



Skills and Profile of the New Role of the Translator as MT Post-editor

Celia Rico

Senior Lecturer

Facultad de Artes y Comunicación

Universidad Europea de Madrid

celia.rico@uem.es

Enrique Torrejón

Language Technologies Consultant

enrique.torreon@gmail.com

ABSTRACT

This paper explores the skills and profile of the new role of the translator as MT post-editor in view of the rising interest and use of MT in the translation industry. After a brief review of the relevant literature declaring post-editing (PE) as a profession on its own, the paper goes on to identify the different tasks involved in PE processes, following the work of Krings (Krings, 2001). Then, a series of competences are defined and grouped into three main categories: core competences, linguistic skills and instrumental competences. Finally, a description of the controlled translation scenario of MT PE is advanced taking into account the overall scenario of any translation project, including client description, text domain, text description, use of glossaries, MT engine, MT output quality and purpose of the translated text.

Keywords: post-editing, machine translation, guidelines for post-editing, skills for post-editing

RESUM (*Habilitats i perfil del nou rol del traductor com a posteditor de traducció automàtica*)

Aquest article aborda les habilitats i les característiques del perfil del nou rol del traductor com a posteditor de traducció automàtica, tot i tenint en compte l'augment de l'interès en i l'ús de la traducció automàtica per part de la indústria de la traducció. Després d'una breu revisió de la literatura més rellevant sobre postedició (PE) en tant que professió per ella mateixa, l'article identifica les diferents tasques implicades en els processos de PE, segons la proposta de Krings (2001). A continuació es defineix una sèrie de competències que s'agrupen en tres categories principals: competències nuclears, habilitats lingüístiques i competències instrumentals. Finalment el artículo proposa una descripció de l'escenari de traducció controlada propi de la PE de traducció automàtica, sense perdre de vista l'escenari general de qualsevol projecte de traducció, que inclou la descripció del client, el domini del text, la descripció del text, l'ús de glossaris, el motor de traducció automàtica, la qualitat de la traducció automàtica resultant i el propòsit del text traduït.

Paraules clau: postedició, traducció automàtica, directrius per a la postedició, habilitats per a la postedició

RESUMEN (*Habilidades y perfil del nuevo rol del traductor como poseedor de traducción automática*)

Este artículo aborda las habilidades y las características del perfil del nuevo rol del traductor como poseedor de traducción automática, a la luz del aumento del interés en y



del uso de la traducción automática por parte de la industria de la traducción. Después de una breve revisión de la literatura más relevante sobre posesición (PE) en tanto que profesión por sí misma, en el artículo se identifican las diferentes tareas implicadas en los procesos de PE, según la propuesta de Krings (2001). A continuación se define una serie de competencias que se agrupan en tres categorías principales: competencias nucleares, habilidades lingüísticas y competencias instrumentales. Finalmente el artículo propone una descripción del escenario de traducción controlada propio de la PE de traducción automática, sin perder de vista el marco general de cualquier proyecto de traducción, que incluye la descripción del cliente, el dominio del texto, la descripción del texto, el uso de glosarios, el motor de traducción automática, la calidad de la traducción automática resultante y el propósito del texto traducido.

Palabras clave: posesición, traducción automática, directrices para la posesición, habilidades para la posesición

1. Introduction

Relevant literature declaring post-editing (PE) as a profession on its own can be traced back to 1985, when Vasconcellos and León reported on work carried out at the Pan American Health Organization. MT had been implemented some years earlier for translating from Spanish into English, with a productivity of 4,000 to 10,000 words a day per post-editor (Vasconcellos and León, 1985: 134). PE was then defined as «adjusting the machine output so that it reflects as accurately as possible the meaning of the original text, [with an emphasis on] adjusting relatively predictable difficulties» (Vasconcellos, 1987: 411). Since then, many other authors acknowledged the use of the term post-editor and, thus, its specific role in the translation industry as a rising profession (Arnold et al., 1994: 33-35; Clarck, 1994: 302; Somers, 1997; among others). PE was definitely shaped with two main contributions on the subject: Krings' (Krings and Koby, 2001) and Allen's (Allen, 2003). The former approached the topic from a psycholinguistic perspective, thoroughly analyzing the process of PE and comparing the associated cost and effort with conventional human translation. As for Allen's work, it was a practical introduction to PE for translators, with specific mention of guidelines, types, levels and actual examples of PE in context. On a more didactic side, it is also worth mentioning the proposals of O'Brien (O'Brien, 2002) and Torrejón and Rico (Torrejón and Rico, 2002) which focus on PE guidelines, training and skills development. Finally, this brief outlook on PE as a profession along time would not be complete without a reference to the Post-Editing Special Interest Group set up by some members of the AMTA in 1998, which marked a milestone at the time and led to several workshops for some years.

Pertinent to the present paper, and common to the authors mentioned above, is the conception that PE is a task to be performed by translators. There seemed to be a general agreement on this as «only a translator can judge the accuracy of a translation, [as] the one best able to pick up errors in the machine translation, he has a fund of knowledge about the cross-language transfer of concepts, and he has technical resources at his disposal which he knows how to use in the event of doubts» (Krings and Koby, 2001: 12). In this sense, the authors go on to acknowledge that, still, «changes in the accustomed pattern of work will be necessary» (Krings and Koby, 2001: 14).

In this paper, we accept this argument as sound and, from there, we explore the skills and profile of the new role of the translator as MT post-editor in a context where the use of MT is finally arriving at a viable business model for the translation industry, as the increasing usage figures show (Houlihan, 2009; Beaton and Contreras, 2010).

2. Defining the new role of MT post-editor

Much has been written about translator's competences both in the academic world and the profession (Kelly, 2007; Gouadec, 2007; PACTE, 2008, to name just a few) as this is an



ongoing concern not only for translator trainers at all levels but also for employers. Even the concept of competence may raise some controversy, since different authors use it differently, linking it both to the cognitive process of translating and to the acquisition of skills, in a more empirical approach that responds to the demands of the professional sector (Rico, 2010: 92). Our interest here goes parallel to this latter conception, in a practical application of the term, and linked to a revised definition of PE as «the correction of machine-generated translation output to ensure it meets a level of quality negotiated in advance between client and post-editor» (TAUS/CNGL, 2011).

In the following sections, we review the processes and tasks involved in PE. Then, we advance some of the key competences we understand a post-editor should demonstrate.

2.1. Processes and tasks involved in PE

Krings' study (Krings and Koby, 2001: 321-522) of PE processes in MT identifies a series of categories which help us define the subsequent PE tasks:

- Source text-related processes. These refer essentially to reading the source text, either entirely or in segments with a view to recognizing some pattern for reformulation in the target text (morphological, syntactic or semantic) or for deciding on textual coherence. In the translation industry, the question of whether the post-editor should get access to the source text is still under consideration as in some contexts it is deemed as a barrier to reaching optimal productivity. In our experience, using the source text as a reference is key when dealing with low quality MT output for there are no other means of understanding (and thus correcting) the target text.
- Machine translation-related processes. This is one of the most important process categories, together with target text related ones (either in production or in evaluation) (Krings and Koby, 2001: 318). The category refers to reading the MT output either entirely or in segments, directing attention to elements which need further confirmation in the source text and evaluating whether a reformulation is necessary. As we will see below, the adequate performance of these tasks can be directly linked to instrumental competences that help the post-editor in appreciating what the machine is doing when it translates.
- Target text production processes. By far, the largest proportion of the process falls into this category (Krings and Koby, 2001: 314), which is concerned with producing a new text either from old elements already present in the text or by adding new ones. Tasks involved in this process are then related to language correction according to PE guidelines (spelling, morphology, agreement, syntax order, lexical choice), dealing with terminology issues, guaranteeing style/terminology consistency/coherence. In this respect, we should remember that defining PE guidelines is a complex task since it involves considering quality acceptance from the client's point of view, turn-around time and final use of the text, among other aspects. Usually, approaches to PE distinguish between full and light PE (Allen, 2003; TAUS/CNGL, 2011) but, when human post-editors try to implement it in an actual PE project, they usually engage in full post-editing (O'Brien, 2011). As we will see below, this directly influences the definition of competences.
- Target text evaluation processes. Tasks involved in this process are related to making positive or negative evaluations of the MT output and to comparing it with the source text, which, in turn, is related to defining quality in terms of client's expectations.
- Reference work-related processes. This category is concerned with choosing dictionaries to be used (if any), collocations to be found, parallel texts to be consulted



and/or informants to be asked for. Similarly, this involves tasks related to dictionary/terminology maintenance in MT and TM systems in order to improve lexical and phraseological accuracy.

- Physical writing processes. These refer to the action of writing linearly, deleting or inserting elements, leaving a gap, marking specific elements, overwriting and rewriting.
- Global task-related processes. These are processes that serve to control the procedure of dealing with the PE task, i.e., they are related to task management: the post-editor «must not only determine *how* the task should be best divided, but also *in what order* the subtasks should then be processed» (Krings, 2001: 510). This includes, as well, reporting feedback to allow for MT improvement and/or source content optimization, which can help solve repetitive mistakes in MT output. Post-editors take then the role of stakeholder in the Controlled Translation scenario (Torrejón and Rico, 2002) and they can then realize that MT output improves thanks to their valuable feedback. Additionally, global tasks involve collecting samples of different post-editing issues in order to facilitate training of other fellow post-editors in the team, and keeping up-to-date with the latest advances in the field of MT and pre/post-editing tools.

2.2. Competences and skills required in PE

Taking into consideration the processes and tasks just mentioned, the skills and competences to look for in a post-editor can be grouped into three main categories: core competences, linguistic skills and instrumental competences, as summarized in Figure 1 below.

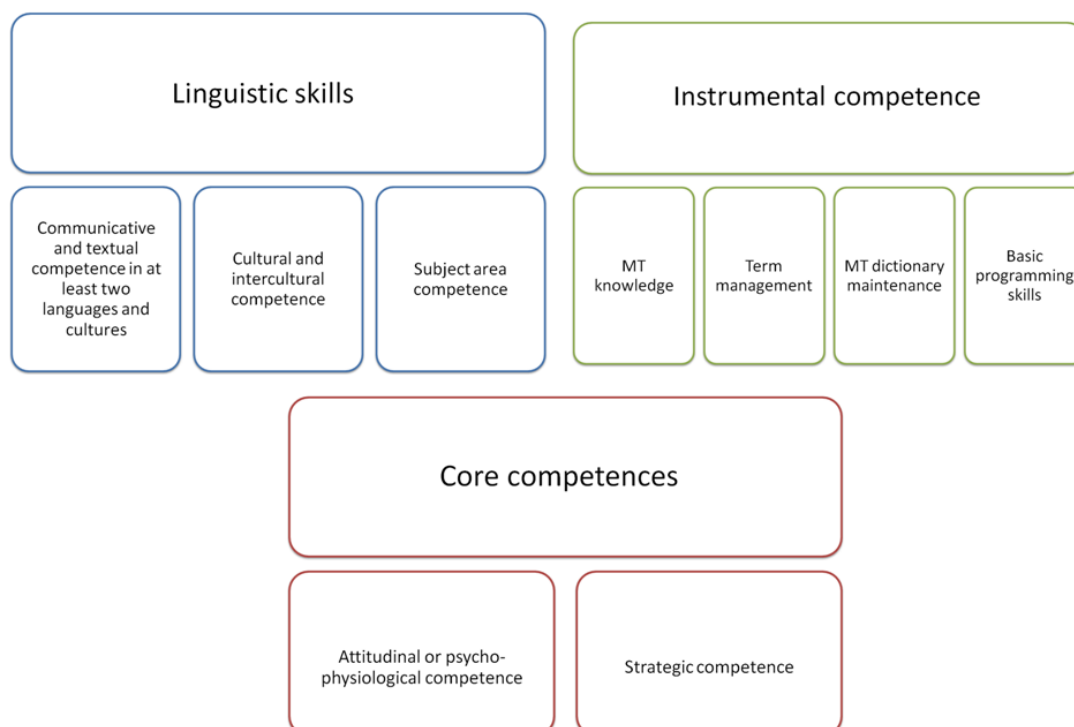


Figure 1: PE skills and competences



- Core competences. These are in line with the attitudinal or psycho-physiological competence that allows the post-editor to cope with *subjectivity* issues involved in defining and applying PE specifications, adequately handling client's *expectations* in terms of text quality acceptance, and overcoming *uncertainty*. To these, we add the strategic competence that helps post-editors reach at *informed decisions* when choosing among different PE alternatives, following the directions as mechanically as possible and showing no stylistic concerns, if required, even when faced with low quality output. As Guzmán puts it, this means «specifying the scope of manual MT post-editing and sticking to it stoically» (Guzmán, 2007).
- Linguistic skills. These can be seen as related to skills usually demanded of a translator, and refer to excellent knowledge of source and target language, familiarity with post-editing directions/guidelines, communicative and textual competence in at least two languages and cultures, along with cultural and intercultural competence and subject area competence.
- Instrumental competences. These are related to technical skills, as we agree with O'Brien (O'Brien *et al.*, 2009) that, in order to understand MT output and develop a positive attitude/tolerance towards the machine, the post-editor should understand what MT is about. Instrumental competences refer then to knowledge of MT systems and their capabilities (either rule-based, example-based, statistical or hybrid systems), terminology management skills, MT dictionary maintenance (for rule-based systems), corpus quality assessment skills (for example-based and statistical engines), controlled language pre-editing skills in the sense advanced by Torrejón and Rico (Torrejón and Rico, 2002), and finally some programming skills (for creating macros or scripts for automated correction).

3. Defining a controlled translation scenario for PE purposes

The definition of the scenario of MT post-editing has to fit in the overall scenario of any translation project, although there are clear particularities which post-editors will need to be aware of. Therefore, post-editors will have to know general contextual aspects of the project and also under what conditions the post-editing has to be carried out.

These are the main factors regarding automatic controlled translation projects which affect post-editing:

- Client description: a short description of the client regarding products/services, markets, and any other issue which may have to be considered in the translation process
- Domain: content subject area of the project
- Text description: a short description of the type of text contents
- Glossary: information regarding the type of glossary, whether it was provided by the clients, whether post-editors have to add/modify terms, whether it was used by the MT engine, etc.
- MT engine: specific MT used (for instance, Google Translate, Systran, etc.), type of MT (rule-based, statistical or hybrid systems), interaction with TM if any (for instance, DVX2, SDL Trados etc.)
- MT output quality: whether the quality of the output needs to be graded either automatically (for instance, using BLEU metrics) or manually



In addition, there is also a main factor regarding the text profile itself which influences the level of post-editing to be applied to the MT output, namely, the purpose of the text (Allen 2003). Usually, in MT environments there are two scenarios: inbound translation, that is, using MT to get the gist of a text for information browsing; and outbound translation or using MT for publication purposes. Inbound translation does not require a high level of quality whereas outbound translation does so. This means that post-editors will have to choose the right level of post-editing effort in order to meet the purpose of the translation. The higher the quality expected by the client in the final translation, the fuller the post-editing process. Thus, inbound translation may not require any post-editing at all or just rapid post-editing, fixing really flagrant errors which make the MT output incomprehensible. In contrast, outbound translation requires partial or even full post-editing, although the difference between them lies in a gray zone which varies from translator to translator.

The post-editing process needs to be carried out taking into account text-related guidelines and language-related guidelines concerning both the source and the target languages. There is a consensus in the description of general text-related guidelines in the post-editing literature (O'Brien, 2011; Guzmán, 2007; Torrejón and Rico, 2002). The aim of these text-related guidelines is to offer clear indications to post-editors on how to carry on so that they can stick to the guidelines without hesitation. It is worth mentioning that applying post-editing guidelines or rules should be a process as controlled and mechanical as possible in order to avoid unnecessary post-editing, usually because of subjective judgments about style and natural flow of the text.

The set of rules below is an example of text-related guidelines adapted from Torrejón and Rico (2002):

- Fix any wrong term in the text, either technical or non-technical term. Also, correct any inconsistent use of the same term.
- Fix any syntactic error which consists of wrong part of speech, incorrect phrase structure, wrong linear order of words and phrases
- Fix any morphological error which consists of wrong morphological form (number, gender, case, person, tense, mood, voice, aspect)
- Fix any missing text (paragraph, sentence, phrase, word) as long as the omission interferes with the message being transferred
- Fix any misspelling errors
- Fix any punctuation errors

In order to avoid ambiguity in the application of these guidelines, proper training of post-editors with adapted training material for PE is paramount. This explains why, in the context of a controlled translation scenario, to provide a set of example cards illustrating guidelines becomes an additional task for creating a feedback channel for MT linguists who are in charge of updating grammars/dictionaries, thus continuously improving the post-editing process.

Some of these post-editing example cards are provided below (Tables 1 to 13) as an illustration on how to use them in the language pair combinations English-Spanish (ENG-SPA) and Spanish-English (SPA-ENG) using Google Translate as MT engine. Each post-editing project should complete its own example cards taking into account the particularities of the text, language direction and all other factors describing the project as seen above. Other interesting example cards in the post-editing literature can be found (Guzmán, 2007; Guerberof, 2008; Thicke, 2011).



Table 1 shows an example of post-editing a wrong technical term in ENG-SPA combination: the translation of the technical term front wheel sideslip tendency needs post-editing.

PE rule: fix technical term	
MT input: ENG	When the vehicle exhibits this type of front wheel sideslip tendency, the VDIM employs the VGRS to increase the steering gear ratio.
MT output: SPA	Cuando el vehículo presenta este tipo de tendencia frente deslizamiento lateral de la rueda, el VDIM emplea los VGRS para aumentar la relación de engranaje de dirección.
PE versión: SPA	Cuando el vehículo presenta este tipo de tendencia de deslizamiento lateral de la rueda delantera, el VDIM emplea los VGRS para aumentar la relación de engranaje de dirección.

Table 1: Example card of fixing technical term in ENG-SPA

Table 2 shows an example of post-editing a wrong non-technical term in ENG-SPA combination: the translation of the verb taken needs post-editing.

PE rule: fix wrong term	
MT input: ENG	Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc.
MT output: SPA	Especial cuidado se debe tomar al manipular materiales inflamables o tóxicos, tales como gasolina, gas refrigerante, etc.
PE versión: SPA	Especial cuidado se debe tener al manipular materiales inflamables o tóxicos, tales como gasolina, gas refrigerante, etc.

Table 2: Example card of fixing non-technical term in ENG-SPA

Table 3 shows an example of post-editing a syntactic error because of wrong linear order in ENG-SPA combination: the phrase de alta tensión should modify both cableado and conectores, and, therefore, it needs post-editing.

PE rule: fix syntactic error	
MT input: ENG	Do not touch or attempt to remove or replace any high-voltage wiring and connectors.
MT output: SPA	No toque ni trate de retirar o sustituir el cableado de alta tensión y conectores.
PE versión: SPA	No toque ni trate de retirar o sustituir el cableado y conectores de alta tensión.

Table 3: Example card of fixing syntactic error in ENG-SPA



Table 4 shows an example of post-editing a Spanish morphological error in ENG-SPA combination: the adjective adecuada (feminine singular form) does not agree with the noun equipo (masculine singular form) and, therefore, it needs post-editing.

PE rule: fix morphological error	
MT input: ENG	It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation.
MT output: SPA	Es necesario el uso de equipo de remolque adecuada para evitar posibles daños al vehículo durante la operación de remolque.
PE versión: SPA	Es necesario el uso de equipo de remolque adecuado para evitar posibles daños al vehículo durante la operación de remolque.

Table 4: Example card of fixing morphological error in ENG-SPA

Table 5 shows an example of post-editing an English morphological error in SPA-ENG combination: the gerund flowing should be post-edited into the third person singular of the present tense flows.

PE rule: fix morphological error	
MT input: SPA	Aproximadamente una tercera parte del líquido refrigerante en el motor fluye hacia los cilindros y dos terceras partes hacia las zonas de las cámaras de combustión en la culata.
MT output: ENG	Approximately one third of the engine coolant flowing in the cylinder and two-thirds to areas of the combustion chambers in the cylinder head.
PE versión: ENG	Approximately one third of the engine coolant flows in the cylinder and two-thirds to areas of the combustion chambers in the cylinder head.

Table 5: Example card of fixing morphological error in SPA-ENG

Table 6 shows an example of post-editing a syntactic error consisting of wrong linear order of phrases in SPA-ENG combination: the right order should be subject, verb, and complements.

PE rule: fix syntactic error	
MT input: SPA	En el propio turbocompresor está ubicada la electroválvula de recirculación de aire N249.
MT output: ENG	In the turbocharger itself is located the air recirculation valve N249.
PE versión: ENG	The air recirculation valve N249 is located in the turbocharger itself.

Table 6: Example card of fixing syntactic error in SPA-ENG



Table 7 shows an example of post-editing missing text in SPA-ENG combination: the translation of *de forma* is missing in Google Translate output.

PE rule: fix missing text	
MT input: SPA	Si se avería el sensor, el turbocompresor ya sólo funciona de forma controlada.
MT output: ENG	If the sensor fails, the turbocharger works only controlled.
PE versión: ENG	If the sensor fails, the turbocharger works only in a controlled manner.

Table 7: Example card of missing text in SPA-ENG

In addition, there are also language-related guidelines which focus on more specific language issues which are not covered in the general text-related guidelines. These guidelines will cover aspects which range from language locale (different translations depending on the dialect: for example, European Spanish versus American Spanish) to lexical collocations to specific syntactic structures of the languages involved. For instance, in the SPA-ENG combination, guidelines would typically include instructions on how to deal with the translation of sentences using the infinitive form, how to deal with verbs with pronoun *se*, or an indication of when to delete unnecessary uses of the determiner *the*, among others. In the ENG-SPA combination, guidelines will typically cover issues like how to translate *-ing* forms or the passive voice.

As explained above, example cards will also play an important role for training and feedback about language-specific guidelines. These cards will be very valuable for linguists in charge of maintaining the MT engine if the latter is rule-based and its rules and dictionaries can be edited and modified. Samples of this type of post-editing cards are provided below (Tables 8 to 13) both in the combinations ENG-SPA and SPA-ENG using Google Translate as MT engine.

Table 8 shows an example of post-editing a wrong translation of the *-ing* form after verbs like *stop*, *start*, etc. in the ENG-SPA combination. The English gerund has been translated as a lexical noun and needs to be post-edited into infinitive, i.e., *mantenimiento* should be replaced by *mantener*. In addition, the translation of the verb *stop* needs to be post-edited from *se detendrá* to *dejará de*.

PE rule: fix English gerund after stop	
MT input: ENG	Cruise control will stop maintaining the vehicle speed in any of the following situations.
MT output: SPA	El control de crucero se detendrá el mantenimiento de la velocidad del vehículo en cualquiera de las siguientes situaciones.
PE versión: SPA	El control de crucero dejará de mantener la velocidad del vehículo en cualquiera de las siguientes situaciones.

Table 8: Example card of gerund translation after stop in ENG-SPA



Table 9 illustrates how to post-edit wrong translation of gerunds in chapter or section titles in the ENG-SPA combination. If possible, the gerund should be post-edited into noun or infinitive, i.e., *reanudar* should be replaced by *reanudación*, or *Cancelar* should be replaced by *Cancelación*.

PE rule: fix gerund in title/section	
MT input: ENG	Canceling and resuming the constant speed control
MT output: SPA	Cancelación y reanudar el control de velocidad constante
PE version 1: SPA	Cancelación y reanudación del control de velocidad constante
PE version 2: SPA	Cancelar y reanudar el control de velocidad constante

Table 9: Example card of gerund translation in title/section in ENG-SPA

Table 10 shows how to post-edit wrong translation of gerunds in adverbial subordinate clauses. If possible, the gerund could be post-edited as *al* followed by infinitive, *Tirando* should be replaced by *Al tirar*.

PE rule: fix gerund in adverbial clauses	
MT input: ENG	Pulling the lever toward you cancels the constant speed control.
MT output: SPA	Tirando de la palanca hacia usted cancela el control de velocidad constante.
PE versión: SPA	Al tirar de la palanca hacia usted cancela el control de velocidad constante.

Table 10: Example card of gerund translation in adverbial clauses in ENG-SPA

Table 11 shows how to post-edit wrong translation of gerunds with the preposition *from* after verbs like *prevent*. If possible, the gerund should be post-edited into third person singular, present tense in subjunctive mood, i.e., *acercándose* should be replaced by *se acerque*.

PE rule: fix gerund	
MT input: ENG	A warning tone warns you when the system cannot decelerate sufficiently to prevent your vehicle from closing in on the vehicle ahead.
MT output: SPA	Un tono de advertencia le avisa cuando el sistema no puede desacelerarse lo suficiente como para evitar que su vehículo acercándose al vehículo de adelante.
PE versión: SPA	Un tono de advertencia le avisa cuando el sistema no puede desacelerarse lo suficiente como para evitar que su vehículo se acerque al vehículo de adelante.

Table 11: Example card of gerund translation after *prevent* in ENG-SPA



Table 12 shows how to post-edit wrong translation of a verb with the pronoun *se* in impersonal use in the SPA-ENG combination. Depending on the codification of these verbs in MT dictionaries, these verbal structures usually need to be changed from active voice to passive voice in English, and sometimes they require reordering of the phrases. In the example, *calculates* is post-edited into *is calculated*.

PE rule: fix gerund	
MT input: SPA	Con la señal del sensor de temperatura del aire aspirado, se calcula un valor corrección.
MT output: ENG	With the sensor signal of the intake air temperature, calculates a correction value.
PE versión: ENG	With the sensor signal of the intake air temperature, a correction value is calculated.

Table 12: Example card of impersonal *se* translation in SPA-ENG

Table 13 shows how to post-edit wrong translation of a verb with the pronoun *se* in middle voice use in the SPA-ENG combination. Depending on the codification of these verbs in MT dictionaries, these verbal structures usually require reordering of the subject, i.e., *opens a menu* should be changed to *pre-verbal position*, *a menu opens*.

PE rule: fix gerund	
MT input: SPA	Dentro del código de dirección 09 se abre un menú desplegable donde es posible seleccionar la opción.
MT output: ENG	Within the 09 address code opens a menu where you can select the option.
PE versión: ENG	Within the 09 address code a menu opens where you can select the option.

Table 13: Example card of middle voice *se* translation in SPA-ENG

4. Conclusions

Now that post-editing appears as a rising profession in the translation industry there are many questions that still need to be addressed. Even if we acknowledge that the first mention to the role of the post-editor was made almost thirty years ago, skills and competences, tasks and processes, translation workflow and context need to be revised in the light of the rising significance of MT. The present paper is an attempt at answering some of these questions from a comprehensive point of view that examines what it is that makes a translator a good post-editor.



References

- Allen, D. (2003): "Post-editing", In Somers, H. (ed.): *Computers and Translation. A translator's guide*. Amsterdam/Philadelphia: John Benjamins.
- Arnold, D. et al. (1994): *Machine Translation: An Introductory Guide*. Manchester: NCC Blackwell [online] Available: <http://www.essex.ac.uk/linguistics/external/clmt/MTbook/> [accessed 13 September 2012]
- Beaton, A. and G. Contreras. (2010) "Sharing the Continental Airlines and SDL post-editing experience". AMTA 2010, The Ninth Conference of the Association for Machine Translation in the Americas. Denver, Colorado, October 31 – November 4. [online] Available: <http://www.mt-archive.info/AMTA-2010-Beaton.pdf> [accessed 13 September 2012]
- Clarck, R. (1994): "Computer-assisted translation: The state of the art". In *Teaching translation and interpreting, II: insights, aims, visions*, ed. C. Dollerup and A. Lindegaards, 301-308. Amsterdam: Benjamins.
- Gouadec, D. (2007) *Translation as a Profession*. John Benjamins. Amsterdam/Philadelphia.
- Guerberof, A. (2008) "Post-editing MT and TM. A Spanish case". *Multilingual*, vol. 19 (6): 45-50.
- Guzmán, R. (2007) "Manual MT Post-editing: if it's not broken, don't fix it" *Translation Journal*, vol. 11, 4. October 2007.
- Houlihan, D. (2009) *Translating Product Documentation: The Right Balance between Cost and Quality in the Localization Chain*. [online] Available: <http://www.ptc.com/WCMS/files/108879/en/6230-RA-ManagingTranslation-DH-08-NSP.pdf> [accessed 13 September 2012]
- Kelly, D. (2007) "Translator Competence Contextualized. Translator Training in the Framework of Higher Education Reform: in Search of Alignment in Curricular Design". In Dorothy Kenny & Kyongjoo Ryou (eds) *Across Boundaries: International Perspectives on Translation Studies*. Newcastle: Cambridge Scholars Publishing.
- Krings, P. and Koby, G. S. (ed.) (2001): *Repairing Texts. Empirical Investigations of Machine Translation Post-Editing Processes*. Kent: The Kent State University Press.
- O'Brien, S. (2002): "Teaching post-editing: a proposal for course content". 6th EAMT Workshop, Teaching Machine Translation, November 14-15, 2002. European Association for Machine Translation. 99-106. [online] Available: <http://www.mt-archive.info/EAMT-2002-OBrien.pdf> [accessed 13 September 2012]
- O' Brien, S., Roturier, J., & Almeida, G. D. (2009) "Post-Editing MT Output. Views for the researcher, trainer, publisher and practitioner" MT Summit 2009 tutorial. [online] Available: <http://www.mt-archive.info/MTS-2009-OBrien-ppt.pdf> [accessed 13 September 2012]
- O' Brien, S. (2011) *Introduction to Post-Editing: Who, What, How and Where to Next?* [online] Available: <http://www.cngl.ie/node/2542> [accessed 13 September 2012]
- PACTE (2008) "First results of a Translation Competence Experiment: 'Knowledge of Translation' and 'Efficacy of the Translation Process'". In *Translator and Interpreter Training. Issues, Methods and Debates*. John Kearns and Contributors.
- Rico, C. (2010): "Translator Training in the European Higher Education Area". *Curriculum Design for the Bologna Process. A Case Study* en *The Interpreter and Translator Trainer*, vol.4 (1): 89-114



-
- Somers, H. (1997): "A practical approach to using machine translation software: Post-editing the source text". *Translator* 3 (2): 193-212
- TAUS/CNGL (2011) Machine Translation Post-editing Guidelines. [online] Available: <http://www.cngl.ie/node/2542> [accessed 13 September 2012]
- Thicke, L. (2011) "Improving MT results: a Study" *Multilingual*, (February), 37-40.
- Torrejón Díaz, E. y C. Rico Pérez (2002) "Controlled Translation: A new teaching scenario tailor-made for the translation industry" 6th EAMT Workshop, Teaching Machine Translation, November 14-15, 2002. European Association for Machine Translation, pp. 107-116 [online] Available: <http://www.mt-archive.info/EAMT-2002-Torrejón.pdf> [accessed 13 September 2012]
- Vasconcellos, M. and M. León (1985): "SPANAM and ENGSPAN: Machines Translation at the Pan American Health Organization", *Computational Linguistics* 11, 122-136. [online] Available. <http://acl.ldc.upenn.edu/J/J85/J85-2003.pdf> [accessed 13 September 2012]
- Vasconcellos, M. (1987): "A comparison of MT postediting and traditional revision". In *Proceedings of the 28th Annual Conference of the American Translators Association*. Ed. K. Kummer, 409-415. Medford, NJ: Learned Information.