Machine vs Human Translation of Formal Neologisms in Literature: Exploring E-tools and Creativity in Students

Laura Noriega-Santiáñez
Gloria Corpas Pastor

revista.tradumàtica
tecnologies de la traducció

Laura Noriega-Santiáñez
IUITLM, Universidad de Málaga;
laura.noriega@uma.es;
ORCID: 0000-0001-7245-2629

Gloria Corpas Pastor
IUITLM, Universidad de Málaga;
gcorpas@uma.es;
ORCID: 0000-0001-6688-1531

Abstract

This article compares the output of three neural machine translation systems (Google Translate, DeepL, and Phrase TMS) and human translation (undergraduate level students, English into Spanish). It focuses on five formal neologisms extracted from literary texts, thus considering creativity, and technology adoption and training.

Keywords: machine translation, formal neologisms, literary translation, human translation, technological tools, technological resources, creativity.

Resumen

Este artículo compara el resultado de tres sistemas neuronales de traducción automática (Google Translate, DeepL y Phrase TMS) y la traducción humana (estudiantes de nivel universitario, del inglés al español). Se centra en cinco neologismos formales extraídos de textos literarios, considerando así la creatividad y la adopción y el uso de la tecnología.

Palabras clave: traducción automática, neologismos formales, traducción literaria, traducción humana, herramientas tecnológicas, recursos tecnológicos, creatividad.

Resum

Aquest article compara el resultat de tres sistemes neuronals de traducció automàtica (Google Translate, DeepL i Phrase TMS) i la traducció humana (estudiants de nivell universitari, de l'anglès al castellà). Se centra en cinc neologismes formals extrets de textos literaris, considerant així la creativitat i l'adopció i l'ús de la tecnologia.

Paraules clau: traducció automàtica, neologismes formals, traducció literària, traducció humana, eines tecnològiques, recursos tecnològics, creativitat.

Rebuda: 18 de març de 2023 / Acceptació: 24 de novembre de 2023 / Publicació avançada: 20 de desembre de 2023

1. Introduction

Literary translation is a social activity that varies according to the cultures and languages involved, with conventions, norms, and expectations specific to the target system,

influenced by changing socio-cultural circumstances (Pegenaute, 2016). Boase-Beier et al. (2018) highlight the intricate nature of defining a literary text, but they identify at least three common qualities of literary texts: these tend to be fictional (and factual); they use more textual devices (such as rhythm or ambiguity) than other types of texts; and they can exert specific cognitive effects on readers. Therefore, when translating literature, translators face many complex problems, resulting from a textual genre full of linguistic and formal characteristics, different tones, and pragmatic nuances, conditioned by the respective culture (Hurtado Albir, 2011). Factors such as sensitivity, emotion and culture come into play equally and challenge the literary translator (i.e., their linguistic, documentary, and creative skills) when translating them into another language (Merlo Vega, 2005).

The complexity of literary translation is evident in the PETRA-E framework for literary translators (2016), which describes the eight core competencies of literary translators. Rodríguez Martínez and Ortega Arjonilla (2016) have undertaken a similar endeavour. The latter authors compile a series of essential competencies for literary translators, encompassing linguistic and cultural knowledge, awareness of literary trends, and understanding the publishing market. Both models highlight the significance of creativity and heuristic competencies for translators. Creativity and heuristics form the focal points of this research. According to García Álvarez (2018: 13), creativity is defined as "originality of thought, intellectual curiosity, imagination, decision-making capacity, or critical reasoning". Heuristic skills can be defined as follows: the ability to gather in an efficient way the linguistic and thematic knowledge needed for translation, the ability to develop strategies for an efficient use of (digital) information sources, the ability to apply textual criticism and to differentiate between text editions (PETRA-E Framework, 2016). Both competency models advocate for increased attention to creative and heuristic processes in the training of literary translators.

Neology arises because living languages undergo gradual or sudden changes to adapt themselves to the realities of a changing environment. Given the constant changes in the technological, scientific, and economic world, this lexical renewal is particularly noticeable in specialised areas (Cabré Castellví et al., 2012). Martínez de Sousa (2015) attributed this to the historical evolution of a language, which mainly gains and loses lexicon and phraseology as part of society's constant evolution. Díaz Hormigo and Vega Moreno (2018) define the concept of neologism as a lexical unit that arises to name a new concept (called denominative or referential neology) or to introduce subjective or expressive nuances while communicating (stylistic or expressive neology). Cabré Castellví (2006), in the Observatori de Neologia Project (OBNEO), establishes a classification of neologisms in Spanish and Catalan which she distinguishes five main categories: 1) formal neologisms (units created from a possible modification of the lexical base of other existing ones); 2) syntactic neologisms (units that have undergone a change in the grammatical subcategory of their lexical base), 3) semantic neologisms (units of which the meaning of their lexical base is modified); 4) loanwords (units taken from other languages); and 5) others (i.e., dialect words, jargonisms, etc.). Our study focusses on a very frequent type of neological creation: formal neologisms. Formal neologisms can be

subdivided by derivation (suffixation and/or prefixation), composition, lexicalisation, acronymy, or abbreviation (Cabré Castellví, 2006). These alterations in language are the result of the dynamics of the language itself and the creativity of the speakers, who are the ones who bring about this linguistic change (Estornell Pons, 2009). And this inclusion also happens in literary texts.

Given the degree of creativity and novelty involved, translating neologisms is one of the greatest challenges faced by translators of literary texts (Guerberof-Arenas and Toral, 2022). In literary genres of any kind, including science fiction, fantasy works, thrillers or romance, onomastic creation of new words is commonplace (cf. Szymy'slik, 2018; Noriega-Santiáñez and Corpas Pastor, 2023). Depending on the type of neologism, the literary translator is faced with a wide range of problems (e.g., different compositional structures, metonymy or shift of paradigm), which can be tackled with different syntactic, semantic, or 'continuist' strategies (Postolea, 2011). Nevertheless, literary translators do not seem to have much guidance or help at their disposal to carry out such a difficult and demanding task (Noriega-Santiáñez and Rodríguez Martínez, 2020; Noriega-Santiáñez and Corpas Pastor, 2023). Due to its idiomatic nature, along with the intralinguistic and extralinguistic factors at play (Burgués Estrada and Aguilar-Amat, 2019), it is crucial to identify reliable resources and tools for documentation that help address terminological, phraseological, and contextual aspects, as it is explored below.

The interweaving of different disciplines such as Corpus Linguistics (branch that studies data obtained from corpora), Natural Language Processing (NLP) (branch of Artificial Intelligence that helps machines to understand and process spoken and written human language) or Computational Linguistics (area of NLP that studies the development of linguistic applications using computational technologies) has had a significant impact on Translation and Interpreting studies (González Fernández, 2018; Corpas Pastor et al., 2021). Against this background, several ICT technologies can be found to assist translators, such as corpora, online glossaries, repertoires, encyclopaedias or databases, spell checkers, online monolingual or bilingual dictionaries, revision tools, parallel texts, or lexicons, among others (Merlo Vega, 2005; Biau Gil and Pym, 2006; Corpas Pastor, 2013; Surià López, 2014; Bowker and Corpas Pastor, 2022; Rothwell et al., 2023). These resources can be used to uncover relevant information about a particular author or the socio-cultural context of the (literary) text, and an infinite number of nuances with which give coherence to that text. Moreover, in the translation market, computer-assisted translation (CAT) tools, that rely significantly on translation memories and termbases, have become commonplace (Carl and Braun, 2018). In addition, machine translation (MT) systems have recently been added to CAT tools (Rothwell et al., 2023). In fact, MT systems have become very useful to automate translation tasks as well as to increase the speed and efficiency of the translator under certain circumstances (O'Brien, 2012). Their application to literary translation is a recent development. Nonetheless, some studies tentatively explore the use of MT systems for translating literary works (cf. Toral and Way, 2015; Webster et al. 2020; to name but a few).

Following the lead of pioneer studies that test MT in literary translation (Toral and Way, 2015; Moorkens et al., 2018; Matusov, 2019; Webster et al., 2020, among others), our study aims to compare the NMT versus human outputs when translating neologisms. To this aim, a corpus-based pilot study assesses the production of three NMT systems (Google Translate, DeepL and Phrase TM) with the responses of undergraduates from the Degree in Translation and Interpreting at the University of Malaga, Spain. Therefore, it tests the scope of some of the most relevant NMT systems used in the field (cf. Webster et al. 2020, Caro Quintana and Castilho, 2022, to name but a few) in comparison with the human factor (HT) in undergraduates with translation skills and a high language proficiency. Precisely, our pilot study compares and evaluates the creativity (in terms of novelty and acceptability, cf. Guerberof-Arenas and Toral, 2022) of five formal neologisms, i.e., neologism formed by composition whose lexical basis is related to known realities of the seasons of the year (namely, "winter"). The examples of neologisms are extracted from corpora of literary texts (American Google Books and British Google Books), following a rigorous selected criteria described in the Methodology section. Furthermore, an ad-hoc questionnaire is designed to investigate the technology adoption among undergraduates. Finally, the incorporation of these technologies in training is discussed.

The paper is organised as follows. Section 2 provides a brief discussion about the way MT systems are changing the paradigm of literary translation. Against this background, Section 3 introduces our pilot study, outlining its methodology and presenting the primary preliminary findings regarding the challenges in machine translation when dealing with neologisms. Finally, Section 4 provides the main conclusions and limitations of our study, as well as some further avenues of future research.

2. Related work on MT systems in literary translation

Technology has created a new vision in the market and the translator's praxis, and literary translators are not left out of this evolving panorama (Noriega-Santiáñez and Corpas Pastor, 2023). In fact, an increasing number of studies focuses on the possibilities offered by MT in the translation of literary works. Our study follows this trend, as it focusses on the performance of NMT systems for the translation of literary texts, in comparison with human translation.

NMT systems emerged in the 1980s and 1990s and its popular uptake from the mid-2010s onwards "started with the integration of neural language models into traditional statistical machine translation (SMT) system" (Koehn, 2017: 5). NMT systems such as Google Translate (formerly a SMT engine) and DeepL became popular worldwide in open access free online platforms, as their output was more refined and much more like a HT (Large, 2018). According to Toral and Way (2018: 2), these systems "can attain better translation quality than the dominant approach to date, namely phrase-based statistical MT". While MT is commonly linked to technical or scientific texts, its application has expanded in recent years to include literary translation (Toral et al., 2018; Webster et al., 2020; Guerberof Arenas and Toral, 2022). Given "the maturity of post-editing in

industry", as well as the new paradigm of NMT (Toral and Way, 2018: 2; Moorkens et al. 2018), the extent to which these tools help literary translators is increasingly being evaluated (Toral et al., 2018). This shift has prompted an exploration of various advantages, constrains, and ethical issues, some are mentioned below in relation to our pilot study.

In what follows, we provide a brief overview of relevant related work on MT comparing to HT, with special emphasis on creativity and educational dimension. First, some studies that primarily assess the performance of MT systems for literary texts will be mentioned. Voigt and Jurafsky (2012) used Chinese literary and non-literary texts to test the degree of referential cohesion between HT and Google Translate, concluding that the former SMT system was not able to fully emulate cohesion, probably due to the lack of literary data in its corpus. Toral and Way (2015) investigated the MT output of a French novel into English and Italian (revealing that closer languages are easier to post-edit) and proposed the idea of training a customised SMT system for a Spanish>Catalan literary translation. In another paper, Besacier and Schwartz (2015) studied the translation of an American essay from English into French by an MT system and then post-edited and proofread by non-professional translators. Both the postedited and proofreading version were evaluated by BLEU and then the MT+PE text by readers' feedback. Although readers generally found the MT+PE acceptable, several ethical reasons were raised (e.g., whether the author is willing to sacrifice the quality of the translations of their work for wider dissemination). In addition, Moorkens et al. (2018) called in the help of professional literary translators, the translation of a novel chapter (English>Catalan); one version was translated from scratch, the other two translations were post-edited using NMT and SMT engines. They concluded that participants preferred to translate from scratch because it was considered more creative than PE, even if it took longer. Furthermore, Matusov (2019) concluded that customizing NMT systems (in this case, with literary texts translated from English into Russian and German into English) significantly improved the quality of translation compared to general domain NMT systems. Finally, Webster et al. (2020) assessed the use of Google Translate and DeepL in translating classic English novels into Dutch. The study revealed that NMT output contained errors and tacked creativity. HT demonstrated richer style.

Precisely, the assessment of creativity with NMT is one of the cornerstones on our study. The main authors that explored this feature were Guerberof Arenas and Toral (2020, 2022), who measured levels of creativity based on the textual elements in literary works. In both studies, they analysed creativity in literary translation using MT, machine translation post-editing (MTPE) and HT. The results of both studies showed that the intervention of the literary translator is essential in the transfer of creativity. However, while the first study proved that there were creativity-related aspects in which HT and post-edited MT performed similarly, the second study suggested that post-edited MT might hampers creativity. In contrast, the MT output appeared currently unable to convey a creative solution.

Regarding the creation of pedagogical content to solve specific translatological problems, Yamada (2019) measured MT post-editing in a group of students, looking at the challenges they faced when doing NMT+PE and SMT+PE. He highlighted the need for translation training, as NMT's advanced capabilities make it more challenging to achieve professional PE quality. In addition, Hidalgo-Ternero and Corpas Pastor's study (2020) focussed on the development of heuristic competence when translating manipulated idioms by means of e-tools and resources. Their study reinforced the idea of integrating technologies into a translation module to help students deal with complex phraseological challenges. Moreover, Tian and Zhu (2020) aimed to optimise the literary translation student's application of IT technologies through a translation teaching and learning platform. They concluded that a computer-assisted pedagogical approach can help to enhance the competences of the literary translator in-training. Omar and Gomaa (2020) used PE to detect common literary translation errors in the English>Arabic language pair produced by MT systems to teach students how to solve them, thus reflecting on this pedagogical approach to improve the translator's skills. In more specific works on MT, Awadh and Khan (2020) undertook research to juxtapose student translations of neologisms (from English into Arabic) against MT, concluding that MT production did not reach the HT quality standards. Moreover, Sahin and Gürses (2021) asked translation students and professional translators to post-edit a classic English novel into Turkish and studied the adoption of e-tools for translation, which is in line with our study. Finally, Abdulaal (2022) makes a comparison between MT and HT (i.e., EFL learners). He evaluated their errors when translating a novel, concluding that students should be aware of MT limitations (e.g., errors related to polysemy or lexical ambiguities, among others).

What emerges from this body of work so far is that the comparison of HT against MT remains a popular subject of study, given the great complexity of literary texts. Moreover, the incorporation of technologies into the students' training is also observed.

Our study will explore whether the use of technologies, especially MT, is a conditioning factor for human translators and whether the NMT provides creative responses. To this end, a pilot study with student translators has been set up, as described in section 3.

3. Methodology

In what follows, we will deal with the methodological aspects of our study, namely data collection and selection of neologisms, NMT systems chosen for the experiments and subjects.

3.1. Corpora of literary texts

Given the complex nature of terminological variation and their degree of occurrence in literature, the neological challenge proposed in this pilot study was limited to formal neologisms (cf. Szymy'slik, 2018; Rodríguez Martínez, 2020; Ridruejo, 2020, to name but a few). In the first stage, we searched for formal neologisms in contexts within corpora of literary texts, i.e., American Google Books (155 billion words from American English

works) and British Google Books (34 billion words from British English works), spanning both from the 16th to the 21st century. From both corpora, we looked for examples only in contemporary works from 1951 to 2021, since we wanted to include from the most current indexed works (2021) up to 70 years ago. A specific search strings of the word "winter" as a lexical basis was employed, using the substring function (i.e., "*winter" and "winter*").

Therefore, the following neologism selection criteria was designed: 1) one of its constituents must be "winter" (as it is a very common unit and reality in many languages; hence it is prone to modification and widely appear in literature); 2) the second constituent must be a recognised word; that is, the type of formal neologism chosen must be formed by composition of two radicals; and 3) it must be a neologism according to the literary context of the work, i.e., the author consciously used it as a means to simulate the novelty of a neologism (following the lexical creation parameters by Díaz Hormigo, 2012), evoking a distinct atmosphere (medieval, children's, fantasy, etc.).

Among all the results obtained, we checked in some of the most prestigious online dictionaries (*Cambridge Dictionary*, *Merriam-Webster,* and *Collins Dictionary*) if the examples were indeed neologisms. Even if any appear, they do so with a different meaning or were neologisms in the process of becoming established. Thus, the selected neologisms were manually checked within the context of the literary work to ensure their literariness, i.e., that they are created or used for the specific purpose within the novel's setting. For this reason, the neologisms have been used in their context in both human and machine translation tests. Therefore, the particularity of doing this practice in literary translation is the need to contextualize the phraseological challenge within the setting of the work.

Once the neologisms that met the criteria mentioned above were chosen, a fact sheet with these five examples organised alphabetically was made, including the neologism in context, the novel's author, title, and year of publication (see Table 1, below).

1	**Neologism**	Neverwinter
	Context	Against all odds, Drizzt and Dahlia join forces in the aftermath of battle, united in their desire for vengeance against the sorceress who destroyed Neverwinter.
	Novel and author	*Neverwinter: The Legend of Drizzt* by R. A. Salvatore (2012)
2	**Neologism**	Winterland
	Context	He's in a hotel bar in the city center with an associate of his own, Paddy Norton, the Chairman of Winterland Properties.
	Novel and author	*Winterland: A Novel* by Alan Glynn (1960)

3	Neologism	Winterlock
	Context	Batuth, surrounded on two sides by the Wild and by the frozen wastes of Winterlock to the west, is all but a forsaken land.
	Novel and author	*Knightshade: Perdition Bleeds* by John Grover (2014)
4	Neologism	Wintersweet
	Context	Step into Wintersweet Wood to meet the friendly and playful otter, Komowa and his friends
	Novel and author	*The Otter of Wintersweet Wood* by Jeanine Pisani (2021)
5	Neologism	Wintertide
	Context	Then, at Wintertide, the Hill Raiders attack the village of Cirrus Cove.
	Novel and author	*Wintertide* by Linnea Sinclair (2016)

Table 1. Formal neologisms

The five literary examples chosen are found in three fantasy novels (neologisms 1, 3, and 5); one children's novel (4) and one mystery novel (2), respectively. In particular, neologisms 1, 2, and 4 are toponyms, neologism 2 is the name of a business company, and neologism 5 refers to a seasonal time.

3.2. Choice of NMT systems data

The second stage is the use of NMT systems (DeepL, Google Translate and Phrase TMS), to translate into Spanish these neologisms. Both the neologisms with and without context were tested. That is, first we assessed the translation of the neologism in isolation ("no context, NC"), and then the neologism in context ("in context, IC"), i.e., the complete sentence in which the neologism appeared has been introduced in the MT systems and used as context; however, the assessment focuses solely on the neologism. Then we evaluated the performance of these three NMT systems and we identified the most used techniques in the translation of these five formal neologisms, following the classification proposed by Hurtado Albir (2011). It encompasses techniques such as borrowing, literal translation, explanation, generalization, among others.

3.3. Human translation setup

In the third stage, the collection of HT data is explained, including the participants, the modules, the questionnaires, and the sessions involved.

A total of 54 students participated in our pilot study, who are enrolled in two different modules of the Degree in Translation and Interpreting at the University of Malaga, taught by the same teacher who kindly agreed to let us set up this study:

- Module 1: Traducción General "BA-AB" (II) Inglés-Español/Español-Inglés. This is a second-year subject and the second translation module in the degree (45 hours per semester). A total of 38 students participated, primary aged from 19 to 22, having English as a second language and Spanish as a first or third language. Most students are in their second year, with two in their third year and one in their first year. Only two of the students have professional translation experience (in a family-owned translation company).
- Module 2: Traducción General "CA-AC" (II) Inglés-Español/Español-Inglés. This is a third-year subject and the third translation module, but two of them were in the French-Spanish language pairs (45 hours per semester). A total of 16 students participated, ranging from 20 to 22 years old. They have English as a second or third language (the language used in this subject) and Spanish as a first or third language. All participants are third-year students. Only two of the students have professional translation experience (an internship in a translation agency and volunteering).

Each module has been divided into two groups:

- Group A: the students were asked to translate the neologisms specifically without using MT systems.
- Group B: the students were free to use any tool or resource of their choice.

Demography	Module 1		Module 2	
	Group A	Group B	Group A	Group B
Number of students	21	17	10	6
Age	19-29	19-23	20-25	20-22
Professional experience	1 student	1 student	2 students	None
Academic year	1st, 2nd & 3rd year students	2nd and 3rd year students	3rd year students	
Second language education	English		French	

Table 2. Demography of students per module and group

Data collection was carried out by means of two model questionnaires (Model 1, filled by Group A and Model 2, filled by Group B) designed in Google Forms, which are divided into three stages: 1) pre-translation questions, 2) neologism translation practice, and 3) post-translation questions. All the questionnaires have in common the pre-translation demographics-type questions, related to their academic year, level of proficiency in English, translation experience and the translation tools or resources they normally use. The neologism translation practice consisted of translating the five neologisms (see Table 1) into Spanish. The post-translation questions focused on translation time, encountered

difficulties, feasibility of neologism translation tools, and the tools and resources used, highlighting the adoption of technologies. The students from Group 2 are specifically inquired whether they had used any MT system.

The HT in this study has been compiled in a 90-minutes session for each module, following the structure and the scheduled time detailed below:

1. The students filled in the pre-translation questions (5 minutes).
2. The participants were given a training seminar entitled "Formal neologism: a whole new wor(l)d". The seminar focused on some theoretical and practical definitions of neology: the difference between "neology" and "neologism", the classification of neologisms both in English and Spanish, with special emphasis in formal neologisms, and some translation strategies (i.e., adaptation, borrowing, literal translation, etc.) into Spanish through examples in literary contexts (30 minutes).
3. The students filled in the neologism translation exercise and the post-translation questions (35-45 minutes).
4. They discussed their translations and shared some thoughts about the use of technologies and MT systems in literature (5-15 minutes).

In the fourth stage of this study, the data obtained from the four groups of students is compiled, compared, and evaluated.

4. Evaluation and results

In this section, the results obtained by the NMT systems and the undergraduates are evaluated in terms of creativity and linguistic and contextual adequacy. Additionally, a literal translation into English is included in square brackets to enhance the understanding of the Spanish MT and HT output.[1].

Through a quantitative approach, the performance of MT and HT is measured, as well as the adoption of technologies in the translation of formal neologisms.

4.1. Machine translation

The following tables show the first outputs of neologisms produced in-context (IC) and no-context (NC) by the NMT systems (DeepL, Google Translate and Phrase TMS). In some cases, there are more than one term produced, but only up to the second has been included.

[1]In those examples where it is unfeasible to provide a literal translation, the neologism is specified in the following ways: 1) [word1 + word2] when it is a neologism formed by the composition of two constituents; 2) [word'] when a neologism has been formed by the derivation or suffixation of a word; and 3) ["word"], when an English word has been used in the Spanish translation.

Neologism	DeepL	
	IC	NC
Neverwinter	Neverwinter Nunca Jamás [*Neverland/ Never Again*]	Neverwinter Nunca jamás [*Neverland/ Never Again*]
Winterland	Winterland	Winterland Winterland (País de invierno) [“*Winterland” (Winter country)*]
Winterlock	Winterlock Bloqueo Invernal [*Winter Blockade*]	Winterlock Winterlock (candado de invierno) [“Winterlock” (Winter lock)]
Wintersweet	Wintersweet Agridulce invierno [*Bittersweet winter*]	Agridulce invierno [*Bittersweet winter*] Dulce invierno [*Sweet winter*]
Wintertide	Wintertide Invierno [*winter*]	Wintertide Invernada [*Wintering*]

Table 3. Neologisms in DeepL

Neologism	Google Translate	
	IC	NC
Neverwinter	Neverwinter	Nunca invierno [Never winter] Nunca winter [*Never “winter”*]
Winterland	Winterland	Winterland
Winterlock	Winterlock	Bloqueo de invierno [*Winter blockade*] Bloqueo [*Blocking*]
Wintersweet	Wintersweet	Sweet de invierno [“*Sweet” of winter*] Invernal [*Winter/wintry*]
Wintertide	Wintertide	Invernal [*Winter/wintry*] Invernada [*Wintering*]

Table 4. Neologisms in Google Translate

Neologism	Phrase TMS

	IC	NC
Neverwinter	Neverwinter	Neverwinter
Winterland	Winterland	Winterland
Winterlock	Winterlock	Winterlock
Wintersweet	Wintersweet	Agridulce de invierno [*Bittersweet winter*]
Wintertide	Wintertide	Wintertide

Table 5. Neologisms in Phrase TMS

Tables 1-5 show that the performance of the three NMT systems is noticeably different. In general, these NMT systems provided more translation options when the neologism was isolated (without context), as is the case of DeepL and Google Translate. In addition, these NMT systems tent not to translate the neologism, since they did not interpret it as a new word requiring translation, either with or without context. DeepL and Google Translate produced a more varied output than Phrase TMS, although DeepL provided the most diverse translations by far.

DeepL tent to keep the neologism as a loanword. However, this NMT system's output also provided either a literal translation of both the base words that form the neologism (*Wintersweet* < *Dulce invierno* [*Sweet winter*] or *Winterlock* < *Bloqueo Invernal* [*Winter Blockade*]); or explanatory when the neologism appeared in isolation (*Winterland* < *Winterland (País de invierno)* [*"Winterland" (Winter country)*] or *Winterlock* < *Winterlock (candado de invierno)* [*"Winterlock" (winter lock)*]. Moreover, false senses have been identified in other examples such as (*Wintersweet* < *Agridulce de invierno* [mistaken by *bittersweet*] or *Neverwinter* < *Nunca jamás* [mistaken by *Neverland*]). However, among the three NMT systems, DeepL is the one that has best succeeded in translating neologisms. For instance, this is the case of *Wintersweet* < *Dulce invierno* [*Sweet winter*], which fits the children's context of the novel, or *Wintertide* < *invernada* [*wintering*], as it is a seasonal period.

By contrast, Google Translate did not translate any neologism in context. Instead, it seems to be more effective when the neologism was used without context. Nevertheless, its first output sometimes reflected a literal translation (*Neverwinter* < *Nunca invierno [Never winter]*) or a translation that mixed both English and Spanish (*Wintersweet* < *Sweet de invierno* ["*Sweet" of winter*] or *Neverwinter* < *Nunca winter* [*Never "winter"*]), resulting in a poor output. In other cases, the MT system simply translated the base meaning of the neologism as in *Winterlock* < *Bloqueo* [*Blocking*] or *Wintertide* < *invernal* [*winter/wintry*], the latter more successfully.

In Phrase TMS, there is little difference between using the neologism in context and without context, since only one of the neologisms has been translated into Spanish.

Therefore, it has been the most limited of the three tools, thus the least useful for this practice.

Although it cannot be drawn meaningful conclusions due to the limited number of neologisms, the table below summarises the translation techniques (following the classification by Hurtado Albir, 2011) used by the NMT systems in the proposed examples of this pilot study:

Technique	Frequency					
	DeepL		Google Translate		Phrase TMS	
	IC	NC	IC	NC	IC	NC
Borrowing	100%	80%	100%	20%	100%	80%
Literal translation	20%	20%	0%	40%	0%	0%
Explanation	0%	40%	0%	0%	0%	0%
Generalization	20%	20%	0%	60%	0%	0%
Others (mistranslations)	40%	20%	0%	40%	0%	20%

Table 6. Techniques for translating neologisms using MT systems

4.2. Human translation

This section entails the HT results, divided by Module (1 and 2) and by Group (A and B). The results on the adoption of technologies in the pre-translation (Table 7) and post-translation questions are addressed, as well as the neological translation performance in the sections below.

Tools and resources	Frequency	
	Module 1	Module 2
Paper dictionaries or encyclopaedias	13.1%	40%
Online dictionaries or encyclopaedias	89.5%	100%
Bilingual glossaries	55.2%	75%
Parallel texts	23.7%	62.5%
Computer-assisted translation tools (Trados Studio, MemoQ, Omega T, etc.)	18.4%	37.5%

Automatic translation tools (DeepL, Google Translate, Reverso Context, etc.)	84.2%	75%

Table 7. Adoption of technologies by Module 1 and Module 2

When the students from Module 1 were asked about the adequacy of available documentation sources for translating neologisms, 44.7% said no, whereas this figure increased to 68.7% in Module 2. 31% of the students from Module 1 said they did not know about it, compared to 25% from Module 2. Finally, only 23.7% of the students from Module 1 and 25% from Module 2 thought that there were sufficient resources. From these data, it can be deduced that students are not entirely satisfied with the tools at their disposal to tackle creative phraseological challenges (i.e., neologisms).

The detailed study and specific factors for each module are discussed below.

4.2.1. Module 1

This section entails the performance of both groups in Module 1 regarding to the translation of neologisms.

- **Group A**

A total of 21 students participated in group A, who were not allowed to use MT systems. In their pre-translation questions, 16 students have a B2 English level, 3 a C1 and 2 a C2. Concerning the translation practice, most of them spent between 10 and 30 minutes translating all the neologisms. Table 8 shows their results.

Neverwinter	Winterland	Winterlock	Wintersweet	Wintertide
El Valle del Viento Helado [*The Valley of the Icy Wind*]	Winterland	Inverfuerte [*Winter + fort*]	Dulce invierno [*Sweet winter*]	Blanca Estación [*White Season*]
El nunca invernal [*The never winter*]	Güinterland [“*Winter*” + *land*]	Mechones helados [*Icy tresses*]	Dulcinvierno [*Sweet + winter*]	Corrientehelada [*Frozen + tide*]
Eternoestío [*Forever + winter*]	Heladas [*Frosts*]	Cierregelido [*Lock + freezing*]	Dulce helado [*Sweet ice cream*]	Frioleaje [*Cold + swell*]
Friojamás [*Cold + never*]	Inverladia [*Winter + land*]	Invierlock [*Winter + “lock”*]	Dulce-neblina [*Sweet-misty*]	Invermar [*Winter + sea*]
Inviernojamás [*Winter + never*]	Inverlandia [*Winter + land*]	Llavescarcha [*Key + frost*]	Dulceinverno [*Sweet + winter*]	Invernatide [*Winter + “tide”*]

La ciudad que no conoce el invierno [*The city that knows no winter*]	Invernalia [*Winter + land/ Winterfell*]	Helada Prisión [*Freezing Prison*]	Dulces de invierno [*Winter sweets*]	Inverriente [*Winter + current*]
Nevergüinter [*Never + "winter"*]	Invernapolis [*Winter + polis*]	Invernion [*Winter*]	El dulce invierno [*The sweet winter*]	Invierne [*Winter + current*]
Neverwinter	País del invernio [*Land of the wintering]*	Bloqueo invernal [*Winter blockade*]	Encantoinvernal [*Winter + charm*]	Marea Gélida [*Freezing Tide*]
Nunca Helada [*Never Frozen*]	Terragélida [*Land + freezing*]	Cierre helado [*Icy closure*]	Glacidulce [*Glacial + sweet*]	Marea invernal [*Winter tide*]
Nunca invienro [*Never + winter*]	Tierra del frío [*Land of the cold*]	Cerrofrío [*Lock + cold*]	Inverdul [*Winter + sweet*]	Mareafría [*Tide + cold*]
Nuncahiela [*Never + freeze*]	Tierra invernal [*Winter land*]	Glacial Trabado [*Glacial Locked*]	Inverulce [*Winter + sweet*]	Mareagélida [*Tide + icy*]
Nuncainvierno [*Never + winter*]	Tierras invernales [*Winter grounds*]	Hirbiendad [*Winter + housing*]	Inviernilandia [*Winter + land*]	Mareas Frías [*Cold Tides*]
Nuncainvierna [*Never + winter*]	Villa Invernal [*Winter Village*]	Winterlock	Pequeños árboles de China [Small trees from China]	Marhelada [*Sea + freezing*]
Nuncaneva [*Never + snow*]	Villainvierno [*Village + winter*]	Presidio helado [*Frozen prison*]	Suavenieve [*Soft + snow*]	Olafría [*Wave + cold*]
Nuncaverno [*Never + winter*]	Winterland	Cierreinvierno [*Lock + winter*]	Wintersweet	Periodo invernal [*Winter period*]
Nunciver [*Never + winter*]	Güinterland ["*Winter" + land*]	Bloqueo Invernal [*Winter blockade*]	Dulce Invierno [*Winter Sweet*]	Wintertide
Siemprestío [*Forever + summer*]	Heladas [*Frosts*]	Cerranevada [*Lock + snowfall*]	Dulce Nevada [*Sweet Snowfall*]	Avalancha [*Avalanche*]

Sinfrío [*No + cold*]	Inverladia [*Winter + land*]	Cerro nevado [*Snowy mountain*]		periodo invernal *[winter period]*
Veralia [*Summer + land*]	Inverlandia [*Winter + land*]	Sueño invernal [*Winter sleep*], hibernación [*hibernation*]		

Table 8. Neologisms by Group A, Module 1

In the practice of neologisms, most of the students have produced unique solutions and there were very few repetitions of terms. 4.8% of the class, i.e., each student, provided a different proposal. Five proposals were given by 9.6% of the class, namely *Eternoestío* [*Forever + winter*], *Eternoestío* [*Forever + winter*], *Neverwinter*, *Invernalia* [*Winter + land/ Winterfell*], and *Winterlock*. Finally, three proposal were given by 14.4% of the class, specifically *Dulcinvierno* [*Sweet + winter*], *Marea invernal* [*Winter tide*] and *Villainvierno* [*Village + winter*].

As for the translation techniques used, most of the participants in this group chose to create some correspondence with another formal neologism by composition, which conveys the same meaning as the original one (*Dulcinvierno* [*Sweet + winter*], *Marhelada* [*Sea + freezing*] or *cierregelido* [*Lock + freezing*]). In other examples, they kept the neologism as a loanword or used a more descriptive technique (*La ciudad que no conoce el invierno* [*The city that knows no winter*] or *Periodo invernal* [*Winter period*]). Other students came up with neologisms by suffixation (*Invierne [Winter + current]*), while others went a step further by using their connotative meaning (*Glacidulce* [*Glacial + sweet*], *Eternoestío* [*Forever + winter*] or *Invernapolis* [*Winter + polis*]) and thus providing more creative formal neologisms. However, some had not taken the context into account (as in the case of *Winterland*, which should be kept as a loanword as it is the name of a company). Others adapted the neologism phonetically to Spanish (*Nevergüinter* [*Never + "winter"*] or *Güinterland* ["*Winter" + land*]), which ended up losing the meaning in the target language. Finally, some participants failed to address the neologism's meaning and focused on its denotative aspect, leading to a false meaning (*Pequeños árboles de China* [*Small trees from China*] or *avalanche* [*avalanche*]).

Concerning the tools and resources used in this practice, almost 40% of respondents specifically employed Wordreference, compared to almost 48% who said they worked with online monolingual dictionaries (most notably *Cambridge Dictionary* and *Collins Dictionary*) and thesaurus. Very few mentioned the Google's search engine (mostly using Wikipedia). As for the difficulties encountered in this practice, some students primarily highlighted the challenge of conveying the meaning of the neologism into Spanish and the complexity of neological creation. Others highlighted the lack of useful information from the available sources.

- Group B

Unlike Group A, this group was not restrained from using MT systems. Group B consisted of 17 students, of which 9 have a C1 English level, 5 a B2, 2 a C2, and 1 a B1. It took the students between 10 and 40 minutes to translate all the neologisms, and these are the results of their translation exercise:

Neverwinter	Winterland	Winterlock	Wintersweet	Wintertide
Nuncafría [*Never + cold*]	Inverdulia [*Winter*]	Cerraneva [*Lock + snowfall*]	Dulce hibernación [*Sweet hibernation*]	Iverno [*Winter*]
Sinverno [*No + winter*]	Inverlandia [*Winter + land*]	Continuo invierno [*Ongoing winter*]	Dulcerable [*Sweet*]	Inverno [*Winter*]
Sinvierno [*No + winter*]	Inverliandia [*Winter + land*]	Bloque invernal [*Winter block*]	Flor de invierno [*Winter flower*]	Marea invernal [*Winter tide*]
Infrainvierno [*Sub + winter*]	Invernalia [*Winter + land/ Winterfell*]	Cierrinvierno [*Lock + winter*]	Invierno dulce [*Sweet winter*]	Los invervales [*The winters*]
Neverwinter	Inviernolandia [*Winter + land*]	Winterlock	Madreselva [*Honeysuckle*]	Wintertide
Nuncainvierno [*Never + winter*]	La tierra de invierno [*The land of winter*]	Invernalado [*Winter + frozen*]	Suaveinvierno [*Soft + winter*]	Marea del invierno [*Winter tide*]
Invierno de Nunca Jamás [*Winter of Never Ever*]	La tierra invernal [*The winter land*]	La Cerradura del Inverno [*The Winter Lock*]	Dulce de invierno [*Winter sweet*]	Periodo invernal [*Winter period*]
El inviable invierno [*The unfeasible winter*]	Tierra del Invierno [*Land of Winter*]	Inverlock [*Winter + "lock"*]	Calicanto [*Shut tight*]	época invernal [*winter season*]
El invierno del nunca jamás [*The winter of never ever*]	Tierra helada [*Frozen ground*]	Inverna [*Winter*]	Dulce invierno [*Sweet winter*]	Marea invernal [*Winter tide*]

Invierno Jamás [*Winter Never*]	Winterland	Invernalia [*Winter + land/ Winterfell*]	Dulcinvierno [*Sweet + winter*]	Ola Invernal [*Winter wave*]
	Winterlandia [*Winter + land*]	Invernamente [*Winterly*]	Florinvierno [*Flower + winter*]	llegada del invierno [*arrival of winter*]
		La cerradura inviernal [*The winter lock*]	Macasar	Era inviernal [*Winter era*]
		Canal de invierno [*Winter channel*]	Magnolia [*Magnolia*]	Invernada [*Wintering*]
		Inverloga [*Winter*]	Wintersweet	Mareafría [*Tide + cold*]
		Frioscuro [*Cold + dark*]		La marea de los inviernos [*The tide of winters*]

Table 9. Neologisms by Group B, Module 1

In group B, most neologisms have been proposed by 6.3% of the class, i.e., one per student. 3 proposals have been provided by 9.6% of the class (i.e., *Flor de invierno* [*Winter flower*], Madreselva [*Honeysuckle*], and *Marea invernal* [*Winter tide*]). Finally, a proposal was made by 18.8% of the class (*Nuncainvierno* [*Never + winter*] and another by 31.3% (*Neverwinter*). It has been observed creative output. For instance, translation by composition on the lexical was frequent (*Invernalado* [*Winter + frozen*], *Cierrinvierno* [*Lock + winter*]), as well as some terms that came up by using the meaning of the semantic field from the lexical base (*Sinvierno* [*No + winter*], *Dulcerable* [*Sweet*]). Some HT output was created by suffixing the word "inver" (*invernalia* [*winter + land/ winterfell*], *inverna* [*winter*]), which conveys the concept of "winter" and "land" in the target language. In addition, the meaning of some neologisms did not correspond to that English (*Madreselva* [*Honeysuckle*], *Magnolia* [*Magnolia*]), while others did not fit the context of the original neologism (*Marea del invierno* [*Winter tide*], *Marea invernal* [*Winter tide*]). Finally, there were some literal translations (*El invierno del nunca jamás* [*The winter of never ever*], probably mistaken by the word *Neverland*).

Regarding the tools and resources used, 52.9% mentioned Wordreference and MT systems (in which DeepL and Google Translate stand out, although Reverso is also mentioned), compared to 41.2% who have used the Google's search engine (i.e., Google Photos, etymology pages or wiki fandoms). As for the difficulties encountered, some

students had problems to transfer the creative and contextual meaning of the neologism, as well as others regarding the limited time available to do this practice. Finally, other participants did not know the target language well enough.

4.2.2. Module 2

This section entails the performance of both groups in Module 2 regarding to the translation of neologisms.

- **Group A**

Group A encompassed 10 students, 5 have a B2 English level, 3 a B1, 1 a C1 and 1 a C2. The participants took an average of 15-30 minutes to complete the practice.

Neverwinter	Winterland	Winterlock	Wintersweet	Wintertide
Esternoestío [*Always + summer*]	Tierra de nieve [*Land of snow*]	Winterlock	Wintersweet	Wintertide
Hiberno [*Winter + no*]	Tierrinvierno [*Land + winter*]	Candelado [*Lock + frozen*]	Dulcinvierno [*Sweet + winter*]	Mareínvierno [*Tide + winter*]
Inviernunca [W*inter + never*]	Terrenieve [*Land + snow*]	Cerrainvierno [*Lock + frozen*]	Dulcinver [*Sweet + winter*]	Marglas [*Tide*]
La tierra helada [*The frozen ground*]	Tierra Invernal [Winter *Land*]	Cielo helado [*Freezing sky*]	Macasar	Marea de Invienro [*Winter' Tide*]
Neverwinter	Tierra de invierno [*Land of winter*]	Incierno [*Winter + lock*]	Dulce invernal [*Winter sweet*]	Marea de invierno [*Winter tide*]
Nuncanieva [*Never + snowy*]	Winterland	Invierno final [*Final winter*]	Chimonanthus praecox	Marea helada [*Freezing tide*]
Sininvierno [*No + winter*]	Hiberlandia [*Winter + land*]	Cierre congelado [*Freezed closing*]	Flores de invierno [*Winter flowers*]	Invierno [*Winter*]
Tierra sin invierno [*Land without winter*]			Dulce invierno *[Sweet winter]*	Gélida marea [*Icy tide*]
			Inversulce [*Winter + sweet*]	Mar Helado [*Icy Sea*]

			Flores Wintersweet [*Wintersweet Flowers*]	

Table 10. Neologisms by Group A, Module 2

In group A, there is a variety of translations, as most of the neologisms have been provided by 10% of the class, i.e., one per student. Only one proposal was made by 20% of the class (*Wintertide*), two by 30% (*Neverwinter* and *Winterland*), and finally one by 40% (*Winterlock*). Thus, the participants tent to keep the neologism as a loanword, sometimes more successfully (*Winterland*) than others (*Wintersweet*). The main technique they used was composition (*Dulcinver* [*Sweet + winter*], *Cerrainvierno* [*Lock + frozen*]). In other examples, the students came up with some very original formal neologisms, as they relied on the connotative meaning of the lexical basis of the neologism itself (*Sininvierno* [*No + winter*], *Candelado* [*Lock + frozen*], *Hiberlandia* [*Winter + land*]). However, some neologisms made by composition were not understood in the target language (*Macasar*, *Marglas* [*Tide*]). There were also several false meanings, such as the case of using the lexical base "tide" of *Wintertide* as "marea [*tide*]" (*Mar Helado* [*Icy Sea*], *Marea de invierno* [*Winter tide*]), when in this context *tide* is an archaic word referring to a specified time or season. Finally, some students focused on the denotative meaning (*Chimonanthus praecox*, *Cierre congelado* [*Freezed closing*]), so that the author's intention is lost.

The participants could use any resource or tool except MT systems during this practice. Most of them highlighted the use of the Google's search engine (60%), especially for contextual searches of the novels; also, electronic dictionaries such as the *Cambridge Dictionary* (40%) or Wordreference (30%); finally, parallel texts (10%) and other sources (20%) such as blogs or Pinterest are mentioned. The greatest difficulties highlighted by the participants were the creative skills and the ability to adapt the neologism and all its nuances to the target language.

- Group B

There were 6 students in this group, 5 of whom have a B2 level of English and 1 a B1. The practice of translating these neologisms took them an average of 20 to 40 minutes, the results of which are as follows:

Neverwinter	Winterland	Winterlock	Wintersweet	Wintertide
Hiverunca [*Winter + never*]	Winterland	Puertafría [*Door + cold*]	Skade	Marea Gélida [*Freezing Tide*]
Noyvern [*No + winter*]	Tirrerno [*Land + winter*]	Frialandia [*Cold + land*]	Dulcinvierno [*Sweet + winter*]	Invernola [*Winter + wave*]

Nuncanieva [*Never + snow*]	Tierra impasible [*Impassive land*]	Froslandia [*Cold + land*]	Dulcierno [*Sweet + winter*]	Wintertide
Tierras cálidas [*Warm lands*]	Iverlandia [*Winter + land*]	Cerca Invernal [*Winter Fence*]	Caramelicioso [*Sweet + delicious*]	Invernaria [*Winter*]
		Parafrío [*Stop + cold*]	Dulceinvierno [*Sweet + winter*]	Mareainvernal [*Tide + winter*]
		Cámara helada [*Freezing chamber*]	Flores de invierno [*Winter flowers*]	A la caída del invierno [*At the fall of winter*]

Table 11. Neologisms by Group B, Module 2

In group B, most of the proposals have been made by 16.7% of the class, i.e., one per student. Only two proposals were made by 33.4% of the class (*Winterland* and *Iverlandia* [*Winter + land*]) and one by 50% (*Noyvern* [*No + winter*]. Therefore, a contrary tendency to keep the neologism as a loanword is observed. The students preferred to use techniques such as composition by combining the two lexical bases of the original neologism (*Dulcierno* [*Sweet + winter*]), but they also have some rather elaborated creations which have focused on both the denotative and connotative meaning of the source neologism (*Hivernunca* [*Winter + never*], *Nuncanieva* [*Never + snow*] or *Parafrío* [*Stop + cold*]), leading to a successful translation. Other neologisms were more descriptive (*A la caída del invierno* [*At the fall of winter*] or *Flores de invierno* [*Winter flowers*]). There were also false meanings, for instance, *Wintertide* (*Marea Gélida* [*Freezing Tide*] or *Mareainvernal* [*Tide + winter*]), or certain neologisms whose spelling differs from the lexical combinations of the target language (*Skade* or *Noyvern* [*No + winter*]).

Participants were free to use any resource during this practice. 50% used MT systems (especially DeepL and Reverso); however, what really stood out were Google searches (50%). To a lesser extent, thesaurus, parallel texts, and other sources such as e-books or Amazon (16.7% each) were mentioned. As for the difficulties encountered during this practice, the students highlighted the creative component needed to transfer the neologism, as well as the context or the search for synonyms.

5. Discussion

The quality of the results of the neological creation made by a human is not comparable to that of the MT systems, as pointed out Awadh and Khan (2020) and Sahin and Gürses (2021). Indeed, they concluded that students provided better but not entirely accurate translations. In our study, the NMT output show lower lexical richness than students' translations, which is in line with some findings from Webster et al. (2020).

Regarding creativity, the students produced translations that exhibit higher levels of originality, as some studies pointed out (Guerberof Arenal and Toral, 2020; 2022). However, some students relied on MT, indicating a growing use of these systems even in creativity-related challenges. Our findings show that DeepL is also the NMT system preferred by most students. Furthermore, DeepL stands as the most useful system in terms of level of lexical accuracy, far ahead of Phrase TMS. This contradicts the outcomes of Webster et al. (2020), who proved that Google Translate makes less accuracy, but more fluency errors in literary text compared to DeepL.

In terms of productivity, there does not seen to be a significant difference between those students who have used MT and those who have not. In fact, those groups who could use MT have taken a little longer to do the practice, even though some studies pointed to a higher productivity with MT systems (cf. Moorkens et al., 2018; Toral et al., 2018). The time it took them to complete the exercise also varies between modules, which can be due to different levels of language proficiency and practice: Module A students have more experience translating from English into Spanish than those of Module B, and they also have a better English proficiency.

Concerning technology adoption, the most used tools and resources in both modules were the Google's search engine, online dictionaries (monolingual and bilingual dictionaries, and thesaurus), MT systems, and, particularly, Wordreference (as it is a multifunctional tool that provides the definition of the term, its synonyms, and/or its translation into different languages). No student used paper-based tools or resources during the practice, and only very few stated that they did not use any technology. It can be argued that translation students have deeply integrated technological tools into their workflow, even to address literary challenges, which is in line with the findings of Sahin and Gürses (2021). However, there is a general feeling that there are not many specific sources of documentation on translating (formal) neologisms, as some studies highlighted (Noriega-Santiáñez and Rodríguez Martínez, 2020; Noriega-Santiáñez and Corpas Pastor, 2023). This need explains the relevance of teaching undergraduates MT and other e-tools (such as corpora, online platforms, CAT tools or softwares) to translate literature, which follows the outcomes of several studies (cf. Zanettin, 2017; Dimitroulia and Goutsos, 2017; Tian and Zhu, 2020; Youdale and Rothwell, 2022; to name but a few). Thus, this practice can be used to reflect on the incorporation of these technologies into the student's curricula, so they can learn about their limitations in practice, for instance, when dealing with complex phraseological challenges (e.g., formal neologisms). This is in consistency with the results of previous studies (cf. Hidalgo Ternero and Corpas Pastor, 2020; Abdulaal, 2022).

In addition, there are some ethical issues to consider that other studies have also brought up. For example, the extent to which it is good for literary translation students to use MT that may constrain their creative voice in the text (cf. Kenny and Winters, 2020; Matusov, 2019; Guerberof Arenas and Toral, 2022). In fact, it might have had a negative impact on the student's translation in some of our study's groups. As Taivalkoski-Shilov (2019) pointed out, the MT is often not able to render all the stylistic features

and meaning of the source text. Perhaps this would make translations less original and of poorer quality, as the translator's voice is further limited in post-edited works, as highlighted by Kenny and Winters (2020). Therefore, undergraduates would not make the effort to come up with new terms.

Finally, the limitations of our pilot study relate to the low number of participants (although students who have English as their second and third language of study have been also included), and the number of formal neologisms, which is also rather low (due to the intricate nature of conducting research of translating new words in a time-limited seminar).

6. Conclusions

To the best of our knowledge, this is one of the few studies that compares the quality between MT and HT of formal neologisms extracted from literary works in the English>Spanish language pair. The outcomes reinforce the idea that MT performance is not yet up to solve all complexities presented by formal neologisms in literary works (from their connotative and denotative meaning in context to their adaptation to the target language). When the role of creativity comes into play, MT systems are still unable to convey all these features, precisely because of all the intricate aspects involved in the creation of new terms (e.g., linguistic, denotative and/or referential meaning, to name but a few). However, students continue to use them as a source of reference or inspiration, but traditional technological resources (as electronic thesaurus or dictionaries) are still the most employed. The emergence of technologies in the classroom is an inherent reality for students and it significantly affects their translations. Thus, many students rely heavily on electronic resources, even for phraseological challenges that require creativity skills. However, some of our main contributions point to the advantages (effective terminology and contextual queries) and limitations (lack of results, literal, or inadequate translations) of technologies to overcome the challenges posed by formal neologisms in literary translation. Hence this contribution reinforces the need to effectively teach the use of these technologies to literary translation students.

Following our promising preliminary results, we plan to expand our pilot study in various ways: by adding another pair of languages, increasing the number of students, and incorporating other groups of subjects, such semi-professionals (i.e., 4th year or MA students) and professional translators. We also intend to refine our methodology and triangulate results by using evaluation metrics and human annotators to assess aspects such as readability, naturalness, and creativity. Thus, our future research will follow the path of studies that address emerging topics such as MT performance in pedagogical context within different literary genres. Particularly, this research might delve into the potential uses of these tools when dealing with complex phraseological challenges. In addition, this study might explore the integration of MT into the literary translator's workflow as an aid, but never to replace human translators.

Acknowledgements

This work has been carried out in the framework of various research projects on language technologies applied to translation and interpretation: VIP II (PID2020-112818GB-I00), Proof-of-concept VIP (PDC2021-121220-I00) and RECOVER (ProyExcel_00540).

Bibliography

Abdulaal, Mohammad Awad Al-Dawoody (2022). Tracing machine and human translation errors in some literary texts with some implications for EFL translators. *Journal of Language and Linguistic Studies*, v. 18. <https://www.jlls.org/index.php/jlls/article/view/3073/1000>. [Accessed: 20231211].

Awadh, Awadh Nasser Munassar; Shafiull, Khan Ansarullah (2020). Challenges of translating neologisms comparative study: Human and machine translation. *Journal of Language and Linguistic Studies*, v. 16, n. 4. <https://doi.org/10.17263/jlls.851030>. [Accessed: 20231211].

Besacier, Laurence; Schwartz, Lane (2015). Automated translation of a literary work: a pilot study. In: Anna Feldman; Anna Kazantseva; Stan Szpakowicz; Corina Koolen (eds.). *Proceedings of NAACL-HLT Fourth Workshop on Computational Linguistics for Literature.* Denver: Association for Computational Linguistics, pp. 114-122. <https://aclanthology.org/W15-0713.pdf>. [Accessed: 20231211].

Biau Gil, José Ramón; Pym, Anthony. (2006). Technology and translation: a pedagogical overview. In: Anthony Pym, Alexander Perekrestenko; Bram Starink. (eds.), *Translation Technology and its Teaching*, Tarragona: Universitat Rovira i Virgili. <https://www.intercultural.urv.cat/media/upload/domain_317/arxius/Technology/BiauPym_Technology.pdf>. [Accessed: 20231211].

Boase-Beier, Jean; Fisher, Lina; Furukawa, Hiroko (2018). *The Palgrave Handbook of Literary Translation*. Cham: Palgrave Macmillan. <https://doi.org/10.1007/978-3-319-75753-7>. [Accessed: 20231211].

Bowker, Lynne; Corpas Pastor, Gloria (2022). Translation Technology. In: Ruslan Mitkov (ed.). *The Oxford Handbook of Computational Linguistics.* 2nd ed. Oxford: Oxford University Press.

Burgués Estrada, Sofía.; Aguilar-Amat, Anna. (2019). Las colocaciones neológicas y su traducción humana y automática. *Revista Digital Internacional de Lexicología, Lexicografía y Terminología, ReDILLet,* n. 2, pp. 88-103. <https://revistas.unc.edu.ar/index.php/ReDILLeT/issue/view/2023>. [Accessed: 20231211].

Cabré Castellví, Maria Teresa (2006). La clasificación de neologismos: una tarea compleja. *Alfa: Revista de Linguística*, v. 50, n. 2, pp. 229-250. <https://periodicos.fclar.unesp.br/alfa/issue/view/311>. [Accessed: 20231211].

Cabré Castellví, Maria Teresa.; Estopà Bagot, Rosa; Vargas Sierra, Chelo (2012). Neology in specialized communication. *Terminology: International Journal of Theoretical and Applied Issues in Specialized Communication,* v. 18, n. 1, pp. 1-8. <https://personal.ua.es/chelo-vargas/documentos/gestadm/neology-in-specialized-communication.pdf>. [Accessed: 20231211].

Cambridge Dictionary (2023). Cambridge: Cambridge University Press. <https://dictionary.cambridge.org/>. [Accessed: 20231211].

Carl, Michael; Braun, Sabine (2018). Translation, interpreting and new technologies. In: Kirsten Malmkjaer. (ed.), *Routledge Handbook of Translation Studies and Linguistics*, Brixham: Routledge.

Caro Quintana, Rocío.; Castilho, Sheila (2022). A review of the Integration of Machine Translation in CAT tools. In: Sheila Castilho; Rocío Caro Quintana; Maria Stasimioti; Vilelmini Sosoni, (eds.), *Proceedings of the International Conference New Trends in Translation and Technology NeTTT 2022, 4-6 July, 2022*, *Rhodes Island,* Greece. Bulgaria: Incoma Shoumen, pp. 214-221. <https://acl-bg.org/proceedings/2022/NeTTT%202022/NeTTT-2022-Final-Proceedings.pdf>. [Accessed: 20231211].

Collins Online Dictionary: Definitions, Thesaurus and Traslation (2023). Collins. <https://www.collinsdictionary.com>. [Accessed: 20231211].

Corpas Pastor, G.loria (2013). Detección, descripción y contraste de las unidades fraseológicas mediante tecnologías lingüísticas. In: Inés Olza Manero Richard (eds.), *Fraseopragmática.* Berlin: Frank & Timme. <https://doi.org/10.13140/RG.2.1.2155.9122>. [Accessed: 20231211].

Corpas Pastor, Gloria; Bautista Zambrana, María Rosario; Hidalgo-Ternero, Carlos Manuel (eds.) (2021). *Sistemas fraseológicos en contraste: Enfoques computacionales y de corpus*. Granada: Comares.

Díaz Hormigo, María Tadea; Vega Moreno, Érika (2018). Algunas de las aplicabilidades actuales de las investigaciones en neología y sobre los neologismos. *Pragmalingüística*, n. 26, pp. 54-68. <https://doi.org/10.25267/Pragmalinguistica.2018.i26|> [Accessed: 20231211].

Díaz Hormigo, María Tadea (2012). Lexical Creation and Euphemism: Regarding the Distinction Denominative or Referential Neology vs. Stylistic or Expressive Neology. *Lexis:Journal in English Lexicology*, n. 7. <https://doi.org/10.4000/lexis.371>. [Accessed: 20231211].

Dimitroulia, Titika.; Goutsos, Dionysis (2017). Corpora and Literary Translation. *InTRAlinea: online translation journal (Special Issue: Corpora and Literary Translation).* <https://www.intralinea.org/specials/article/corpora_and_literary_translation_intro>. [Accessed: 20231211].

Drugan, Joanna; Moorkens, Joss; Fernández-Parra, María Fernández-Parra; Austermuehl, Frank (2023). *Translation Tools and Technologies*. 1st ed. Abingdon, Oxon [etc.]: Routledge.

Estornell Pons, María (2009). *El reconocimiento de neologismos y su caracterización en un corpus de prensa escrita: 2004-2007*. [Tesis doctoral]. Universitat de València. <https://www.tdx.cat/handle/10803/9827;jsessionid=1DB9225C7A72BC61E29D1F3144B77257#page=1>. [Accessed: 20231211].

García Álvarez, Ana María (2018). Reflexiones sobre la creatividad en la enseñanza de la traducción literaria. In: Carlos Fortea (coord.). *El viaje de la literatura: aportaciones a una didáctica de la traducción literaria*, Madrid: Cátedra.

González Fernández, Adela (2018). Aproximación a la Lingüística Computacional y sus herramientas para el trabajo con corpus. *Futhar: revista de investigación y cultura*, n. 13, pp. 37-52. <https://dx.doi.org.10.12795/futhark.2018.i13.02.>. [Accessed: 20231211].

Guerberof-Arenas, Ana; Toral, Antonio (2020). The Impact of Post-editing and Machine Translation on Creativity and Reading Experience. *Translation Spaces*, v. 9, n. 2 (December), pp. 255-282. <https://doi.org/10.1075/ts.20035.gue>. [Accessed: 20231211].

Guerberof-Arenas, Ana; Toral, Antonio (2022). Creativity in translation: Machine translation as a constraint for literary texts. *Translation Spaces*, v. 11, n. 2 (November), pp. 184-212. <https://doi.org/10.1075/ts.21025.gue>. [Accessed: 20231211].

Hidalgo-Ternero, Carlos Manuel; Corpas Pastor, Gloria (2020). E Estrategias heurísticas con corpus para la enseñanza de la fraseología orientada a la traducción In: Seghiri, Miriam (ed.) *La lingüística de corpus aplicada al desarrollo de la competencia tecnológica en los estudios de traducción e interpretación y la enseñanza de segundas lenguas.* Berlin [etc.]: Peter Lang, pp. 183-206.

Hurtado Albir, Amparo (2011). *Traducción y traductología: introducción a la traductología*. 5.ª ed. rev. Madrid: Cátedra.

Kenny, Dorothy; Winters, Marion (2020). Machine translation, ethics and the literary translator's voice. *Translation Spaces*, v. 9, n. 1 (August), pp. 123-149. <https://doi.org/10.1075/ts.00024.ken>. [Accessed: 20231211].

Koehn, Philipp (2017). Neural Machine Translation. In: Koehn, Philipp (ed.). *Statistical Machine Translation.* Baltimore: Johns Hopkins University, pp. 5-111. <https://doi.org/10.48550/arXiv.1709.07809>. [Accessed: 20231211].

Kruger, Alet.; Wallmach, Kim; Munday, Jeremy (2011). *Corpus-based translation studies: Research and applications*. London [etc.]: Continuum. (Continuum advances in translation studies).

Large, Duncan (2018). Could Google Translate Shakespeare? *In Other Words,* n. 52, pp. 79-98.

López Pereira, Ariana (2019). Traducción automática neuronal y traducción automática estadística: percepción y productividad, *Revista Tradumàtica: tecnologies de la traducció,* n. 17. <https://revistes.uab.cat/tradumatica/article/view/n17-lopez-pereira/pdf_65>. [Accessed: 20231211].

Marco de Referencia PETRA-E para la Educación y la Formación de Traductores Literarios. Petra E-Network. <https://petra-educationframework.eu/es/>. [Accessed: 20231211].

Martínez de Sousa, José (2015). *Manual de estilo de la lengua española.* 5.ª ed. Gijón: Trea. (Biblioteconomía y Administración Cultural; 38).

Matusov, Evgeny (2019). The Challenges of Using Neural Machine Translation for Literature. In: James Hadley; Maja Popovic; Afli Haithem; Andy Way (eds.). *Proceedings of the Qualities of Literary Machine Translation: 19 August 2019,* Dublin, Ireland. European Association for Machine Translation, pp. 10-19. <https://aclanthology.org/W19-7302.pdf>. [Accessed: 20231211].

Merlo Vega, José Antonio (2005). Uso de la documentación en el proceso de la traducción literaria. In: Rosario Consuelo Gonzalo García; Valentín García Yebra (eds.). *Manual de documentación para la traducción literaria.* Madrid: Arco Libros. (Instrumenta bibliológica), pp. 181-200.

Merriam-Webster: America's Most Trusted Dictionary. Springfield: Merriam-Webster. <https://www.merriam-webster.com/>. [Accessed: 20231211].

Moorkens, Joss; Toral, Antonio; Castilho, Sheila; Way, Andy (2018). 'Translators' Perceptions of Literary Post Editing using Statistical and Neural Machine Translation *Translation Spaces*, v. 7, n. 2 (November), pp. 240-262. <https://doi.org/10.1075/ts.18014.moo>. [Accessed: 20231211].

Noriega-Santiáñez, Laura; Corpas Pastor, Gloria (2023). La traducción del género fantástico mediante corpus y otros recursos tecnológicos: a propósito de 'The City of Brass'. *Moenia: revista lucence de lingüística & Literatura,* v. 29, pp. 1-30. <https://doi.org/10.15304/moenia.id8491>. [Accessed: 20231211].

Noriega-Santiáñez, Laura; Rodríguez Martínez, M. C. (2020). La identificación de elementos imaginarios en la traducción de literatura fantástica mediante corpus. In: Giovanni Caprara; Victoria García-Alarcón (dir.). *Estudios interdisciplinares en traducción literaria y literatura comparada,* Granada: Comares, pp. 169-180.

O'Brien, Sharon (2012). Translation as Human-Computer Interaction. *Translation Spaces: A multidisciplinary, multimedia and multilingual journal,* v. 1, n. 1 (January), pp. 101-122. <https://doi.org/10.1075/ts.1.05obr>. [Accessed: 20231211].

Omar, Abdulfattah; Gomaa, Yaseer A, (2020). The Machine Translation of Literature: Implications for Translation Pedagogy. *iJet: International Journal of Emerging*

Technologies in Learning, v. 15, n. 11, pp. 228-235. <https://doi.org/10.3991/ijet.v15i11.13275>. [Accessed: 20231211].

Pegenaute, Luis (2016). Aproximaciones teóricas a la traducción literaria contemporánea. In: Iolanda Galanes Santos;Ana Luna Alonso; Silvia Montero Küpper; Aurea Fernández Rodriguez (eds.). *La traducción literaria: nuevas investigaciones*, Granada: Comares, pp. 5-29.

Postolea, Sorina (2011). New Trends and Concepts in the Study of Neology in Specialized Translation. In: Anuarul Universităţii Petre Andrei din Iasi = *Yearbook Petre Andrei University from Iasi, Fascicula: Drept, Ştiinţe Economice, Ştiinţe Politice,* v. 8, n. 1, pp. 529-538.

Ridruejo, Emilio (2020). Los neologismos jocosos de la literatura barroca a la luz de la semántica cognitiva. *Tropelías: revista de teoría de la literatura y literatura comparada*, n. 7, pp. 1162-1175. <https://doi.org/10.26754/ojs_tropelias/tropelias.202074688>. [Accessed: 20231211].

Rodríguez Martínez, Manuel Cristóbal; Ortega Arjonilla, Emilio (2016). Traducción y adaptación de referentes culturales en la literatura de género fantástico del francés hacia el español. *Entreculturas: revista de traducción y comunicación intercultural*, Segunda época, n. 9 (Febrero), pp. 155-166. <https://doi.org/10.24310/Entreculturasertci.vi9.11261>. [Accessed: 20231211].

Rodríguez Martínez, Manuel Cristóbal (2020). La variación fraseológica intencional como recurso estilístico para la traducción de la ciencia ficción. *Çédille: revista de estudios franceses,* n. 18 (Otoño), pp. 649-664. <https://doi.org/10.25145/j.cedille.2020.18.26>. [Accessed: 20231211].

Şahin, Mehmet.; Gürses, Sabri (2021). English-Turkish Literary Translation Through Human Machine Interaction. *Revista Tradumàtica: tecnolgies de la traducció,* n. 19, pp. 171-203. <https://doi.org/10.5565/rev/tradumatica.284>. [Accessed: 20231211].

Surià López, Scheherezade (2014). La caja de herramientas del traductor: recursos lexicográficos. *En la luna de Babel: blog sobre lenguas y traducción,* (22, miércoles, Oct. 2014). <https://enlalunadebabel.com/2014/10/22/la-caja-de-herramientas-del-traductor-i-recursos-lexicograficos/>. [Accessed: 20231211].

Szymyslik, Robert (2018). Estudio de la traducción de neologismos relacionados con la medicina en la literatura de ciencia ficción. *Panace@: revista de medicina, lenguaje y traducción*, v. 19, n. 47, pp. 89-95. <https://www.tremedica.org/wp-content/uploads/n47-tribuna-3.pdf>. [Accessed: 20231211].

Taivalkoski-Shilov, Kristiina (2019). Ethical issues regarding machine(-assisted) translation of literary texts. *Perspectives: Studies in Translation Theory and Practice,* v. 27, n. 5, pp. 689-703. <https://doi.org/10.1080/0907676X.2018.1520907>. [Accessed: 20231211].

Tian, Lu; Zhu, Chunshen (2020). Making Connections Through Knowledge Nodes in Translator Training: On a Computer-Assisted Pedagogical Approach to Literary Translation. *The International Journal of Translation, Interpretation and Applied Linguistics,* v. 2, n. 2, 15 pp. 15-29. <https://doi.org/10.4018/IJTIAL.20200701.oa2>. [Accessed: 20231211].

Toral, Antonio; Way, Andy (2015). Machine-Assisted Translation of Literary Text: A Case Study. *Translation Spaces,* v. 4, n 2, pp. 240-267. <https://doi.org/10.1075/ts.4.2.04tor>. [Accessed: 20231211].

Toral, Antonio; Way, Andy (2018). What level of quality can neural machine translation attain on literary text? In: Joos Moorkens; Sheila Castilho; Federico Gaspari; Stephen Doherty (eds.). *Translation Quality Assessment: From Principles to Practice.* 1st ed. Cham: Springer. (MATRA; 1), pp. 263-287.

Toral, Antonio; Wieling, Martijn; Way, Andy (2018). Post-editing Effort of a Novel With Statistical and Neural Machine Translation. *Frontiers in Digital Humanities*, v. 5, pp. 1-11. <https://doi.org/10.3389/fdigh.2018.00009>. [Accessed: 20231211].

Voigt, Rob; Jurafsky, Dan (2012). Towards a Literary Machine Translation: The Role of Referential Cohesion. In: David Elson; Ana Kazantseva; Rada Mihalceda; Stan Szpakowicz (eds.). *Proceedings of the NAACL-HLT 2012 Workshop on Computational Linguistics for Literature: June 2012,* Montréal, Canada. Association for Computational Linguistics. Association for Computational Linguistics, pp. 18-25. <https://aclanthology.org/W12-2503>.Accessed: 20231211].

Webster, Rebeca; Fonteyne, Margot; Tezcan, Aarda; Macken, Lieve; Daems, Joke (2020). Gutenberg Goes Neural: Comparing Features of Dutch Human Translations with Raw Neural Machine Translation Outputs in a Corpus of English Literary Classics. *Informatics*, v. 7, n. 3. <https://doi.org/10.3390/informatics7030032>. [Accessed: 20231211].

Yamada, Masaru (2019). The impact of Google Neural Machine Translation on Post-editing by student translators. *Jostrans: The Journal of Specialised Translation,* n. 31. <https://jostrans.org/issue31/art_yamada.php>. [Accessed: 20231211].

Youdale, Roy; Rothwell, Andrew (2022). Computer-assisted translation (CAT) tools, translation memory, and literary translation. In: Sharon Deane-Cox; Anneleen Spiessens (eds.), *The Routledge Handbook of Translation and Memory.* 1st ed. Abingdon, Oxon: Routledge, pp. 381-402.

Zanettin, Federico (2017). Issues in Computer-Assisted Literary Translation Studies. *InTRAlinea: Online translation journal (Special Issue: Corpora and Literary Translation).* <https://www.intralinea.org/specials/article/issues_in_computer_assisted_literary_translation_studies>. [Accessed: 20231211].

Appendices

Appendix 1: Model 1 Questionnaire

Questionnaire on translation of formal neologisms (Model 1)

QUESTIONNAIRE FOR TRANSLATION AND INTERPRETING STUDENTS AT THE UNIVERSITY OF MALAGA, DEGREE IN TRANSLATION AND INTERPRETING.

The Model 1 questionnaire expressly asks participants not to use machine translation systems to carry out the following practice.

*Obligatorio

Pre-translation questions.

Before starting, please answer the following questions.

1. 1. Academic year: *

Marca solo un óvalo.

- 1st
- 2nd
- 3rd
- 4th

2. 2. Age: *

3. 2. Level of English according to the Common European Framework of Reference for Languages: *

Marca solo un óvalo.

- B1: Intermediate
- B2: Upper Intermediate
- C1: Advanced
- C2: Mastery or proficiency

4. 3. Have you ever translated professionally? *

Marca solo un óvalo.

- Yes
- No

5. 4. If you have answered yes to the previous question, please give a brief description of your professional experience.

6. 5. What tools or resources do you normally use to translate literary texts? *

Selecciona todos los que correspondan.

- Paper dictionaries or encyclopaedias.
- Online dictionaries or encyclopaedias
- Bilingual glossaries
- Parallel texts
- Computer-assisted translation tools (Trados Studio, MemoQ, Omega T, etc.)
- Machine translation systems (DeepL, Google Translate, Reverso Context, etc.)
- Otro:

Neologism translation exercise

Five examples of contextualised neologisms will appear below. The aim of this practice is to translate into Spanish the formal neologisms taken from different literary texts.

7. 1st neologism: *Wintersweet* *

Neologism	Wintersweet
Context	Step into Wintersweet Wood to meet the friendly and playful otter, Komowa and his friends
Novel and author	*The Otter of Wintersweet Wood* by Jeanine Pisani (2021)

8. 2nd neologism: *Wintertide* *

Neologism	Wintertide
Context	For centuries the Infernal War has been waged by witches and sorcerers to control the Orb of Knowledge. The war must end. Then, at Wintertide, the Hill Raiders attack the village of Cirrus Cove.
Novel and author	*Wintertide* by Linnea Sinclair (2016)

9. 3rd neologism: *Neverwinter* *

Neologism	Neverwinter
Context	Against all odds, Drizzt and Dahlia join forces in the aftermath of battle, united in their desire for vengeance against the sorceress who destroyed Neverwinter.
Novel and author	*Neverwinter: The Legend of Drizzt* by R. A. Salvatore (2012)

10. 4th neologism: *Winterland* *

Neologism	Winterland
Context	He's in a hotel bar in the city center with an associate of his own, Paddy Norton, the Chairman of Winterland Properties.
Novel and author	*Winterland: A Novel* by Alan Glynn (1960)

11. 5th neologism: *Winterlock* *

Neologism	Winterlock
Context	Batuth, surrounded on two sides by the Wild and by the frozen wastes of Winterlock to the west, is all but a forsaken land.
Novel and author	*Knightshade: Perdition Bleeds* by John Grover (2014)

Post-translation questions.

Once you have finished the translation, answer the following questions.

12. 1. Approximately how long did it take you to translate all the neologisms? *

13. 2. What translation tools or resources have you used? *

14. 3. Which have been most useful? *

15. 4. What difficulty or difficulties would you highlight in this translation? *

16. 5. Do you consider that there are sufficient sources of documentation for the translation of neologisms? *

Marca solo un óvalo.

- Yes
- No
- Do not know

17. 6. Please use this space if you have any comments regarding this practice.

Appendix 2: Model 2 Questionnaire

Questionnaire on translation of formal neologisms (Model 2)

QUESTIONNAIRE FOR TRANSLATION AND INTERPRETING STUDENTS AT THE UNIVERSITY OF MALAGA, DEGREE IN TRANSLATION AND INTERPRETING.

*Obligatorio

Pre-translation questions.

Before starting, please answer the following questions.

1. 1. Academic year: *

Marca solo un óvalo.

- 1st
- 2nd
- 3rd
- 4th

2. 2. Age: *

3. 2. Level of English according to the Common European Framework of Reference for Languages: *

Marca solo un óvalo.

- B1: Intermediate
- B2: Upper Intermediate
- C1: Advanced
- C2: Mastery or proficiency

4. 3. Have you ever translated professionally? *

Marca solo un óvalo.

- Yes
- No

5. 4. If you have answered yes to the previous question, please give a brief description of your professional experience.

6. 5. What tools or resources do you normally use to translate literary texts? *

Selecciona todos los que correspondan.

- Paper dictionaries or encyclopaedias
- Online dictionaries or encyclopaedias
- Bilingual glossaries
- Parallel texts
- Computer-assisted translation tools (Trados Studio, MemoQ, Omega T, etc.)
- Machine translation systems (DeepL, Google Translate, Reverso Context, etc.)
- Otro:

Neologism translation exercise

Five examples of contextualised neologisms will appear below. The aim of this practice is to translate into Spanish the formal neologisms taken from different literary texts.

7. 1st neologism: *Wintersweet* *

Neologism	Wintersweet
Context	Step into Wintersweet Wood to meet the friendly and playful otter, Komowa and his friends
Novel and author	*The Otter of Wintersweet Wood* by Jeanine Pisani (2021)

8. 2nd neologism: *Wintertide* *

Neologism	Wintertide
Context	For centuries the Infernal War has been waged by witches and sorcerers to control the Orb of Knowledge. The war must end. Then, at Wintertide, the Hill Raiders attack the village of Cirrus Cove.
Novel and author	*Wintertide* by Linnea Sinclair (2016)

9. 3rd neologism: *Neverwinter* *

Neologism	Neverwinter
Context	Against all odds, Drizzt and Dahlia join forces in the aftermath of battle, united in their desire for vengeance against the sorceress who destroyed Neverwinter.
Novel and author	*Neverwinter: The Legend of Drizzt* by R. A. Salvatore (2012)

10. 4th neologism: *Winterland* *

Neologism	Winterland
Context	He's in a hotel bar in the city center with an associate of his own, Paddy Norton, the Chairman of Winterland Properties.
Novel and author	*Winterland: A Novel* by Alan Glynn (1960)

11. 5th neologism: *Winterlock* *

Neologism	Winterlock
Context	Batuth, surrounded on two sides by the Wild and by the frozen wastes of Winterlock to the west, is all but a forsaken land.
Novel and author	*Knightshade: Perdition Bleeds* by John Grover (2014)

Post-translation questions.

Once you have finished the translation, answer the following questions.

12. 1. Approximately how long did it take you to translate all the neologisms? *

13. 2. What translation tools or resources have you used? *

14. 3. Which have been most useful? *

15. 4. Have you used any machine translation system? *

Marca solo un óvalo.

- Yes.
- No.

16. 5. If you answered yes to the previous question, please specify the machine translation system(s) you have used.

17. 6. What difficulty or difficulties would you highlight in this translation? *