

16 The post-editor's skill set according to industry, trainers and linguists

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16.1 Introduction

In this chapter, we present survey-based research carried out in 2019 via three online questionnaires. The objective of this study is to learn more about the current profile of the 'translator who post-edits', as it has been argued in the past that while post-editing constitutes a new profession, training still does not meet the needs of the market (Cid-Leal et al. 2019; Jia et al. 2019).

The three questionnaires contribute valuable insights from the current practices and views of three key stakeholders. The first, *Machine Translation & Post-editing in the Industry*¹¹¹, was addressed to European language service companies (LSCs) and translation departments that use machine translation (MT) followed by post-editing. The second, *Survey for Post-editors of Machine Translation*¹¹², was addressed to individual linguists who do MT post-editing (PE) as part of their job. Finally, the third and last questionnaire was addressed to PE instructors in European masters programmes; its title is *Survey for MTPE Training Providers*¹¹³. Moreover, this last questionnaire is supplemented with qualitative data from interviews with the instructors. Thus, we present a mixed method study whose outcomes allow us to develop hypotheses that justify an experimental project.

In the next section, *Related literature*, we present the main works that inspired the design of some questions in our survey-based research. In *Methodology* we briefly describe how the surveys were prepared and disseminated. The section *Quantitative results – 3 surveys* presents the outcomes of the questionnaires, and in particular, we compare the two core topics of the present chap-

111 <https://form.jotformeu.com/82863740587368>, hereinafter 'survey of LSCs'.

112 <https://form.jotformeu.com/82855955787379>, hereinafter 'survey of linguists'.

113 <https://form.jotformeu.com/82844920241354>, hereinafter 'survey of trainers'.

ter, namely PE-related tasks and skills. The section *Qualitative results – Interviews* contains a brief commentary on a selection of topics covered in the one-to-one interviews with some professors who agreed to be interviewed. Finally, *Concluding remarks* summarises the main ideas and key points and determines the next steps.

16.2 Related literature

16.2.1 Machine translation

In recent years, the quality of MT systems has increased significantly, mainly due to Neural Machine Translation (NMT). This relatively new paradigm has boosted the field of MT, both at research level, as well as in the use of MT technology in the industry.

An increasing number of NMT toolkits are available, most of them with a permissive free license. To name some of them: OpenNMT¹¹⁴, Marian¹¹⁵, Sockeye¹¹⁶, ModernMT¹¹⁷ and Joey NMT¹¹⁸. The free licenses allow any user to train their own systems and to translate with them. However, technical skills are required to use these systems, and strict hardware requirements apply (powerful GPU units).

Several companies offer easy access to NMT technologies and under a subscription contract at very competitive prices. One example is the popular and widely used DeepL Translator. Undoubtedly, this availability has led to an increase of translation projects implemented via MTPE. For instance, in the global series Translation Technology Insights Research 2016, 40% of 2,784 freelancers, providers and corporations participating in the survey used MT. The progressively increasing shift from translation to MTPE projects has a great impact on the market and some new standards have appeared. For example, ISO 17100:2015 *Translation services – Requirements for translation services*, defined PE as a professional activity in the context of translation services. A more specific standard, ISO 18587:2017 *Translation services – Post-*

114 <http://opennmt.net/>

115 <https://marian-nmt.github.io/>

116 <https://github.com/awslabs/sockeye>

117 <https://github.com/modernmt/modernmt>

118 <https://github.com/joeynmt/joeynmt>

editing of machine translation output — Requirements, establishes the requirements for this new job description.

But to what extent does MTPE offer advantages in terms of productivity? Some researchers have tried to answer this question keeping in mind that the concept of 'productivity' not only encompasses processing speed for the process, but also quality of the product. The use of MT in a CAT tool environment is analysed in Garcia (2011). He shows that the gains in productivity are marginal but regarding quality, post-editing MT proposals produces significantly better results compared to human translation (HT). Another important aspect when comparing translation and PE tasks is the use of external resources. Daems et al. (2016) compared the type of resources and the time spent consulting them in 40 translation sessions and the same number of PE sessions. In both tasks, the resources used were comparable, but more time was spent consulting them in the translation sessions. The authors also concluded that PE was faster than regular translation with no negative effects on the quality of the final product. They observed that participants were more successful in problem-solving by consulting different resources when translating than when post-editing, leading to the conclusion that PE requires different skills from translation.

At this point, it is important to know what tasks are performed during or around the PE process, which skills are necessary to perform these tasks well and how a potential post-editor can be trained to acquire these skills.

16.2.2 PE tasks & skills

Some researchers focused on studying PE operations. For example, Popović et al (2014) investigated five types of operations: correcting word form, correcting word order, adding omissions, deleting additions and correcting lexical choices. They also studied the relationship of these operations with cognitive and temporal PE effort. Sanchez-Gijón (2016) compared the tasks in computer-assisted translation and in MTPE. The author argues that the PE task requires similar competences to those in the translation task, except for the instrumental subcompetence.

Regarding the skills, the most noteworthy study is the analysis carried out by O'Brien (2002) in which the author enumerates several skills observed in fellow researchers' work. These are (1) expertise in the subject area, the target language, the text-type and contrastive knowledge (Johnson and Whitelock, 1987); (2) excellent knowledge of the source language, perfect command of

the target language, specialised subject knowledge, word-processing experience and tolerance (Wagner, 1987:76); (3) full key proficiency, cursor positioning, search and replace, use of macros, functional treatment of linguistic constructions, etc. (Vasconcellos, 1986); and (4) positive disposition towards MT (Wagner, 1987 and Vasconcellos, 1986). Before proposing an outline for a PE course module, the author argues that several other skills are required for PE:

1. Knowledge of MT technology, current limitations and how this technology might improve in the future.
2. Terminology management skills with knowledge of several term management tools and terminology exchange formats, as well as how to code dictionaries for use in MT systems.
3. Pre-editing/controlled language skills to be able to apply controlled language rules to a text before it is submitted to a MT system.
4. Programming skills to be able to write macros or scripts for automatically correcting repetitive errors of the MT system.
5. Text linguistics skills useful both for PE as well as for programming macros and automatic PE modules

According to EDIT-TA project findings (Rico et al. 2013a,b), the methodology for PE comprises three steps: (1) preliminary analysis (performed by the PE team coordinator); (2) post-editing of MT (done by post-editors); and (3) error reporting and quality control (done by both roles in collaboration). PE coordinators and post-editors collaborate in some tasks before and after the PE takes place, which leads to the conclusion that they share some competences. These competences are classified in three groups: core competences (attitudinal or psycho-physiological competence and strategic competence); linguistic skills (excellent knowledge of source and target language, PE guidelines, communicative and textual competence, cultural and intercultural competence, subject area competence) and instrumental competence (knowledge of MT systems, term management, MT dictionary maintenance, corpus quality assessment skills and some programming skills).

Guerberof et al. (2012) is the result of an interesting interview with three PE specialists. One of the questions concerns the subject of skills, highlighting the following elements:

1. Knowledge of different MT technologies and how to interact with this technology
2. How to measure the effort involved in PE, the expected quality and a fair price for the work
3. How to minimise the technical (keyboarding) effort.
4. Practice on the task of reviewing texts translated by humans
5. Knowledge of error typology
6. Different aspects related to quality, such as definitions of quality and quality expectations.
7. How to use and how to write PE guidelines

Related to item 4, revision skills are important due to fact that, in spite of the significant improvement in quality of the MT systems, they still produce errors (Austermuehl, 2013). The initiative of the European Master's in Translation (EMT) lists research skills, that is, information mining, as an essential translation competence. Citing other authors, Austermuehl notes the supporting role information literacy plays for all other competences. Nonetheless, these major categories or groups encompass a considerable number of subskills. Doherty & Gaspari (2013), for instance, enumerate a set of 8 skills specific for PE: excellent word-processing and editing skills; ability to work and make corrections directly on screen; general knowledge of the problems and challenges faced by MT; specific knowledge of the weaknesses of the particular MT system; knowledge of source and target languages; speed in making decisions as to what and how to correct or ignore errors; ability to always balance PE speed and cost with respect to required quality; and ability to adapt to different specifications required for each job.

The more recent attempt to link subskills to higher categories was made by Nitzke et al. (2019). The authors propose a set of four core competences (risk assessment competence, strategic competence, consulting competence and service competence) and a set of 8 subsidiary competences (bilingual competence, extralinguistic competence, instrumental competence, research competence, revision competence, translation competence, MT competence and PE competence). As a concluding remark, the authors stress the idea that PE should be a cooperative task, where each agent (customers, post-editors and project managers) should work towards the same goal.

We believe that the 'PE competence' not only has a stronger technical component than translation competences, but is essentially determined by two of

the skills discussed in Doherty & Gaspari (2013): ability to balance PE speed and cost with required quality; and ability to adapt to different specifications. In that sense, Yamada (2015), after a series of experiments with students collecting data on the ease of the task, editing quantity and quality of final product, the author found that these data did not correlate with the students' course grades. This led him to the conclusion that PE requires different skills from HT, although there may be some common skills. He also concludes that specific training for PE tasks is necessary. The same observation is made in Zaretskaya (2017), where the author focuses on PE training and on the importance of the feedback provided by linguists at Transperfect, an American LSC. She underpins the differences between PE and translation or proofreading and concludes with seven recommendations for efficient PE.

16.2.3 Surveys and interviews

It is clear that new professional skills are needed, but neither the industry nor the research community seem to have found consensus about the specific definition or delimitation of such skills. To shed light on the overarching topic of the post-editor profile, we designed and distributed three questionnaires. Several previous studies on MTPE have also used questionnaires, surveys and interviews with informants.

Olohan (2007) analysed economic data and a selection of surveys to obtain economic information and to shed light on trends in the translation industry. She also suggests a set of learning outcomes for students of translation for two specific items: translation as entrepreneurial activity and translation as provision of specialized services. She concluded that to establish the knowledge and skills needed to enter the translation profession successfully, it is necessary to have a realistic understanding of the employment prospects.

PACTE (2014) presents research results on the acquisition of translation competence. They analysed the variable knowledge of translation using a questionnaire with 27 items covering concepts such as translation units, types of translation problems, the different phases involved in the translation process, methods and procedures and the role of the translation brief and the target reader. Doherty & Kenny (2014) present a Statistical Machine Translation syllabus design for postgraduate students along with both quantitative and qualitative assessment.

An anonymous questionnaire to randomly selected translation agencies in Lithuania was used to shed light on the employers' expectations of the ability and skills of professional trained translators (Horbačaskienė et al., 2017).

They enumerate a set of 10 translation-related skills and also a set of 10 transferable skills.

In terms of individual linguists, Guerrero (2018) states that the task of PE is often viewed negatively by post-editors and she provides useful guidelines to improve the experience. She suggests three key actions: transparent and fair remuneration, involving post-editors in the process of improving MT systems and establishing a feedback cycle using a specific form. A survey carried out on the occasion of the EAMT 2018 21st Annual Conference (Pérez-Macías et al., 2018) showed mitigated results, where 52% of the translators were willing to accept post-editing jobs. In 2019, an interactive survey (Guerrero, 2019) took place at GALA Conference to discuss the intricacies of MT in the localization industry.

Considering universities, Flanagan & Chistensen (2014) present a study on how students of an MA course interpret some PE guidelines, showing that trainees have difficulties interpreting them. Depraetere (2010) offers some interesting recommendations for teaching PE based on analysis of a corpus of post-edited texts. She concludes that it is not necessary to insist too much on the importance of avoiding stylistic changes or rephrasing. It is also important that the students know the typical MT errors, so it seems very useful to carry out MT error analyses. In her opinion, students have too much trust in the translation engine. The author also highlights the importance of consistency and formal accuracy. Guerberof & Moorkens (2019) present a description of an MT course and PE module. The authors argue that, as translation is above all a practical task, universities need to constantly adapt to the industry and modify their syllabi accordingly. In Plaza Lara (2019), several EMT labelled master's degrees are analysed to observe whether they include contents on MT and PE. A SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis is presented in order to identify the factors that could influence teaching of these subjects.

16.3 Methodology

In order to gain in-depth insight into the industry practices in the field of PE, we reviewed previous work (see *Related literature*) and we drafted a list of 14 PE-related tasks and 11 PE skills to be included in three online questionnaires. Their abbreviations are outlined in the tables below.

T1	Customization/Tuning of MT engines
T2	Feedback collection on MT output quality for solution engineers
T3	Management of MTPE projects: outsourcing, etc.
T4	Material preparation for MT engine training (building corpora, alignment, cleaning TM ...)
T5	MT output quality evaluation (error categorization...)
T6	PE guidelines design
T7	Post-editing machine translation output
T8	Pre-editing the source text
T9	Proofreading of post-edited output (monolingual)
T10	Quality control and text checking
T11	Revision of post-edited MT output (bilingual)
T12	Support users with CAT/MT tools
T13	Terminology extraction and TB management
T14	Tracking PE productivity

Table 1: List of 14 PE-related tasks

S1	Capacity to decide when to edit or discard (translating from scratch) an MT result.
S2	Capacity to post-edit according to PE guidelines
S3	Capacity to post-edit up to human quality (full PE)
S4	Capacity to post-edit to a good enough quality (light PE)
S5	Capacity to pre-edit a source language according to a controlled language
S6	Capacity to train and tune an MT engine
S7	Capacity to identify MT output errors
S8	Capacity to apply the right correction strategy
S9	Capacity to advise when MTPE is appropriate for a text or project
S10	Capacity to provide feedback for the MT solution engineers
S11	Capacity to learn about new technologies

Table 2: List of 11 PE-related skills

The questionnaires were addressed to three main actors in MTPE: language service companies (LSCs), linguists and trainers in master's degrees in European universities. The survey of LSCs contains 69 questions and can take up to 15 to 20 minutes to fill out. It was disseminated to specific industry associations and via the leading social media channels and forums between December 2018 and February 2019. It received 66 valid submissions. To read more about its design and results we refer the reader to Ginovart Cid et al. (2020).

The survey of linguists contains 79 questions and, depending on the background of each respondent, takes approximately 20 minutes to fill out. It re-

mained open between January and April 2019 and it received 142 valid submissions. The results of the survey of linguists and comparison with those from the survey of LSCs are presented in Ginovart Cid (2020).

Finally, the survey of trainers contains 32 questions and can take around 10 minutes to fill out. On this occasion, the European translation faculties with masters in translation or related studies were contacted individually and the link to the questionnaire was only shared with the relevant instructors after a consent form had been signed. It remained open between May and August 2019 and it had 54 valid responses.

Our study is completed with qualitative data from 49 interviews with the instructors who agreed to discuss the content of their syllabus in an informal conversation. These interviews allowed for the collection of detailed views from the participants to help explain the initial quantitative survey. They were, depending on the availability of the instructor, of different types: mail, telephone, Internet and personal interviews. Hence, the methodology of the research presented in this chapter is sequential and exploratory, with a first quantitative phase (3 questionnaires), followed by a qualitative phase (interviews).

16.4 Quantitative results – 3 surveys

This section examines the core topics of the three surveys. First, we will comment on the PE-related tasks. As expected, the PE task itself was the main reference for the three groups, so it is ranked first. As can be observed in Figure 1, trainers agree more with post-editors regarding T9 (Proofreading of post-edited output, monolingual), whereas they agree slightly more with LSCs about the frequency at which linguists perform tasks T11, T2 and T5 (Revision of post-edited MT output, Feedback collection on MT output quality for solution engineers, and MT output quality evaluation).

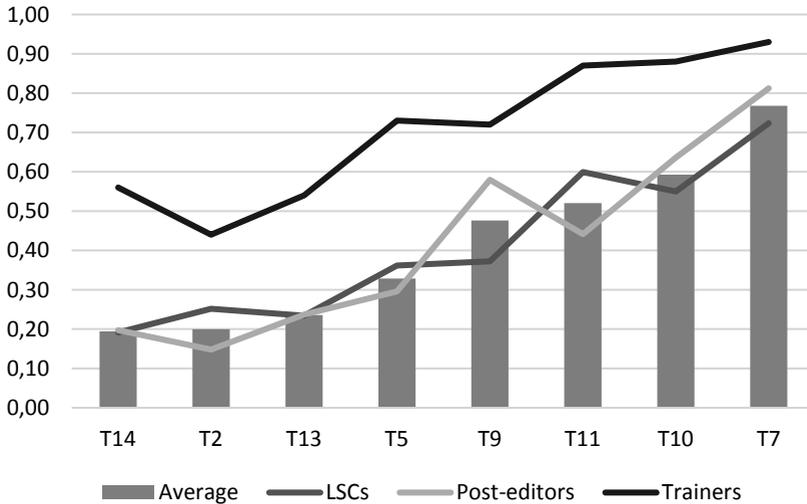


Figure 11: Top 8 PE-related tasks

Figure 1 also shows that the trainers think T5 (MT output quality evaluation) performed more often than T9 (Proofreading of post-edited output). Furthermore, three PE-related tasks that were in the top 8 ranking for trainers but not for the three stakeholders overall are: T3, T6 and T8 (Management of MTPE projects, PE guidelines design and Pre-editing the source text, respectively).

To conclude with the review of PE-related tasks, it must be highlighted that, when trainers come into play, all the suggested PE-related tasks seem to be significantly more present in the working day of professionals than the linguists say they actually perform such operations, or than LSCs claim to request them from their collaborators. This is represented by the purple trend line in Figure 1, which is significantly above the average and the results of LSCs and post-editors. This might lead to the conclusion that a closer collaboration between trainers, LSCs and linguists would be beneficial to balance what is taught with the tasks actually performed in the industry.

In terms of PE skills, there is higher agreement among the three surveyed audiences, as reported in Figure 2.

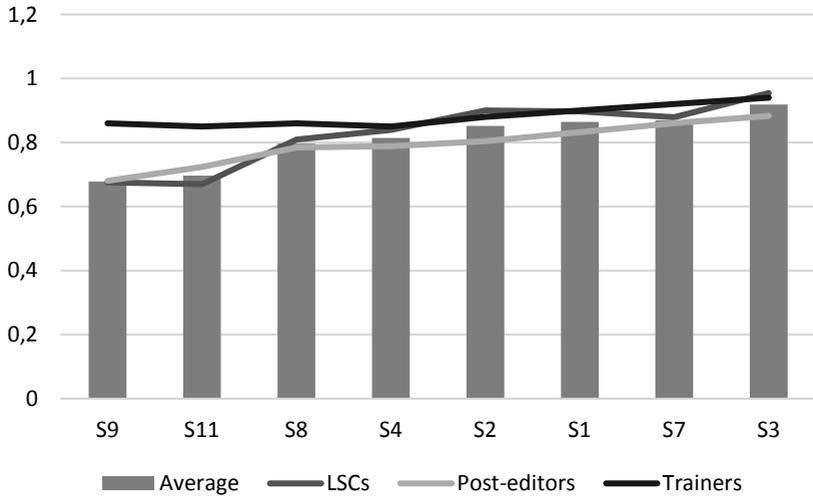


Figure 12: Top 8 PE skills

Three statistically significant divergences can be observed (see Figure 3): teachers at translation faculties show a preference for S9 (Capacity to advise when MTPE is appropriate; it came 5th in the ranking for trainers) and S11 (Capacity to learn about new technologies). These two skills are less valued by LSCs and linguists.

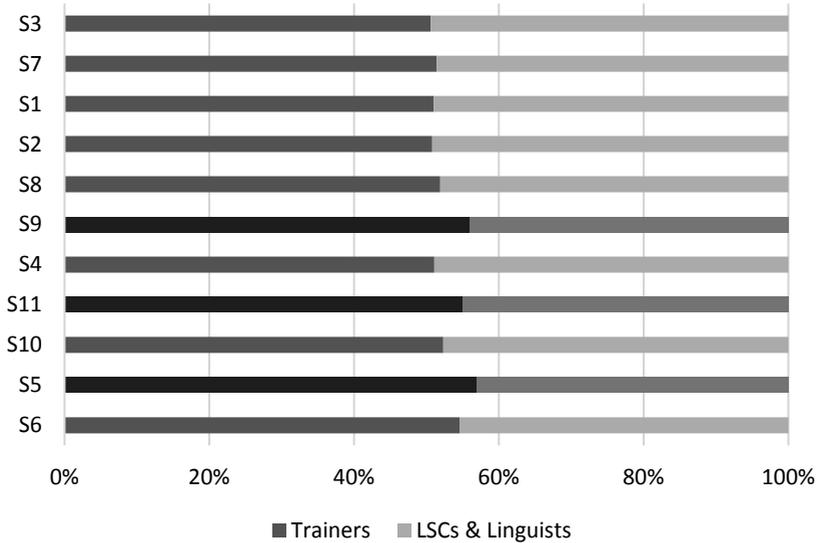


Figure 13: Three PE-related skills better rated by trainers

The same applies to S5 (Capacity to pre-edit the ST), which is not in the top 8 ranking, and which exhibits significant differences between trainers and LSCs. One possible explanation would be that even when a text needs translation into multiple target languages and could benefit from pre-editing, companies may not have the time or the budget to include this step in their workflow. On the other hand, the idealistic view that academia sometimes holds on the processes in the industry may affect how instructors consider these three skills.

16.5 Qualitative results – Interviews

As mentioned in *Methodology*, our study entails mixed-methods research of a sequential and exploratory nature. In this last section, the interviews bring qualitative insights into matters such as the instructors' opinion of pre-editing the ST and whether it will be as useful with NMT as it had proved to be with SMT or hybrid MT. As a general outcome, the interviews allowed the researchers to see that question 27 of the online questionnaire ["Do you show the students how to use MT engine suggestions? (i.e. predictive writing)"] was not understood as expected due to the confusing choice of the word "suggestions". Hence, we have excluded it from the study. Similarly, when two instruc-

tors of the same syllabus submitted the questionnaire separately, the interview with one of them or a joint interview helped clear up some mismatches in their survey answers.

Due to space limitations, only a couple of ideas are discussed in this chapter. One interesting opinion of the interviewees is how useful it can be to include a task of error categorisation (related to our T5). For instance, one professor said:

We have a couple of exercises where the students submit several different types of texts in both technologies [SMT and NMT] and compare the results, discussing which technology they would prefer if they were the final client (a 'mere' native speaker of the target language) and which do they believe could be more useful for them as professionals, if they were to post-edit that same output. In fact, after that exercise, we dedicate almost an entire class to the typical errors and advantages of RBMT, PBMT and NMT.

In the case of the Microsoft '5–10 second evaluation' rule (Mesa-Lao 2013, p.16), which stipulates that a linguist should not spend more than 10 seconds deciding whether to post-edit or translate from scratch, there may be some debate. While a few instructors find it useful, either to apply or to discuss it, they are in the minority. Most of the PE trainers interviewed do not even mention such a rule. One professor told us this during the interview:

We do discuss it and I like to hear their opinion, mostly when the class has both people with a lot of experience in MTPE and people who have never done it before. However, I like to emphasise the need for each one to try different approaches and decide what works best for him/her: sometimes, a 10+ seconds 'analysis' of the MT can still prove itself useful, as well as, sometimes, a 1 second glance can be enough for one to understand whether that output will be useful or not.

Finally, we asked the professors about their knowledge of the 'split training' or 'split principle' concept (Absolon, 2019). According to the split principle, borrowed by the author from the physical education domain, exercising specific competencies would bring about better results, faster. Almost none of the interviewees had heard of it, but almost all were interested in finding out more. However, after a short description of what it implies, their opinions on how useful it can be in practice varied considerably.

16.6 Concluding remarks

To close the gaps observed by the research community, we undertook complex survey-based research between 2018 and 2019. In this chapter, we presented insights into the current industry practices in the field of MTPE. In *Quantitative results – 3 surveys*, we explored PE-related tasks and skills and the course content in a variety of contexts. We also compared the answers of the three audiences (LSCs, linguists and trainers) to the cited core questions. The section *Qualitative results – Interviews* contributed qualitative perspectives on the profession of PE and MT-aided translation thanks to one-to-one interviews with the relevant professors.

As can be deduced from the statistically significant differences observed in these three questionnaires, the linguistic services related to MTPE probably do not correspond exactly to existing job descriptions. This had already been observed by Pym (2019), who highlights the importance of knowing how to sell the right service in the right way. We hope that our findings will contribute to the field with renewed insight about the different approaches the three stakeholders have towards PE or MT-aided translation. As it turns out, trainers at European universities believe that all the 14 PE-related tasks are performed much more frequently in the working day of translators than the industry stakeholders (LSCs and linguists themselves) claim. In terms of skills, teachers at translation faculties show a preference for S9, S11 and S5 (Capacity to advise when MTPE is appropriate, Capacity to learn about new technologies and Capacity to pre-edit the ST, respectively).

In the informative Annex A of the ISO 18587:2017, one of the four listed benefits of training language professionals in PE skills is to “provide language professionals with the required PE skills that are different from translation skills”. However, the PE competence model is not yet fully defined. The model by Nitzke et al. (2019) is the closest suggestion to establishing one, as it includes the ‘post-editing competence’, which would consist of “spotting exactly these more fine-grained problems”. Nevertheless, our hypothesis is that a more complex skill set builds up such PE competence. Furthermore, in ISO 18587:2017, five topics are suggested as elements that could be covered in PE training and they are very much in line with the PE-related tasks and skills more valued throughout our survey-based research. For instance, the standard mentions “use of quality tools to perform quality checks” and “advanced terminology work”, which correspond to our T13 and T10 and which occupy the 2nd and 6th positions in the ranking by the three stakeholders surveyed. However, while T5 (MT output quality evaluation) is the 4th task according to

trainers, T10 (the terminology-related task) is not among the 8 most voted activities by trainers only.

In the light of the results of our survey-based research, we speculate that “practice in light and full post-editing” (ISO 18587:2017) covers the three core skills for PE: S1, S7 and S2 (decision-making, error identification and respect of PE guidelines). For this reason, our future research will consist of an experimental setup with the following hypothesis: Split training on the mentioned core PE skills could result in higher productivity (time & edit distance vs quality) when post-editing. These three core PE-related skills were chosen based on the perfect correlation between the three surveyed audiences: LSCs, individual professionals and trainers alike consider them capital PE skills, in the 2nd, 3rd and 4th position of the ranking, just after S3 (Capacity to post-edit up to ‘human’ quality¹¹⁹).

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