators have for (not) using technology for literary translation?

- Do factors such as age, education, and experience have an impact on literary translators' use of and attitude towards technology?
- How do literary translators perceive the (potential) usefulness of translation technology upon learning more about it?
- What are the limitations of current translation technology for literary translation and which desires do literary translators have when it comes to translation technology?

The answers to these questions will help us understand to what extent modern translation environments might be of use to literary translators and whether or not certain translators are more open to working with such environments. The survey serves both a fundamental and practical purpose. First, when discussing technological developments and their potential, it is crucial to include the (intended) users in the development and evaluation, as argued by O'Brien and Conlan:

> Considering the major shifts we are witnessing due to technological innovation, and to avoid repeating the mistakes of the past, it is surely worth making translators central to the current developments. More collaboration and consultation between technology researchers and developers and their end users is needed.
>
> (O'Brien and Conlan 2018, 85)

Second, in order to find suitable participants for the next phases in the project, we need to understand which users are open to using the technology and which users are most likely to benefit from using it.

In the following sections, we first introduce some related research on technology and translation technology use and acceptance, and the potential and limitations of translation technology for literary translation. We then describe our methodology, covering the survey and respondents, the analysis performed on the data, and the results. We conclude with a discussion of the answers to the questions formulated above and some pointers for potential future empirical studies on the use of technology for literary translators.

Related research

Technology use and acceptance

A variety of psychological and sociological factors are at play when someone determines whether or not to use technology. Researchers have been trying to capture these factors in models and theories for decades in an attempt to predict technology acceptance and use. One of the earlier models was the Technology Acceptance Model (TAM) (Davis 1989), which stated that the use of technology was influenced most strongly by a person's perception as to the usefulness of the technology and its ease

of use. Since then, increasingly complex models have been proposed, the most widely accepted of which is the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003). The UTAUT model was created as a synthesis of eight earlier models of acceptance (such as the TAM mentioned before) and was found to outperform all of them (Venkatesh et al. 2003). The theory builds on four core concepts: performance expectancy, effort expectancy, social influence, and facilitating conditions. These constructs can be defined as follows:

- Performance expectancy: the degree to which a person believes that using technology will positively influence their work performance—for example, by making them more efficient or productive, or by improving the quality of their work.
- Effort expectancy: the degree to which a person believes that the technology is easy to use.
- Social influence: the influence of a person's environment on their use of technology, or the degree to which someone feels that their environment expects them to use the technology—for example, clients or employers demanding they use certain software.
- Facilitating conditions: anything offering additional support to someone using technology, such as the availability of training and technical support.

Although UTAUT has been used extensively and successfully since its creation, it has not been free from criticism. "[A] key element missing from the UTAUT model is the 'individual' engaging in the behaviour—i.e., individual characteristics that describe the dispositions of the users may be influential in explaining their behaviours" (Dwivedi et al. 2019, 721). By conducting a meta-analysis, Dwivedi et al. (2019) found that the attitude of the individual was indeed a key factor in the acceptance and use of technology that was missing in the original UTAUT model. They proposed an adapted UTAUT model that included the factor "attitude" and found that it was being mediated by the four factors of the original UTAUT model and, in turn, had an influence on behavioural intention (i.e., the extent to which a person intends to use technology) as well as use behaviour (i.e., the actual use of said technology).

Translation technology use and acceptance

While (to the best of our knowledge) none of the earlier studies into technology use among translators have explicitly looked at the underlying factors from a UTAUT perspective, these factors can be found throughout. In what follows, we make a distinction between "(general) technology" and "translation technology". "General technology" covers all digital tools and software that can be used by a translator to support their work but were not developed specifically for translation work.

Examples of these kinds of technology would be word processing tools, dictionaries, grammar and spelling reference works, and dictation software. "Translation technology", then, covers the digital tools and software specifically developed for translators. These consist of termbases, translation memories, and machine translation, potentially integrated into a translation environment tool.

A large body of research on technology in translation has focused on the "performance expectancy" of technology: to what extent does using technology improve a translator's performance, either from a productivity or a quality perspective? The potential of general technology to improve a translator's performance has been more or less established, and few modern day translators choose to work without any form of technological support (Fulford and Granell-Zafra 2005). Its positive impact on performance often goes hand in hand with a reduction in effort compared to analogue equivalents. Word processing tools lend themselves more to the recursive process of generating and correcting a text during translation than handwriting or typewriting on physical paper, for example, and rather than having to leaf through hefty volumes of physical dictionaries, translators can now find those same dictionaries in digital form, along with many other types of resources that one might want to consult during the translation process.

The potential benefit of using translation technology for translation, however, is somewhat more controversial. In theory, using translation technology should lead to increased productivity—a translator needs less time to look up specific terms, can reuse existing translations through fuzzy or exact matches in the translation memory, or can start from MT suggestions rather than having to start from scratch—and increased quality (e.g., consistency improvements). To a certain extent, this is supported by research. When used correctly, termbases (ideally integrated into a translation environment) can lead to time gains, as they reduce lookup or typing effort, although translators need to be taught how to critically evaluate the suggestions from terminology resources (Bowker 2015). Translation memories can indeed increase productivity (Bowker 2005), although the actual time gains depend on the content and style of the translation memory (Yamada 2011). Likewise, post-editing machine translation is generally found to be faster than translating from scratch (Zhechev 2012), without reducing a translation's quality (Daems 2016), although time gains vary wildly across translators, with not all translators benefiting from MT (Macken, Prou, and Tezcan 2020). The impact of translation technology on a translator's performance is not always positive, however. Although there are translation memory systems that work on a paragraph level, many translation memory systems force a translator to work on a sentence level, which can cause them to lose the overview of the text as a whole (Bowker 2005). Working with a translation memory can lead a translator to avoid the use of pronouns and references to increase reusability of the translations, which, in turn,

can negatively impact the coherence and quality of a translation (Bowker and Barlow 2008). Translations produced with translation memories in such a way have sometimes negatively been referred to as "sentence salad" (Bédard 2000) or "collage translation" (Mossop 2006). Especially when under time pressure, there is a risk of translators not being critical enough of translation memory suggestions, leading them to blindly accept exact matches even when they contain errors (Bowker 2005). The same trend can be seen with student translators putting too much trust in MT output and accepting it without correcting errors (Depraetere 2010). In addition, regular human translation was found to outperform post-editing with regards to language and consistency (Guerberof Arenas 2009).

Factors such as effort expectancy, social influence, facilitating conditions, and attitude are mostly found in usability or user studies, such as the one conducted by Vargas-Sierra (2019), which showed that students do not seem to find it easy to learn to work with CAT tools such as Trados Studio. The different factors are often found together, which fits the adapted UTAUT model proposed by Dwivedi et al. (2019). In a study on translators' opinions on TM systems, for example, McBride (2009) found that the availability of technical support and the cost (which would be examples of facilitating conditions) are really important to users when deciding whether or not to use translation technology, a steep learning curve (effort expectancy) could act as a deterrent, and translators sometimes felt they had to use a certain tool or risk losing work (social influence). Where attitudes towards MT post-editing and human translation are concerned, translators feel that human translation is more rewarding (attitude) and that editing MT is more effortful (effort expectancy) (Daems 2016). In a study on the (non-)adoption of machine translation, Cadwell, O'Brien, and Teixeira (2018) established that professional translators have a variety of reasons for (not) using MT. Many of those were related to performance expectancy (expected negative or positive impact on quality or productivity), but quite a few were linked to attitude (level of trust in the MT technology, the fear of it reducing their translation ability) or social influence (being required to use machine translation).

Translation technology and literary translation

With the introduction of neural machine translation (NMT) systems in 2016, the expectations of what machine translation could achieve skyrocketed to the extent that researchers began to explore its potential for more creative text types. Toral and Way (2018) argue that its increased quality (Wu et al. 2016; Junczys-Dowmunt, Dwojak, and Hoang 2016) and the fact that NMT can handle lexically rich texts (Bentivogli et al. 2016) make it better suited for literary translation than phrase-based

statistical machine translation (PBSMT) systems. By training an NMT and PBSMT system on literary texts and comparing the output, Toral and Way (2018) indeed found that NMT quality outperformed PBSMT quality in an automated evaluation as well as a human evaluation. Up to 34% of the NMT sentences were perceived to be of equal quality to human translations (compared to 20% for PBSMT). Toral and Way (2018, 285) conclude with the wish to "assess the feasibility of using MT to assist with the translation of literary text." Whether this wish is shared by literary translators, however, remains to be seen.

Ruffo (2018) studied literary translators' perceptions of their roles in an increasingly technological society and their attitude towards technology and found that, while most literary translators appreciated technology such as the internet, corpora, or terminology tools, they did not consider CAT tools or MT to be suitable for literary translation. She further states that literary translators are "against those tools that threaten to steal the essence of their translation activity, ignoring the peculiarly human aspects of it" (Ruffo 2018, 130). These sentiments are not entirely new. Already in 1980, Martin Kay described what he called a *translator's amanuensis*, a cooperative man-machine system for translation. The core idea was that the translator should retain control of the translation process, but that they could request support from the computer when needed.

> A computer is a device that can be used to magnify human productivity. Properly used, it does not dehumanize by imposing its own Orwellian stamp on the products of the human spirit and the dignity of human labor but, by taking over what is mechanical and routine, it frees human beings for what is essentially human.
>
> (Kay 1980, 1)

This need for control by translators has been echoed throughout the years, and only relatively recently do translation technology developers seem to have taken to heart O'Brien's (2012, 116) claim that "[w]hat is needed are efforts to promote symbiosis, rather than friction." Modern translation tools have begun to incorporate interactive elements, where the translator is offered suggestions while they write, and adaptive machine translation systems, i.e., systems that learn from the changes a translator makes while they are translating. Such systems might be better suited to the translation of literary texts than the regular post-editing systems in use for the translation of, for example, technical documentation (Toral and Way 2015), although this has, to the best of our knowledge, not been tested in practice yet. Neither do we know to what extent Dutch literary translators are even aware of the existence of such technologies, or what their attitudes towards these tools would be. This is what we aim to explore with our survey.[1]

Method

Survey

The survey was created using Google Forms and was shared with potential respondents via email. Responses were collected from August to October 2019. In total, the survey consisted of seventy questions divided into the following subsections:

- respondent information (e.g., year of birth, language combinations, education, and experience);
- use of technology for non-literary translation if applicable (e.g., to what extent translators use technology for non-literary translation, which types of technology they use, why they decide to (not) use technology), with questions covering general technology and translation technology in separate sections;
- use of technology for literary translation (questions identical to the ones from the previous section but focusing on literary translation);
- types of translation technology (containing information on translation memory systems, terminology, and machine translation, questions related to translators' awareness of these translation technologies and whether or not they believe the translation technology in question could be useful for the translation of literary texts);
- translation technology and literary translation (to verify whether there are other types of translation technology the survey did not cover, and to identify the key shortcomings of current translation technology and the desired features of a potential translation tool for literary translation); and
- contact information (optional, to be able to inform respondents of the survey results and to contact respondents willing to participate in future experiments on translation technology for literary translation).

The questions in the survey were a mix of Likert scale questions (for example, "I … make use of this technology", with "never", "sometimes", "often", and "always" as possible answers) and open questions, giving respondents the chance to clarify their choices in more detail (for example, "Why do you use this technology during translation?"). Respondents were required to answer the multiple-choice questions, whereas some of the open questions were optional. Only completed survey results were saved, so no incomplete answers had to be removed before analysis.

Respondents

With this survey, we aimed to collect responses from literary translators working from or into Dutch. Potential respondents were found on the website of the Centre of Expertise for Literary Translation (Expertisecentrum

Literair Vertalen, ELV) and by contacting other Belgian and Dutch organizations that represent or work with literary translators (a list can be found in the Acknowledgements section). A total of 155 respondents completed the survey. Of those, 153 responses could be used for subsequent analysis (one respondent indicated they had yet to start work as a literary translator, another indicated that they did not translate literary texts).

For half of the respondents, literary translation is the main occupation, although for 62% of this group, literary translation is not their only occupation. Another 22% of respondents list non-literary translation as their main occupation and 20% list a different type of main occupation. The final 8% of respondents indicate that they took up literary translation upon retirement from other professions.

The survey managed to reach a diverse audience, with respondents' ages ranging from 25 to 88 years (mean 55, median 57). On average, respondents have eighteen years of experience working as literary translators, with the least experienced having just started their career as a literary translator and the most experienced having been working as a literary translator for 54 years.

Most respondents are Dutch (60%, of which 18% have dual citizenship) or Belgian (20%, of which one person has dual citizenship). One respondent has dual Dutch and Belgian citizenship. The other most common nationalities are German (6%), Spanish (3%), Czech (2%), Italian (1%), Swedish (1%), and American (1%). In total, responses were collected from seventeen different nationalities, and eighteen different native languages were mentioned. Of these, Dutch was the most common (70%, of which 4% with a dual native language), followed by German (7%), English (4%), French (4%), Czech (3%), Spanish (1%), Catalan (1%), and Swedish (1%).

Most translators (61%) work from another language into Dutch, 32% work in the other direction, and 7% indicate that they work in both directions.

A majority of respondents (92%) translates prose, but poetry (41%) and theatre texts (22%) were common as well. In addition to these three predefined options in the survey, respondents could add their own types of literary text. The most commonly mentioned text types were literary non-fiction, children or young adult literature, essays, and biographies.

Analysis

The collected responses were anonymized, and answers were processed using a combination of Microsoft Excel, the qualitative data analysis software NVivo, and the statistics software package SPSS. Excel was used to explore respondent characteristics and visualize the answers to the multiple-choice questions. To better understand the underlying reasons for the acceptance and use of technology, respondents' answers to open

questions were manually coded using NVivo, and effects were statistically verified using SPSS. A first round of coding in NVivo was exploratory: every argument mentioned in the text was assigned a code describing that argument quite literally. We then used the adapted Unified Theory of Acceptance and Use of Technology (UTAUT) (Dwivedi et al. 2019) as a framework to identify larger categories across individual codes. All arguments coded in NVivo were assigned to one of the five previously discussed factors that can influence the intention to use technology and actual technology use: performance expectancy, effort expectancy, social influence, facilitating conditions, and attitude.

Results

In the following sections, we highlight the key findings of the survey. We establish the degree to which respondents are aware of the existence of current translation technology tools, to what extent they make use of these themselves, whether or not they consider them to be potentially useful for literary translation, and what they consider to be the main limitations of existing technology for literary translation. We also report on the features that respondents felt a translation tool for literary translation should consist of.

Awareness

In order for a potential user to accept technology, they first need to be aware of its existence (Dillon and Fraser 2006). In the survey, respondents had to indicate whether or not they had been aware of specific types of translation technology before their participation. The distribution of the answers to this question can be seen in Figure 2.1.

The results show that, while the majority of literary translators seem to be aware of the existence of specific forms of translation technology (translation memories, termbases, and machine translation), they seem mostly unaware of more recent developments. In particular, the developments related to integration into translation environments and recent MT developments such as interactivity and adaptivity seem to be less familiar, and it is exactly these that could potentially be most relevant for literary translators (Toral and Way 2015).

We wanted to verify whether this lack of familiarity could be explained by a lack of technology in translation education. Education, like experience, has been shown to contribute to technology acceptance (Dillon 2001). Only 40% of respondents indicated that they had received some form of translation education, with another 13% having an educational background in languages or linguistics, and the final 46% having a different background. Of the respondents with a translation education, only 24% indicated that translation technology had formed a part of said education. A total of 44% of all respondents had attended classes
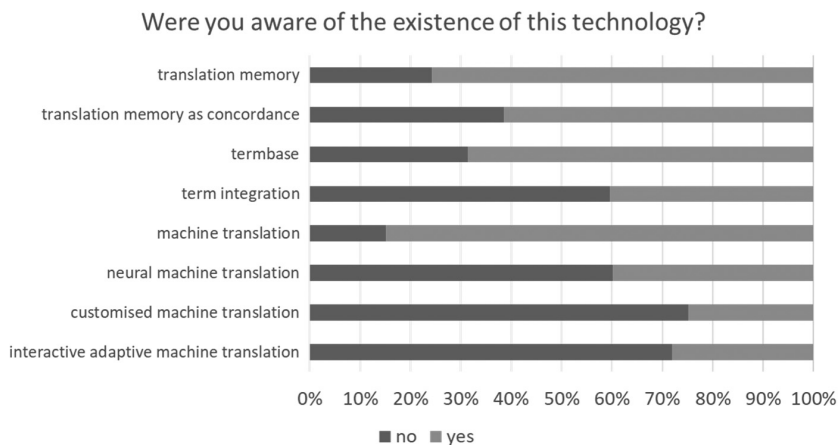
Were you aware of the existence of this technology?

Figure 2.1 To what extent are literary translators aware of the existence of recent developments in translation technology?

or received an education specifically focusing on literary translation (of this group, 60% had received a general translation education as well). However, only 6% of respondents with a literary translation education indicated that translation technology had been included in said education. We would expect respondents' age to offer some explanation for the lack of integration of technology into translation education, as affordable personal computers were not available before 1990, by which most of our respondents would already have graduated. However, even among the younger generation of translators, very few received information on translation technology as part of their education (only 3 out of 12 respondents younger than 40).

Especially for terminology (integration) and translation memory (concordance), there is a clear relationship between education and awareness (Figure 2.2). Almost all respondents that received technology training as part of their (literary) translation education are aware of the existence of these translation technologies. Respondents that received a (literary) translation education which did not include translation technology have a higher awareness than respondents that did not receive any kind of translation education at all. The relationship is different for machine translation, where education seems to have less of an effect. Most participants seem to be aware of machine translation regardless of education, and a comparably small percentage of participants is aware of the existence of neural MT and customized MT. Education does seem to impact the awareness of interactive and adaptive machine translation, with participants that received translation technology training being somewhat more aware of its existence. This could mean that machine translation is included in translation education to a lesser extent than translation memories and
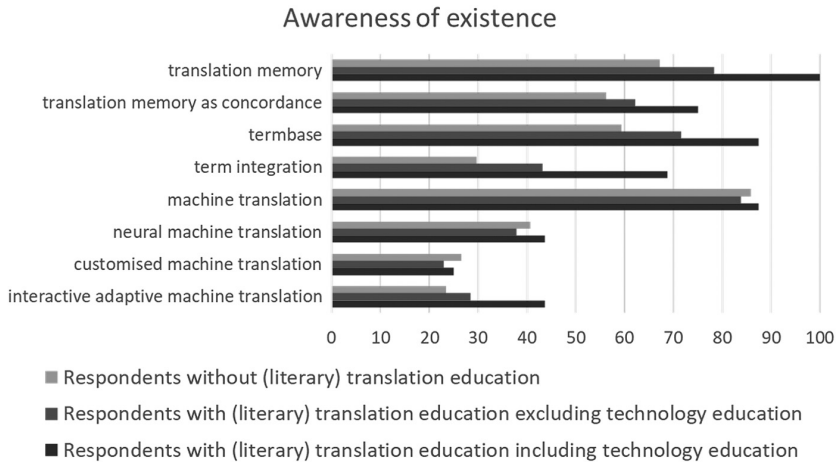
Awareness of existence

Figure 2.2 Relationship between awareness of translation technology existence and education (expressed in % of the number of respondents in the category under scrutiny).

terminology, or that machine translation technology simply evolves too quickly for translation courses to keep up with developments.

Use

In total, only 18% of respondents indicate they use a form of translation technology for literary translation. When asked about their main working environment, respondents indicated that they use MemoQ (7), Trados Studio (5), Wordfast (2), CafeTran Espresso (2), MetaTexis, and OmegaT. Two respondents mentioned they had developed their own software for literary translation.

In order to better understand the factors at play in the adoption of technology, we performed a binomial logistic regression using SPSS to verify whether or not age, experience, translation education, and translation technology education had an effect on the probability of respondents' using translation technology for literary translation. The model was statistically significant ($\chi^2(4) = 14.251$, p = 0.007) and correctly classified 81% of cases, but it explained only about 8% of the probability of respondents using translation technology (Cox & Snell $R^2 = 0.089$; Nagelkerke $R^2 = 0.147$). Only age (p = 0.03) and technology education (p = 0.003) were found to be significant predictor variables in this model, with younger respondents and respondents with technology training being somewhat more likely to use translation technology.

In a next step, we wanted to verify whether respondents that use translation technology for their regular translation work are also more likely to

use translation technology for their literary translation work. We added "uses translation technology for regular translation" as an additional predictor to the model. This model is statistically significant ($\chi^2(6) = 35.441$; $p < 0.001$) and correctly classified 85% of cases. It explains about 20% of the probability of respondents using translation technology (Cox & Snell $R^2 = 0.207$; Nagelkerke $R^2 = 0.341$). The only significant predictor in this model is whether or not respondents use translation technology for their regular translation work, with respondents who use translation technology for their regular translation work being far more likely to use translation technology for literary translation as well ($p < 0.001$).

In addition to knowing whether literary translators use translation technology or not, we were interested in determining to what extent they used specific types of translation technology (i.e., termbases, translation memories, and machine translation). Based on the "awareness" section, we can conclude that respondents are not always aware of the existence of certain types of translation technology. Given that awareness is a prerequisite for the potential use of technology, it is not entirely surprising that most respondents do not seem to use any of the abovementioned translation technologies for their literary translation work (Figure 2.3). Most respondents indicate that they never use these translation technologies for literary translations, with termbases and translation memories being used somewhat more frequently than machine translation systems.

Respondents could clarify why they chose (not) to use translation technology in an open question. An overview of the number of arguments per UTAUT category can be seen in Figure 2.4. The arguments listed by respondents that indicated they did not use translation technology for literary translation were mostly related to performance expectancy (49.62%)
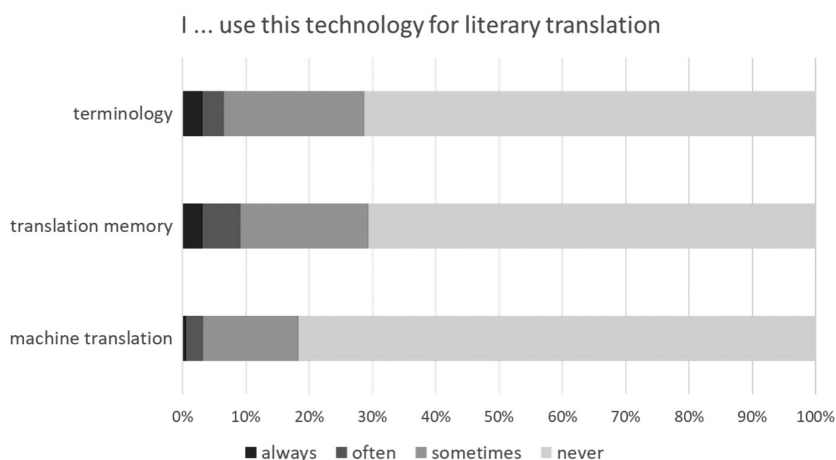

Figure 2.3 Percentage of respondents that always, often, sometimes, or never use certain types of translation technology for literary translation.
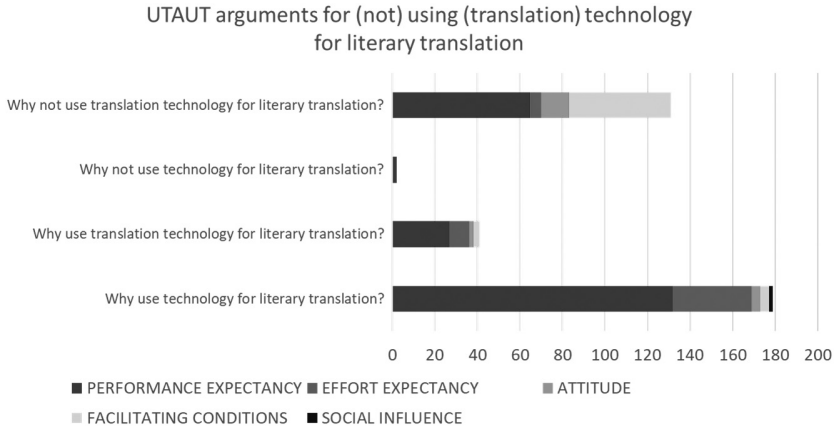
UTAUT arguments for (not) using (translation) technology
for literary translation

Figure 2.4 Arguments for (not) using (translation) technology for literary trans-
lation per UTAUT category.

and facilitating conditions (36.64%), followed by attitude (9.92%) and
effort expectancy (3.82%). The bulk of the arguments related to perform-
ance expectancy mentioned ways in which respondents felt the technology
would not support the translation process: they simply did not see the
point, they did not see the benefit of certain features, they did not like
that the software made them work on a sentence level, the technology is
not compatible with their source text or not suitable for their text type
because of its diversity and complexity. Other limitations related to per-
formance expectancy were the fact that the software cannot capture style
or humour and cannot take context or cultural background into account,
which were all seen as key elements of literary texts. To a lesser extent,
respondents argued that translation technology would have no or even a
bad influence on quality and would not save them any time, or, rather, that
literary translation requires time to be able to consider every word, making
"speed" less important. Arguments grouped under facilitating conditions
fell into three categories, with "lack of familiarity" being the main one.
Respondents indicated that they had no idea about the possibilities or
they had not received any education or information on translation tech-
nology. To a lesser extent, the price of technology was mentioned, with
some respondents indicating that they do not believe the investment is
worth it for their (often limited) needs. For attitude, the arguments related
mostly to respondents' lack of trust of technology, or their lack of interest,
and the feeling that using technology would be less fun, as they prefer to
work with the text itself. Effort expectancy arguments were the fact that
the software is not user friendly, the respondent had no technical skill, or
it costs time to learn to work with the software.

The arguments listed by respondents that indicated they did use translation technology for literary translation were mostly related to performance expectancy (65.85%), followed by effort expectancy (21.95%), facilitating conditions (7.32%), and attitude (4.88%). The majority of performance expectancy arguments listed ways in which the technology supports the translation process: by offering inspiration (a good basic translation to start from, interesting alternative suggestions) or practical support such as concordance search, by providing the possibility to view source and target text together, and by helping them not to accidentally skip a sentence. Other performance expectancy arguments were related to an improvement in quality or an increase in productivity. The bulk of effort expectancy arguments were related to ease of use, facilitating conditions arguments were related to price and good customer service, and the attitude argument was that it made the process more fun.

The fact that most translators do not use translation technology for literary translation does not mean that they use no other forms of technology. On the contrary, almost all respondents use word processing tools such as Microsoft Word (96%) or Google Docs (5%) as their main working environment. In addition to these working environments, which were explicitly presented to respondents, seven respondents mentioned other text editors (LibreOffice, OpenOffice, Apple Pages) and four respondents listed the writing software Scrivener as their main working environment. Digital tools such as dictionaries and search engines are used by 99% of respondents. Only two respondents claimed not to use any technological support, as they did not see the added value.

The reasons for using general technology for literary translation follow a pattern comparable to that for translation technology: most arguments are related to performance expectancy (73.74%), followed by effort expectancy (20.67%), facilitating conditions (2.23%), attitude (2.23%), and social influence (1.12%). Most of the performance expectancy arguments are related to the way that the technology supports the translation process (it is more practical and efficient to look through digital resources than paper dictionaries, they are "the tools of the trade") and the way that it offers solutions or inspiration (the importance of comparing different resources to really understand the source text or a given word, finding additional background information for cultural elements, or even using image search or maps to better understand a text). The fact that it speeds up the translation process is another common performance expectancy argument; the impact on translation quality is mentioned to a lesser extent. For effort expectancy, most arguments relate to ease of use, with a few arguments explicitly mentioning accessibility or ergonomics (for example, Dragon NaturallySpeaking speech recognition software was said to reduce neck and shoulder aches).

Perceived usefulness of translation technology

In the previous section, "lack of familiarity" was one of the main reasons why respondents do not use translation technology for literary translation. It can already be derived from the survey itself that knowledge of translation technology can change people's perception about its potential usefulness. Despite the majority of respondents indicating that they never used translation technology for literary translation, most of them indicated that they thought translation technology could sometimes be useful for literary translation after reading the section giving them more information about specific translation technologies. Respondents are more positive about the potential of termbases and translation memory systems than about machine translation (see Figure 2.5).

Here, as well, respondents could choose to clarify their answer by responding to an open question. For termbases (see Figure 2.6), most respondents list reasons related to performance expectancy, regardless of how useful they believe the technology to be. Respondents who believe it can never be useful argue that it is dangerous to use a fixed list of terms and their translation, as literary translation is highly dependent on context and the texts require a different level of specificity. Respondents who believe it is always, often, or sometimes useful argue that they cannot remember everything and that it helps them save time and maintain consistency throughout. Specific cases mentioned by respondents where termbases could be useful are historical fiction or other specialized literary works with a lot of jargon, and works by the
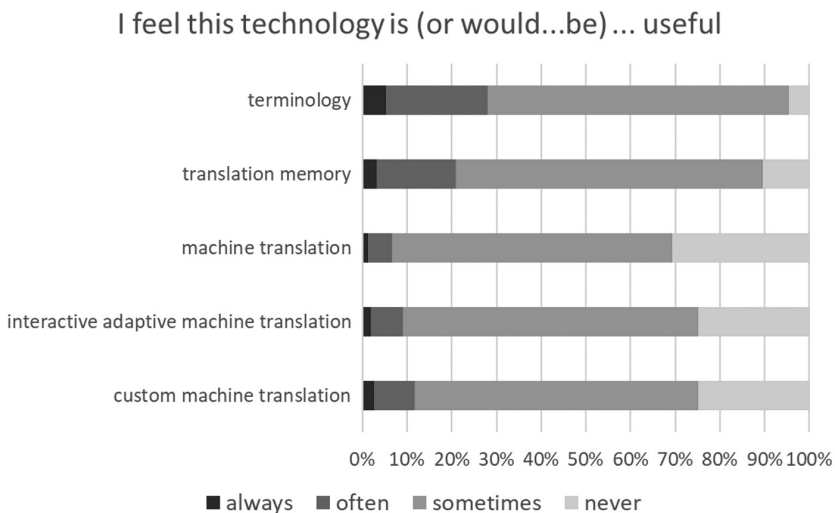

Figure 2.5 Literary translators' perceived usefulness of specific types of translation technology.

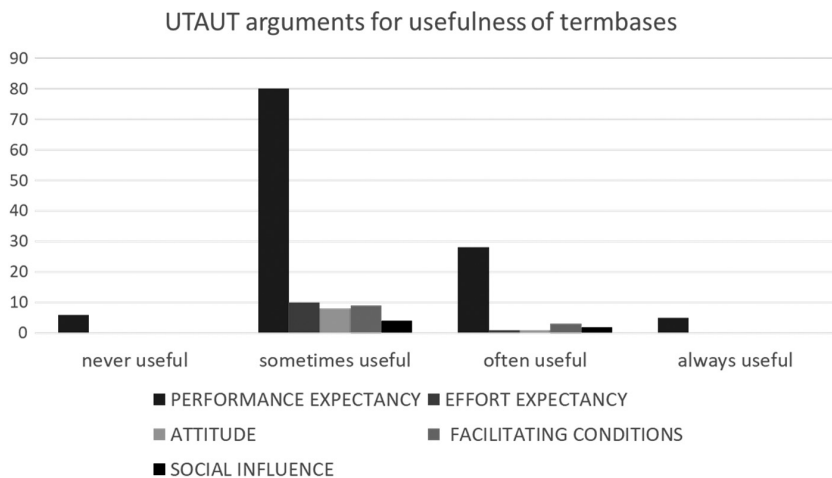**UTAUT arguments for usefulness of termbases**

Figure 2.6 UTAUT arguments for usefulness of termbases per degree of perceived usefulness.

same author. Respondents who feel termbases are often or sometimes useful further mentioned reasons related to effort expectancy, with some assuming automatic term recognition would be easier than having to look things up online, and others feeling that it would only be useful if it was easy to create a termbase. Arguments related to facilitating conditions can be summarized as respondents feeling that they lack the experience or education to work with termbases. The few arguments related to social influence explicitly mentioned the potential of termbases for collaboration with other translators, or when another translator has to translate the next book in a series. As a point of reference, 72.55% of respondents indicated that they sometimes collaborate with another literary translator.

For translation memories, as for termbases, most respondents list reasons related to performance expectancy, regardless of how useful they believe the technology to be (see Figure 2.7). Those who think it will never be useful for literary translation argue that literary texts are so specific that there will rarely be sufficient repetition to justify using a translation memory system, and reusing the same sentences makes you lose the linguistic specificity and personality of the author. Those who feel translation memories will always, often, or sometimes be useful list "consistency in case of repetitions" and "concordance search" as potential benefits. Respondents agree that these features are more useful for longer texts, or texts by the same author. Reasons related to facilitating conditions were mentioned much less frequently, and most of these came down to lack of familiarity. Attitude arguments were rare, but they were
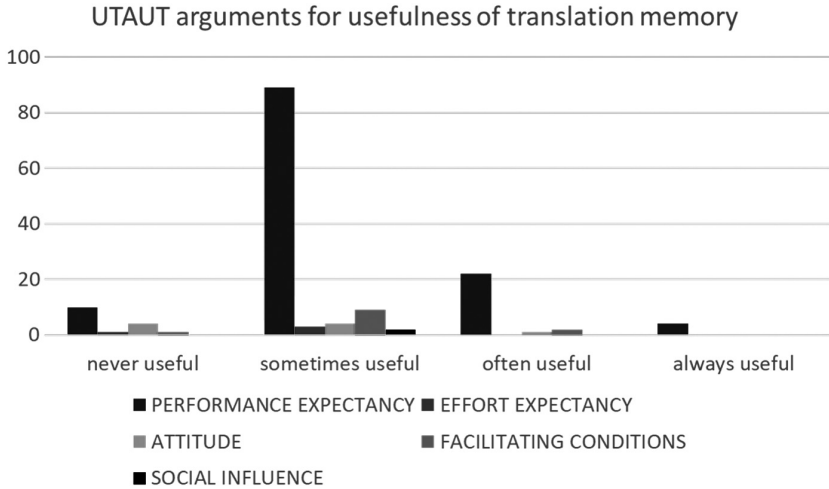
UTAUT arguments for usefulness of translation memory

Figure 2.7 UTAUT arguments for usefulness of translation memory per degree of
perceived usefulness.

more frequent among respondents that believe translation memories
would never be useful. They indicate that they "don't believe in it" or
"don't see the point".

The trend for machine translation is different from that for termbases
and translation memory systems, as can be seen in Figure 2.8. While
most respondents still mainly use arguments related to performance
expectancy, there are no arguments related to effort expectancy or social
influence, and there are more arguments related to facilitating conditions
or attitude than there were for the other types of translation technology.
Those who feel that machine translation can never be useful argue that
it would not save time and forces the translator in a certain direction,
whereas the nature of literary translation makes it crucial for a transla-
tor to keep different options open. The fact that a machine transla-
tion system cannot take voice, style, context, or nuance into account
is mentioned explicitly. Some respondents go as far as to call machine
translation dangerous, in the sense that its output contains so many
errors that a translator might miss them or it might impair a translator's
own linguistic knowledge. One respondent explicitly said that machine
translation systems "destroy the craft" of literary translation (original
NL: "Ze maken het ambacht kapot"). Arguments related to facilitating
conditions mostly indicate a lack of familiarity (and a lack of desire
to become familiar) with the technology. Arguments related to attitude
reflect translators' scepticism about the potential of machine transla-
tion, or the feeling that they would be very annoyed when a system
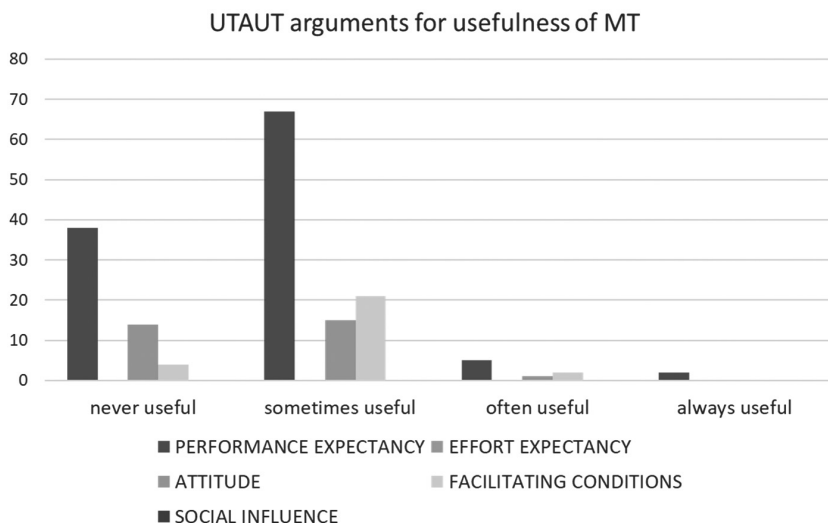
UTAUT arguments for usefulness of MT

Figure 2.8 UTAUT arguments for usefulness of machine translation per degree of perceived usefulness.

presented them with ready-made translations, taking away their sense of control or potentially causing them to lose the translation they had formulated in their mind. Respondents who believe machine translation is always, often, or sometimes useful are more nuanced in their argumentation than for translation memories and termbases. Many respondents indicate that they see some potential for machine translation in the future, especially seeing how much it has evolved in recent years. Some respondents tentatively argue that they see the potential benefit for certain texts and languages, but they doubt it would be useful for more unique and creative literary works that require a more flexible and individual approach. Interactivity and adaptivity are mentioned as crucial factors if literary translators are to even consider using machine translation. The more outspoken positive translators indicate that they believe machine translation can save time or offer interesting solutions, or that it would be nice to start from a suggestion that they can then improve. Opinions on the potential of custom machine translation systems are mixed. Some respondents see a benefit of such systems, in particular when translating more works by the same author; others argue that literary translation is so diverse that it becomes impossible or useless to train custom MT systems for a text. A few respondents question the desirability of developing such systems altogether, fearing it might be "the end of the literary translation profession" (original NL: "dan is het met het vak van literair vertaler gedaan").

Limitations and future perspectives

Towards the end of the survey, we asked respondents what they felt the key limitations were of current translation technology, and which features they felt would be crucial in a literary translation tool if they had the opportunity to develop one themselves.

For the question related to limitations, 12% of respondents said they had no idea. The other 88% mainly listed arguments related to performance expectancy and, in particular, the limitations that translation technology puts on inspiration or creativity. Respondents argue that translation technology cannot capture author style or take the context or reader into account, and it has no feel for language, humour, metaphors, rhythm, culture, irony, layers, intertextuality, idiomaticity, dialogue, quotes, tone of voice, etc., all elements crucial to literary translation. They further feel that the existing translation software does not support the translation process enough, in the sense that it is limiting, it forces a translator to work on a sentence level, and it has little added value. Current translation software, respondents argue, makes the role of a translator more passive, which is the opposite of what is needed for literary translation, as literary translation is considered to be an art. Or, as one respondent argued, tools "get in the way of the literary translator (often someone with limited technical skills) and disrupt the 'appearance' of the literary text as art" (original NL: "ze zitten de literair vertaler (die vaak niet erg technisch geörienteerd is) te veel in de weg en verstoren de 'verschijning' van de literaire tekst als kunstwerk"). The quality of translation tools was found to be insufficient for literary translation, and there was a fear that the use of translation tools would lead to a reduction in creativity. To a far lesser extent, respondents mentioned limitations that can be related to attitude or facilitating conditions. The main attitude argument is related to the fact that technology is not human or even goes against human nature. Two respondents explicitly mention that it would take the fun out of translation work. Answers that can be linked to facilitating conditions come down to lack of experience and the assumption that technology would be too expensive.

The question related to the development of the ideal translation tool for literary translation seemed somewhat harder to answer. Most respondents indicated that they had no idea or did not want to think about such a thing. However, 30% of respondents proposed one or more ideas. An idea shared by seven respondents was that it would be useful to be able to look through a large database with previously made literary translations to find specific words in literary context. Such bilingual corpora exist, but they are generally created for research purposes and are not necessarily accessible to literary translators. There are some translator-driven attempts at creating a large literary translation memory ("Collectief Vertaalgeheugen"), but these are in the early stages (Bakker

and de Bok 2021). Additionally, respondents would like to be able to click a word and get a variety of information from different resources such as (synonym) dictionaries. The way translation tools force a translator to work on a segment level is perceived as too limiting, and respondents would like to be able to easily switch between the translation environment and a visualization of the final target text. This last requirement is especially important for poetry, where the formal aspect needs to be considered. It must be noted that many CAT tools today do offer a paragraph-based segmentation and include the option to view a translated segment in context, features of which the respondents seem to be unaware. One of the respondents explicitly made a comparison with the writing software Scrivener:

> "I really like the Scrivener environment, where it's possible to present texts side by side and you can switch from a single chapter to an entire book, with space for documents containing extra remarks, background information, and annotations. If this program would offer the possibility to switch to a sentence-by-sentence presentation, where it would be easier to recognize words and sentences that have been skipped, this would be perfect for me" (original NL: "Ik vind de omgeving van Scrivener erg prettig, waarbij men teksten naast elkaar kan weergeven en kan wisselen tussen een enkel hoofdstuk en een heel boek, met nog ruimte voor documenten met extra opmerkingen, achtergrondinformatie en annotaties. Als dit programma de mogelijkheid zou hebben om te wisselen naar een weergave per zin, waarbij het makkelijker zou zijn om overgeslagen zinnen en woorden te herkennen, zou het voor mij perfect zijn").

As far as the design of such a tool is concerned, most respondents seem to agree that it needs to be as user-friendly and as unobtrusive or even invisible as possible, although some respondents indicate that they want the tool to offer a lot of different options and possibilities, such as additional reference material, a social media element, highlights of keywords or quotes and references, footnote support, collaboration possibilities, and AI integration. Two respondents indicated that they themselves have developed or are developing a form of translation technology for literary translators. The first envisions a perfect writing and translation environment called Comtexxt: a browser-based application that would include features such as an advanced search through existing translations, information lookup from a variety of external resources, text analysis and prediction, bookmarks to mark sections in the translation to return to, collocation lookup, a customizable interface, and more (van der Ster 2021). The other believes that it is impossible or undesirable to create a CAT tool where everything is integrated, as this could get in the way of the creative process. They see more merit in a discreet solution, where

additional functionalities for translation support are added to the existing text processing tools and document viewers that literary translators are familiar with by means of plugins.

Conclusion and discussion

The survey results reveal that, while translators are generally aware of the most common translation technologies, they are less aware of the recent advances in the field and the integration of some functionalities into translation environment tools. Some respondents explicitly indicated that they found the information in the survey enriching, claiming that "this indeed looks like a useful tool, I was not aware of its existence and should probably reconsider my prejudice" (original NL: "Dit lijkt me inderdaad een waardevol hulpmiddel, ik was er niet van op de hoogte en zou mijn vooroordeel wellicht moeten overwinnen"). It is striking that lack of awareness of translation technology is still an issue more than fifteen years after it was established by Fulford and Granell-Zafra (2005) as one of the reasons for the non-adoption of translation tools.

Almost all respondents (99%) indicated that they used general technology such as word processing tools, dictionaries, and search engines for their literary translation work, whereas only 18% of respondents said they use some form of translation technology for literary translation. Translators that used translation technology for non-literary translation were far more likely to use translation technology for their literary translation work as well. Translators that had received technology training were also more likely to be aware of the different types of translation technology and were therefore more likely to use it. This highlights the importance of education (Dillon 2001) and, in particular, the inclusion of translation technology in said education. However, seeing how quickly translation technology evolves, "translation education must be understood as a lifelong process," as one of the reviewers of this chapter rightly noted.

General technology was felt by most respondents to support the translation process, by being more practical or efficient and by offering inspiration and solutions to problems. For translation technology, most of the reasons for (not) using it were also related to performance expectancy. Respondents who use translation technology say it supports their translation process by, for example, offering inspiration, ensuring they do not skip sentences, and increasing their productivity. Respondents who do not use translation technology argue that their translation process would not be supported by translation technology, as their texts are very diverse and require a level of creativity and awareness of, for example, culture and style that translation technology cannot capture. They also indicated that increased speed is not necessarily desirable when it comes to literary translation. The issue of productivity in relation to technology has been raised before by Teixeira and O'Brien (2017). They found that,

regardless of the quality of TM and MT, participants spent a lot of time consulting a variety of additional resources, yet they managed to maintain high levels of productivity. Teixeira and O'Brien therefore wonder "whether it is reasonable to expect the translation process to become any faster. Or should tool development efforts focus on making the tools and processes more ergonomic?" (2017, 98).

Although only 18% of respondents use translation technology for literary translation, between 70% and 90% believe translation technology can sometimes be useful upon learning more about it. Termbases and translation memory systems are perceived as more useful than machine translation. Translators who are more sceptical of translation technology mention the specificity of literary translation as a key reason why translation technology would not be useful. Respondents mostly see the potential of translation technology for longer texts, texts by the same author, texts where repetition is more likely to appear, texts where consistency is crucial (for example, in historical fiction), or when collaborating with another translator (which almost three out of four respondents indicated they do).

As in most translation research, there seems to be a lot of individual variation across translators, with some respondents categorically refusing to even think about what translation technology could look like for literary translation, and others actively developing their own translation technology for literary translation. This echoes the need for more personalized translation technologies as raised by O'Brien and Conlan (2018). Strikingly, the word "fun" was used both by respondents who did not want to use translation technology, believing it would take the fun out of their work, as well as respondents that did want to use it, believing it could make their work more fun. Similar answers were found among non-literary translators working with an interactive, adaptive environment, where participants who said they enjoyed solving puzzles were also more likely to say they enjoyed post-editing (Daems and Macken 2019). Respondents mentioned various limitations of existing translation technology, most of them related to a negative impact on inspiration and creativity and the fact that it makes the role of the translator more passive. To date, there is some evidence that post-editing machine translation can indeed negatively impact creativity (Guerberof Arenas and Toral 2020), but additional research is required. According to respondents, translation technology that could support literary translators would need to include a database of literary translations, provide easy access to a variety of resources, and offer ways of moving beyond the sentence level of a text.

Regardless of their attitude towards technology, respondents are eager to learn more about translation technology, with 85% of respondents wanting to be informed about the results of the survey and 56% of respondents potentially willing to participate in future experiments. Our main goal with the project is to study the impact of interactive, adaptive translation environments on literary translators' individual style. The

survey highlighted translators' fear that translation technology can get in the way of the process, and that the use of translation technology can lead to a loss of autonomy and creativity. We wish to explore the potential of interactive and adaptive translation environments, as these environments have been developed to give translators more control over the translation process, as such corresponding more to the *translator's amanuensis* envisioned by Kay (1980), and the integration of neural machine translation systems should allow the tools to generate more creative solutions than previous tools. Whether these translation environments truly meet the expectations and needs of literary translators as established by this survey remains to be seen, however.

From the arguments in the survey, it is clear that interactive, adaptive translation technology might be useful for literary translators that work in languages for which machine translation has achieved high quality and that have translated a number of works by the same author, particularly in genres such as historical fiction, where consistency and repetition are more likely to occur. We shall therefore attempt to recruit such translators first for the next steps in the project. In addition to the potential of interactive and adaptive environments, it would be interesting to explore the potential of translation environments that offer easy lookup of a variety of resources and allow translators to work on a document level instead of a sentence level.

While there does not seem to be a perfect translation environment for literary translation yet, there are some existing tools that offer at least some of the support literary translators seem to be looking for. For example, GT4T (https://gt4t.net/) allows translators to access machine translation and dictionaries of their choice in any environment on their computer, and Termsoup (https://termsoup.com/) explicitly claims to offer support for book translators by allowing them to work beyond the sentence level and making it easy to look up terms in a variety of dictionaries as well as create personal glossaries. These might be a good starting point for future empirical studies with literary translators open to using translation technology. In addition, collaboration could be sought between researchers, the literary translators that shared their thoughts for technology improvements, and industry partners. Since conducting this survey, we have been in touch with Nuanxed, a Swedish start-up company that is building an end-to-end translation service with a focus on translation technology. They explicitly welcome translator feedback in this process, and we are excited to see what the future holds for technology-supported literary translation.

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Note

1 Preliminary survey results have already been published in a Dutch online journal targeting literary translators (Daems 2021). While parts of the description in this chapter will naturally overlap with the online article, the analysis in the present chapter contains a much more elaborate and academically oriented analysis of the collected data. This extended work has been published with permission of the *Filter* editorial board.

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