

Dictionary, corpus and CAT tool use in legal and business translation

A comparative pilot study

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Abstract

This article aims at assessing the impact of the use of monolingual original corpora in the target language, hereafter MOC, containing texts produced by native speakers, on translation quality with respect to errors related to the relationship between source and target text (adequacy errors) and errors in the target text independent of the source text (acceptability errors) (cf. (Daems et al 2014:62). Past limited research has shown that MOC have a positive impact on, among other things, text subject understanding, term choice and idiomaticity (Bowker, 1998) and that MOC raise language awareness (Bowker, 1999). Two experiments were conducted among a total of 56 students who used various translation aids (bilingual dictionary, translation memory (TM), self-compiled MOC, online resources) for the translation of specialized (legal and business) text fragments. After determining the effect of the different translation aids on the number and the type of errors (established through error typologies) the positive effect of MOC on the error rate could be confirmed. TMs, whether or not combined

with MOC, appear to be more oriented towards adequacy. TMs in combination with MOC lower the number of adequacy errors with regard to word sense disambiguation (hereafter WSD): TM use increases the number of context-correct translations compared to dictionary use. MOC could also have a positive effect on the number of acceptability errors (e.g. idiomaticity and grammar), as MOC use lowers the number of acceptability errors in our experiments. However, this positive effect may also have been induced by the combined use of MOC, dictionaries and online resources, as the students were allowed to use MOC next to other resources.

1. Introduction

Today various aids can be used to facilitate translation tasks. An aid which is currently widespread is that of so-called translation memories (TMs), integrated in computer-assisted translation (CAT) tools (Lagoudaki 2006; Blancafort & Gornostay 2010; Gough 2011; Allard 2012; Zaretskaya et al 2015). A TM can be defined as “a bilingual or multilingual repository of parallel translations, whether executed by the users themselves or collected from other sources” (Fernández-Parra 2010:8). In a TM, users can store sentences, headings, titles, etc., referred to as ‘translation units’, which can then be reused in future translations (Fernández-Parra 2010:8) as matching content segments. In TMs, context beyond the segments is not taken into account. Translation aids which are currently still much less widespread are corpora in one or more languages (Zaretskaya et al 2015). Contrary to TMs, corpora provide context beyond the segment level, because these are running texts. A distinction is made between parallel and comparable corpora. A parallel corpus consists of texts in one language along with their translations in another language. Comparable corpora can be defined in different ways. In Baker’s (1995) definition, a comparable corpus consists of two single monolingual corpora, one containing original texts (viz. texts written in the language of the native speaker) in a particular language and the other corpus including translations in that same language from (a) specific source language(s). Thus, in this case, the corpus is a combination of translated and non-translated (original) language. The corpora also need to be similar with regard to domain, language variety and time span (Baker 1995:234).

By contrast, the description of comparable corpora by Johansson (2007) does not incorporate translated language: in this definition a comparable corpus consists of original texts in two or more languages or language varieties matching in genre,

moment of publication, etc. (Johansson 2007:9).¹ In other words, “texts collected from different native languages using comparable sampling techniques to achieve similar coverage and balance” (Xiao 2007:2). These corpora consist of spontaneous language use by native speakers, so that they are not influenced by translated language (Granger 2003:19). Early limited research by Bowker (1998) has shown the positive impact of MOC produced by native speakers in the target language on translation, particularly with regard to subject-understanding, term choice and idiomatic constructions, contrary to dictionary use. There was no considerable improvement with regard to grammar and register, however. Still, it is important to note that corpus use did not reduce translation quality (Bowker 1998:648).

Another similar experiment showed that corpus-based resources help to increase students’ language awareness (Bowker 1999:170), especially with regard to language for specific purposes (LSP). Students are often insufficiently trained in this respect: they are not aware “of the importance of factors such as context, text type, register and idiom” (Bowker 1999:161), which causes them to rely incorrectly on language for general purposes, while the situation might require LSP. This keeps students from producing appropriate translations (Bowker 1999:161).

The positive impact of MOC may be due to the fact that MOC do not contain translated language, and are therefore uninfluenced by so-called translationese, defined as “expressions and structures in translated texts owing to the source language or the translation process” (Kübler & Zinsmeister 2015:12).

In this article we investigate the influence of MOC on translation in combination with different translation aids, such as (bilingual) dictionaries, specialized TMs and online resources which are not parallel corpora, as the latter contain translated language. We aim to determine more specifically whether the use of MOC positively impacts translation quality with regard to (1) adequacy errors and (2) acceptability errors. As the MOC compiled for the experiments in the current paper are small scale corpora in the *target* language only, a logical hypothesis was that these MOC reduce especially the number of acceptability errors. By contrast, TMs contain *both* source text and target text content segments. Therefore, a logical

¹ cf.

http://www.essex.ac.uk/linguistics/external/clmt/w3c/corpus_ling/content/corpora/types/comparable.html

4 An Lambrechts & Heidi Verplaetse

hypothesis was that the use of TMs in the experiments described below reduce especially the number of adequacy errors.

The current study differs mainly from the set-up of Bowker's (1998, 1999) early experiments in that we added the translation condition of TMs, as TMs have become a standard resource for professional translators since then. A TM basically represents a type of parallel corpus, albeit presented in a segmented, decontextualized manner. Adding this source text segment-to-target text segment resource allowed us to focus attention on the distinction between acceptability errors and adequacy errors, instead of the analysed categories of translation quality discussed by Bowker (1998, 1999). In this manner the resource of a target language MOC, which is more acceptability-oriented, could be compared to the more adequacy-oriented resource of a TM for the current study. Bowker (1998) pointed to the obvious merits of parallel corpora for translation purposes, but also pointed out the practical limitations for including them as part of her experiments at the time, viz. their unavailability and the challenges of aligning translated content. But, as Bowker (1998) predicted in a note, the lack of bilingual parallel corpora for translation purposes at the end of the previous century, especially for specialized domains, has since that time been filled by the professional success of TMs in CAT tools. Again, of course, we should also point out the limitations of TMs as a type of parallel corpus due to their decontextualized segmented nature.

Regarding the use of MOC as a translation resource by student translators the current study also differs from Bowker's (1998, 1999) methodologies in that keylogging software allowed us to track the extent to which the students consulted their MOC during their translation activities.² In this manner one single aspect of the translation processes was analysed, in addition to the translation products.

The article first outlines our methodology (section 2) and the results of both experiments, as well as the overall results (section 3). This is followed by a discussion (section 4), the conclusion (section 5) and some limitations and suggestions for further research (section 6).

² The MOC compiled for the current study are small scale corpora compared to the much more extensive corpus data used for Bowker's (1998) study.

2. Methodology

2.1. *Legal translation experiment*

The first experiment was executed with 11 master students from the English Translation Workshop: Translating Legal Texts at KU Leuven campus Antwerp, Belgium. Before the experiment, the students were briefly introduced to corpora and to the software AntConc, which they would use to compile and query their own corpus.

The students had to translate two text fragments about international human rights law from English into Dutch. For the translation of the first fragment (341 words) 5 students had access to the online version of the bilingual English-Dutch general dictionary Van Dale. The other 6 students used a specialized freely available TM from the European Commission's Directorate-General for Translation, which was imported in the CAT tool SDL Trados Studio 2017. The TM users were briefly introduced to the CAT tool before the experiment. The CAT tool users were asked to rate their expertise with the software from 1 to 5, with 1 described as 'no experience' and 5 as 'much experience'.³ Their levels of experience ranged from 1 (no experience) to 3 (little experience).

After the translation of the first text fragment the students had a maximum of 30 minutes to compile their own MOC, using pre-defined keywords. These keywords were provided in English and originated from the second text fragment they would translate later. The following keywords were selected randomly:

- human rights
- human rights organisation
- Court of Justice of the European Union (EU)
- respect for human rights
- Charter of Fundamental Rights
- Treaty of Lisbon
- human rights protection
- European Convention on Human Rights (ECHR)

³ 1 was defined as 'no experience', 2 as 'very little experience', 3 as 'little experience', 4 as 'average experience' and 5 as 'much experience'.

6 An Lambrechts & Heidi Verplaetse

The students were allowed to use any (online) resources they wanted for the MOC compilation. But they needed to check whether the resources they used for their MOC compilation were originally written in Dutch, for instance by looking at the website extension (.be for Belgium). However, as Belgium has three official languages (Dutch, French and German), plenty of online resources are multilingual and were therefore not suitable for the MOC, as it can often not be firmly established what the original language of these websites is. The students were instructed not to use such multilingual websites for their corpus compilation.

The students translated their second text fragment (347 words) with the same bilingual English-Dutch dictionary from text fragment 1 and their self-compiled MOC (5 students) or with the same specialized TM used for text fragment 1 in combination with a self-compiled MOC (6 students). Due to practical constraints only 1 out of the 5 students using a bilingual dictionary and a MOC managed to deliver a full translation executed with a dictionary and a full translation executed with a dictionary and her self-compiled MOC.⁴ 6 students delivered a full translation executed with a TM. The same 6 students delivered a second full translation executed with a TM and their self-compiled MOC.

The students' performance was monitored using keylogging software (Inputlog). This software makes it possible to gather information on, among other things, the MOC files collected and the number of MOC consultations per student.

The translations produced were error-annotated based on the MeLLANGE error typology (Kübler et al 2016) and on annotation guidelines for the English-Dutch language pair (Daems & Macken 2013; Tezcan et al 2015). Both the MeLLANGE error typology and the annotation guidelines distinguish between adequacy errors and acceptability errors.

In order to assess the impact of MOC on translation quality the number and type of adequacy errors and acceptability errors were compared under the different translation conditions.

⁴ The practical constraints were not time related, but the result of the students' course schedule. For this reason, the experiment described here will be repeated (cf. Lambrechts and Verplaetse forthcoming).

2.2. *Business translation experiment*

The second experiment was executed with 45 third-year bachelor students from the course English Writing/Translating Business Texts at KU Leuven campus Antwerp, Belgium. Before the experiment, these students were also briefly introduced to corpora and to the software AntConc, which they would use to compile and query their own MOC. They were given a MOC compilation exercise for which they used pre-defined keywords in English. The students were allowed to use any resources they wanted for the MOC compilation. After this task the students also executed a short translation exercise (subject: financial bonds) for which they were allowed to use their self-compiled MOC, specialized dictionaries and glossaries. The English source text contained the keywords the students were provided with for their MOC compilation.

In a subsequent class the students compiled their own MOC (maximum 30 minutes) with other English keywords for the actual experiment, using any (online) resources they wanted. The students were again instructed to check whether the resources they used for their MOC compilation were originally written in Dutch, not only by checking the website extension, but also by taking into account data such as address and author information.

The source text to be translated from English into Dutch was one fragment about letters of credit. For the translation (180 words) the students were allowed to use the MOC they had compiled previously as well as any other (online) resources apart from parallel corpora (e.g. Linguee, Reverso Context, Wordreference) to avoid the use of translated language.

The students' performance was monitored using keylogging software (Inputlog). It was decided not to use screen recording software for this experiment due to the increased number of students and the laborious work the screen recording analysis involves. With keylogging software the same data can be gathered as with screen recording software, but the data are less detailed.

Similar to the legal translation experiment the translations produced were also error-annotated to assess the impact of MOC on translation quality.

3. Results

3.1. *Legal translation experiment*

3.1.1. *Dictionary and dictionary + MOC translations*

As it was only possible to gather 1 full dictionary and 1 full dictionary + MOC translation (of the same student), it must be noted that the results of the first experiment are limited in scope.

In the dictionary translation 19 errors occurred; 13 of those were adequacy errors. The most frequent error type was WSD (5). With WSD a correct translation is provided, but the translation does not fit the context (Tezcan et al 2015), cf. example (1) below. With regard to acceptability errors, agreement errors mostly occurred (4 cases) in the dictionary translation. Agreement errors can occur at various levels, e.g. at subject-verb level (for instance a singular subject erroneously combined with a plural verb), cf. (2), at conjugational level, cf. (3) and with regard to deixis, cf. (4).

- (1) [ENG] ... pass through a human rights impact assessment ...
[DUTCH] ... *een mensenrechtelijke effectrapportage [...] doorgaan* ...
(correct: *onderworpen worden aan een mensenrechtelijke effectrapportage*)
- (2) [ENG] ... the Commission has indicated that it will in future verify Member States ...
[DUTCH] ... *heeft de Commissie aangegeven dat ze in de toekomst lidstaten gaan controleren* ... (correct: *gaat*)
- (3) The Charter additionally guarantees a number of rights ...
Het Handvest garandeert bijkomend een aantal rechten ... (correct: *garandeert*)
- (4) *The European Commission ... It has also begun 'mainstreaming' ...*
De Europese Commissie ... Het is ook begonnen met het 'mainstreamen'...
(correct: *Ze is ook begonnen* ... as *commissie* is a female noun)

The dictionary + MOC translation showed a similar total number of errors (18). Once again, the majority were adequacy errors (15) and the most frequent error type was WSD (6).

3.1.2. *TM and TM + MOC translations*

6 students executed a full TM translation and the same students each also delivered a full TM + MOC translation.

The total number of errors was very similar in both the TM and the TM + MOC translations, viz. 104 and 99 errors respectively.

No large difference between the number of adequacy and acceptability errors could be detected in the TM only translations (6), with 49 adequacy errors and 55 acceptability errors. In the TM + MOC translations (6) substantially more acceptability errors occurred, viz. 60 as opposed to 39 adequacy errors.

The most frequent error type was agreement (24) for TM translations and typo (19) for TM + MOC translations. The low average number of WSD errors in TM + MOC translations (0.7) was also striking compared to the other translation conditions, viz. dictionary + MOC (average: 6), dictionary only (average: 5) and TM only (average: 3.2).

3.1.3. *Overall results dictionary-, dictionary + MOC, TM-, TM + MOC-based translations*

Table 1 gives an overview of all the translation conditions with the average error rates (calculated per 1 student).

	dictionary only	dictionary + MOC	TM only	TM + MOC
average number of errors	19	18	17.3	16.5
average adequacy errors	13	15	8.2	6.5
average acceptability errors	6	3	9.2	10
most frequent error type	WSD	WSD	agreement	typo

Table 1: overall results in all translation conditions

On average most errors were made in the dictionary only translation. The TM users made slightly fewer errors than the dictionary user (1 student translator), with average error values of 17.3 versus 19 respectively. The average values of the dictionary + MOC user (1 student translator) and the TM + MOC users show the same trend (18 versus 16.5). The average values between dictionary only and dictionary + MOC use are very similar as well (19 versus 18). Similarly, between TM only and TM + MOC use the average values do not differ greatly (17.3 versus 16.5).

Translations executed with a dictionary (+ MOC) show more adequacy errors than acceptability errors (cf. Daems et al 2016), whereas the opposite is true for TM (+ MOC) translations.

3.1.4. *Number of errors and MOC use*

The 6 students who compiled their own MOC and delivered full translations gathered 97 MOC files in total. They consulted their MOC 107 times. The three students with the highest number of MOC files (22, 17 and 15 respectively) also had the highest number of MOC consultations, viz. 53, 21 and 10.

For two out of these three students this resulted in low error rates: the best performing student made 8 errors with 22 MOC files consulted 53 times. The second-best student made 13 errors with 17 MOC files consulted 21 times.

However, the student who gathered the third highest number of MOC files (15) performed the worst in the translation task, with 23 errors in total. The student with the lowest number of MOC consultations (3 for 8 MOC files gathered) did only slightly better, with a total of 22 errors.

3.1.5. *Statistical analysis*

We ran a paired-samples T-test in SPSS to assess whether there is a significant difference in the number of errors between TM and TM + MOC. The resulting p-value (two-tailed significance) is 0.727 for 5 degrees of freedom, viz. more than 0.05, which means that there is no statistically significant difference between the number of errors made with a TM and the combination TM + MOC. This may be due to the limited number of observations.

3.2. *Business translation experiment*

3.2.1. *General error and MOC use analysis*

The total number of errors made in the experiment was 259, with 140 adequacy errors and 119 acceptability errors. The most frequent error type was agreement errors (40).

Despite encouraging the students to use their MOC, the keylogging data showed that 15 students did not use their MOC, whereas 29 students did. The MOC use of 1 student could not be determined due to technical issues, which excluded her translation from the analysis, as the number of errors could not be correlated to MOC use.

The MOC users (29) made 166 errors, as opposed to 93 for the non MOC users (15). Both groups made adequacy errors mostly. Non MOC users mostly made WSD/omission errors (adequacy), whereas MOC users mostly made agreement errors (acceptability) in comparison to non MOC users. Examples of WSD (1), omission (2) and agreement errors (3) in this experiment are:

- (1) [ENG] Letters of credit may be either revocable or irrevocable.
[DUTCH] *Een kredietbrief mag herroepelijk of onherroepelijk zijn.*
(correct: *kan*, expressing possibility; *mag* expresses permission).
- (2) [ENG] ... a transaction that involves a revocable letter of credit ...
[DUTCH] ... *een transactie omtrent een _ kredietbrief*

12 An Lambrechts & Heidi Verplaetse

- (correct: een transactie omtrent een herroepelijke /herroepbare kredietbrief)
- (3) [ENG] ... a contractual agreement between a bank, [...], on behalf of one of its customers ...
[DUTCH] ... *een contractuele overeenkomst tussen een bank, [...], die in naam van een van hun klanten ...*
(correct: *haar*, singular as *bank* is also singular)

Table 2 shows the overall results of the error analysis.

	non MOC users (15)	MOC users (29)	Total
number of errors	93	166	259
adequacy errors	48	92	140
acceptability errors	45	74	119
most frequent error type	WSD/omission	agreement	

Table 2: overall results error analysis

3.2.2. Average error values and MOC use

When we look at the average values per student, the non MOC users made somewhat more errors than the MOC users (6.2 versus 5.7). Both the MOC and the non MOC users also made fewer acceptability errors than adequacy errors. With regard to the average values for acceptability the non MOC users made somewhat more acceptability errors than the MOC users (3.0 versus 2.6).

Table 3 shows an overview of the average error values compared against the condition of MOC use.

	non MOC users	MOC users
average number of all errors	6.2	5.7
average number of adequacy errors	3.2	3.2
average numbers of acceptability errors	3.0	2.6

Table 3: average error values and MOC use

3.2.3. *Number of errors and MOC use*

The 29 students who used their MOC for translation consulted it 152 times. On average, the compiled MOC were consulted 5.2 times. Of the 29 students, 12 (41%) consulted their MOC more than average. The average error rate was 5.7 and 14 of the 29 students (48%) scored below average.

For 5 of the 12 students (42%) consulting their MOC more than average resulted in an error rate lower than the average value (5.7). The error rate for the MOC users ranged from 1 to 12 errors. The maximum number of corpus consultations was 19, resulting in 7 errors in the translation task. The two best performing MOC users consulted their MOC 1 time and 12 times respectively, and together made only 1 error. 12 was the second highest number of corpus consultations in the experiment. For the non MOC users the number of errors ranged from 3 to 10 errors.

3.2.4. *Statistical analysis*

We ran an independent-samples T-test in SPSS to assess the significance between the number of errors made with a MOC and without a MOC. The resulting p-value (two-tailed significance) is 0.502 (equal variances not assumed) for 37.995 degrees of freedom, viz. more than 0.05, which means that there is no statistically significant difference between the number of errors made with a MOC and those made without a MOC.

3.3. *Summary of the experiment results*

Table 4 provides a summary of the results of the legal and the business translation experiments, including the different translation conditions.

	translation condition	adequacy vs acceptability	most frequent error type
1	dictionary only	13 vs 6	WSD (5)
2	dictionary + MOC	15 vs 3	WSD (6)
3	TM only	8.2 vs 9.2	agreement (4)
4	TM + MOC	6.5 vs 10	typo (3.2)
5	online resources (no parallel corpora) (non MOC users)	3.2 vs 3	WSD/omission (1)
6	online resources (no parallel corpora) + MOC	3.2 vs 2.6	agreement (3.5)

Table 4: summary of the experiment results (average values) under the different translation conditions

In our experiments it is shown that in four out of six translation conditions (dictionary only / dictionary + MOC / online resources (no parallel corpora) / online resources (no parallel corpora) + MOC) fewer acceptability errors than adequacy errors occur. If we look at the average values, the largest differences between adequacy and acceptability errors can be seen in dictionary and dictionary + MOC translations, with a difference of 7 and 12 respectively. Only under the TM and TM + MOC conditions are the acceptability errors the dominant error type. The largest difference here between adequacy and acceptability errors occurs in TM + MOC translations (3.5).

4. Discussion

4.1. *Legal translation experiment*

With only one full dictionary and one full dictionary + MOC translation (by the same student) no firm conclusions can be drawn from the first experiment with regard to dictionary only versus dictionary + MOC use.

The average error rate is highest in dictionary only translations, followed by dictionary + MOC translations. This implies that the use of TMs (+ MOC) would be more beneficial with regard to error rate than using dictionaries (+ MOC), possibly because of the larger context TMs offer in comparison to (most) dictionaries. The dictionary used (Van Dale) is also a general dictionary, whereas the TM is specialized. In the legal translation experiment the positive effect of MOC (cf. Bowker 1998; 1999) is confirmed as TM + MOC use in translation generates the lowest error rate.

The higher number of adequacy errors in dictionary and dictionary + MOC translations are possibly related to the limitations of the aids used (bilingual dictionary and MOC) for the transfer from the source text into the target text. It appears that these aids are more suitable to ensure the correctness of the target text conventions in this experiment, as fewer acceptability errors occur in dictionary only and dictionary + MOC translations. We decided to use a general bilingual dictionary instead of a specialized legal dictionary due to practical constraints mostly: specialized ENG-DUTCH legal dictionaries are generally only available on paper and specialized electronic dictionaries online often require a paying subscription, which we did not have at our disposal at the time of the experiments. TM and TM + MOC translations show more acceptability errors. The use of TM and TM+MOC seems better suited to avoid adequacy errors. TMs in particular contain source and target segments, which according to this experiment makes them more oriented towards adequacy, as hypothesized.

With WSD as the most frequent error type in dictionary only and dictionary + MOC translations, it can be assumed that the lack of context in dictionaries, more specifically bilingual dictionaries such as the one used in this experiment, makes it difficult to determine the appropriate translation option and that MOC as a supplementary resource to these dictionaries cannot undo this difficulty (at least not for this particular student). However, when combining TMs with a MOC, the number of WSD errors largely decreased. Therefore, it could be assumed that in

this experiment a combination of a TM and a MOC helps in determining correct context-specific translations. As agreement errors are the most frequent (acceptability) error type in TM translations, student translators must devote special attention to internal clause and sentence structure and referencing.

Notwithstanding some exceptions, in the legal translation experiment a high number of MOC consultations resulted in a low error rate.

4.2. *Business translation experiment*

For the business translation experiment a distinction is made between non MOC and MOC users. MOC users made fewer errors than non MOC users, showing that MOC use has a positive impact on the error rate (cf. legal translation experiment, cf. Bowker 1998; 1999). However, both the MOC and the non MOC translations show more adequacy than acceptability errors, which is in line with the dictionary and dictionary + MOC translation in the legal translation experiment. In this experiment it is shown that online resources (excluding parallel corpora such as Linguee or Reverso Context), whether or not in combination with MOC, appear to be suitable aids to decrease the number of acceptability errors. If we compare the MOC and the non MOC translations, we see that more acceptability errors than adequacy errors are present in the non MOC translations, which suggests that MOC also have a positive impact on acceptability. In line with TM translations (cf. legal translation experiment) agreement errors are the most frequent error type in MOC translations. In this respect student translators must devote special attention to internal clause and sentence structure and referencing.

Non MOC users made WSD/omission errors mostly. This may indicate once more that MOC are beneficial in finding context-specific translations, but it must be noted that the number of WSD errors was also high among the MOC users in this experiment.

This experiment shows that MOC use does not always lead to fewer errors, as the best scores were obtained respectively by one student who consulted his MOC 12 times, making only 1 translation error and one other student who consulted his MOC only 1 time, making 1 error as well. This illustrates that a MOC can have a beneficial supporting function in translation for some students. Note that the students in this experiment are bachelor degree students who have not opted for a specialised applied linguistic master programme yet, such as translation, interpreting, journalism studies or multilingual communication.

4.3. *Overall experiment results*

In the experiments by Bowker (1998) it was shown that MOC in the target language have a positive influence with regard to idiomaticity and term choice, but no real effect with regard to grammar. Idiomaticity and grammar relate to acceptability, whereas term choice (cf. WSD) relates to adequacy.

In our experiments MOC use mostly decreases the number of acceptability errors, so it partly confirms the positive effect of MOC found by Bowker (1998), and our hypothesis (cf. section 1), as adequacy errors mostly occur in MOC-based translations (dictionary + MOC / online resources (no parallel corpora) + MOC).

Only in TM (+ MOC) translations does a lower number of adequacy errors occur. This may mean that MOC can also have a positive impact with regard to adequacy (WSD), provided they are combined with TMs, thus confirming our hypothesis that TMs optimize the adequate relation between source text and target text (cf. section 1).

It should be added that a high number of MOC consultations does not systematically lead to better translation results: adequate corpus compilation and searching skills as well as the general level of the student (third-year bachelor versus master students) may play a role in this respect.

5. Conclusion

In determining whether the use of MOC has a positive effect on translation quality with regard to adequacy errors or acceptability errors we found that dictionaries, whether or not in combination with a MOC, generate fewer acceptability errors. Therefore, based on the legal translation experiment, dictionaries and MOC seem to be more suitable aids with regard to target text conventions than for the transfer between source and target language. The results of the business translation experiment confirm this finding, as translations executed with and without a MOC (including online resources, but excluding parallel corpora) also show adequacy errors mostly.

TMs, whether or not in combination with a MOC, generate fewer adequacy errors, making them more suitable for the transfer between source language and target language. As stated above (section 1), this logically reflects the fact that TMs

contain both source text and target text content segments. In addition, it may partly be due to the segmented TM approach, which visualizes the relationship between source and target segments. This relationship is oriented more towards adequacy than towards acceptability. In the legal translation experiment the combination TM + MOC also positively influences term choice (cf. Bowker 1998) by decreasing the number of WSD errors. This implies that the combined approach of TM and MOC is sometimes useful for providing correct context-specific translations.

With the frequent occurrence of agreement (acceptability) errors in TM and online resources + MOC (no parallel corpora) translations, internal clause and sentence structure and referencing deserve particular attention when using these translation aids.

A high number of MOC consultations only decreases the number of errors to a limited extent and not in all cases. In this respect the development of adequate corpus compilation and querying skills would be an important asset. These skills are also incorporated in the most recent European Master's in Translation Competence Framework (2017), which states that students need to be able to effectively use, among other things, corpus-based tools (European Master's in Translation Competence Framework 2017:9).

With respect to translation quality, the required quality level for specific purposes and in specific contexts needs to be considered. If the required level of a specific translation is limited to that of information-quality (i.e. the translation is read by a small number of readers for information purposes only and will then be discarded) acceptability errors may, for instance, be taken into account to a lesser extent than when publication-quality needs to be achieved. Publication-quality implies that a large external target group will read the translation over a longer time period (Mossop 2001:22). Therefore, acceptability errors are far less acceptable in translated texts for which publication-quality is required.

6. Limitations and future research

Due to practical constraints the number of dictionary and dictionary + MOC translations was limited. An additional number of TM and TM + MOC translations is also needed to draw firmer conclusions with regard to MOC use.

With respect to TM and MOC experience different results may be obtained for higher degrees of familiarity, as the students involved in these experiments had no or little experience with TM use, MOC compilation and querying. In addition, the students participating in the business translation experiment were third-year

bachelor students who had not yet chosen their specialised applied linguistic master programme. Other experiments with master students who have already enrolled in the Master in Translation (cf. legal translation experiment) and with professional translators could also be envisaged. The search terms provided for the MOC compilation were English terms. Providing target language terms (Dutch) may impact the MOC compilation phase and improve compilation speed. The text domains under investigation in these experiments were legal and business texts. Other text domains may provide different insights.

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References

- Allard, M. G. P (2012) *Managing Terminology for Translation Using Translation Environment Tools: Towards a Definition of Best Practices*. Doctoral Dissertation, University of Ottawa.
- Baker, M. (1995) 'Corpora in translation studies: An overview and some suggestions for future research'. *Target* 7(2), 223-243.
- Blancafort, H., & Gornostay, T. (2010) '(Calling Professionals: Help Us to Understand Your Needs'. Retrieved July 16, 2018 from https://www.researchgate.net/profile/Tatiana_Gornostay/publication/236626809_Calling_Professionals_Help_Us_to_Understand_Your_Needs/links/02e7e51882f0b3d6f5000000/Calling-Professionals-Help-Us-to-Understand-Your-Needs.pdf
- Bowker, L. (1998) 'Using specialized monolingual native-language corpora as a translation resource: a pilot study'. *Meta: Journal des traducteurs / Meta: Translators' Journal* 43(4), 631-651.
- Bowker, L. (1999) 'Exploring the potential of corpora for raising language awareness in student translators'. *Language awareness* 8(3-4), 160-173.

- Daems, J. & Macken, L. (2013) 'Annotation Guidelines for English-Dutch Translation Quality Assessment, version 1.0.'. Retrieved 27 October, 2017 from <https://www.lt3.ugent.be/media/uploads/publications/2013/Technical%20Report%20TQA%20Annotation.pdf>
- Daems, J., Macken, L., & Vandepitte, S. (2014) 'On the origin of errors: A fine-grained analysis of MT and PE errors and their relationship'. Presented at the Ninth International Conference on Language Resources and Evaluation, Reykjavik, 26-31 May.
- Daems, J., Carl, M., Vandepitte, S., Hartsuiker, R., & Macken, L. (2016) 'The Effectiveness of Consulting External Resources During Translation and Post-editing of General Text Types'. In M. Carl, S. Bangalore, & M. Schaeffer, eds, *New Directions in Empirical Translation Process Research*. Springer, Cham, 111-133.
- European Master's in Translation Competence Framework (2017). Retrieved September 19, 2018 from https://ec.europa.eu/info/sites/info/files/emt_competence_fwk_2017_en_web.pdf
- Fernández-Parra, M. (2010) 'The Workflow of Computer-Assisted Translation Tools in Specialised Translation'. In C. Heine & J. Engberg, eds, *Reconceptualizing LSP: Online proceedings of the XVII European LSP Symposium 2009*. Retrieved December 8, 2016 from <http://bcom.au.dk/fileadmin/www.asb.dk/isek/fernandez-parra.pdf>
- Gough, J. (2011) 'An empirical study of professional translators' attitudes, use and awareness of Web 2.0 technologies, and implications for the adoption of emerging technologies and trends'. *Linguistica Antverpiensia, New Series—Themes in Translation Studies* 10, 195-225.
- Granger, S. (2003) 'The corpus approach: a common way forward for Contrastive Linguistics and Translation Studies'. *Corpus-based approaches to contrastive linguistics and translation studies* 20, 17-29.
- Johansson, S. (2007) *Seeing through Multilingual Corpora: On the use of corpora in contrastive studies (Vol. 26)*. John Benjamins Publishing, Amsterdam.
- Kübler, N., Mestivier, A., Pecman, M., & Zimina, M. (2016). 'Exploitation quantitative de corpus de traductions annotés selon la typologie d'erreurs pour améliorer les méthodes d'enseignement de la traduction spécialisée'. Presented at Colloque JADT Actes des 13èmes Journées internationales d'analyse statistique des données textuelles. Nice, 7-10 June.
- Kübler, S., & Zinsmeister, H. (2015). *Corpus linguistics and linguistically annotated corpora*. Bloomsbury Publishing, London/New Delhi/New York/Sydney.

- Lagoudaki, E. (2006) 'Translation memories survey 2006: Users' perceptions around TM use'. *Proceedings of the ASLIB International Conference Translating & the Computer* 28(1), 1-29.
- Lambrechts, A., & Verplaetse, H. (forthcoming). Medical and legal translation: the impact of dictionary, CAT tool and corpus use on translation quality.
- Mossop, B. (2001). *Revising and editing for translators*. St. Jerome Publishing, Manchester.
- Tezcan, A., Daems, J., Macken, L., & Van Brussel, L. (2015) 'Annotation Guidelines for English-Dutch Machine Translation Quality Assessment, version 1.3.3.' Retrieved 7 February, 2018 from <http://users.ugent.be/~atezcan/>
- Xiao, R. Z. (2007) 'What can SLA learn from contrastive corpus linguistics? The case of passive constructions in Chinese learner English'. *Indonesian JELT* 3(1), 1-19.
- Zaretskaya, A., Corpas Pastor, A., & Seghiri, M. (2015). Translators' requirements for translation technologies: a user survey. Presented at the AIET17 Conference New Horizons in Translation and Interpreting Studies. Malaga, 29-31 January.