The MT post-editing skill set: course descriptions and educators' thoughts

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In a fast-evolving translation industry, practices and workflows often undergo essential changes to which all its stakeholders need to adapt. These stakeholders include language-service companies, translation departments in businesses, end-clients, professional translators and academic educators and researchers. The emergence of new job descriptions and the transformation of existing ones call for updated training methods and models. Machine translation post-editing is currently a field of interest in Translation Studies, a trend recognized by the inclusion of the relevant skills in the European Master's in Translation Framework under the label 'Strategic, Methodological, and Thematic Competence'. In this chapter, a review of the syllabi and courses in postgraduate programmes in Europe is proposed, and the authors explore the views of the educators involved in these programmes, views collected via an online questionnaire and one-on-one interviews. This makes it possible to show how the European Master's programmes have undergone an update in relation to post-editing syllabi in order to adapt to current market needs.

This chapter explores the findings of a mixed-methods study based on an online questionnaire, an analysis of syllabi[i] and one-on-one interviews with educators[ii] in European Master's in Translation (EMT) or related programmes where the students learn and practise machine translation post-editing (MTPE). The decision to consider Master's programmes only (and exclude undergraduate MTPE courses) was made in order to delimit the study, given the time constraints faced by the researchers. Furthermore, the fact that MTPE has been more present in postgraduate programmes (O'Brien, 2002: 105; Plaza Lara, 2019: 276) means that Master's courses probably benefit from a stable body of knowledge about such training. The present study belongs to a larger research project that involves two other questionnaires: one directed at language service companies (LSCs)[iii] and another at individual translators (Ginovart et al, 2020; Ginovart, *forthcoming*, 2020). The findings of the three surveys are presented by Ginovart & Oliver (*forthcoming*, 2020).

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With all three data collection instruments (questionnaire, syllabus analysis and interviews), we had a general research question: How do postgraduate educators train MTPE in Europe nowadays?

In section 1, the relevant literature is summarized to introduce our field of study. In section 2, the methodology used for the three instruments is described. We then present the quantitative outcomes of the online questionnaire in section 3. Section 4 explores the qualitative outcomes: first the syllabi and then the more prominent topics covered during the interviews. Finally, the concluding thoughts and suggestions for further work are set out in section 5.

1. Relevant literature

The conviction that familiarity with translation technology is crucial to a successful professional career is shared by industry stakeholders (Transperfect as reported by Zaretskaya, 2017: 123; SDL in their Corporate Translation Technology Survey, 2017: 12) and translator educators (O'Brien, 2002: 100; Bowker, 2002; Doherty et al, 2012; Doherty & Kenny, 2014; Kenny & Doherty, 2014). More recently, the improved performance of MT, with its neural networks technology, and the expanding presence of MT in the industry are posing a new challenge to translator training programmes. As Cid-Leal et al (2019) point out, there is a shift from computer-assisted human translation to human-assisted machine translation. Colominas & Oliver (2019) present a survey showing that, at Spanish universities, there is a significant mismatch between the real use of MT by students and the use understood (or recommended) by educators. This gap between the educators' beliefs and the actual practice of the students certainly leads to a misalignment between learning objectives and outcomes.

In fact, for some time researchers have generally agreed (O'Brien, 2002; Şahin, 2011) that post-editing is different from conventional human translation and consequently requires specific skills. Gaspari et al (2015) observed that training programmes lacked MT, translation quality assessment, and post-editing (PE) skills in their syllabi. The proposed skill sets found in the literature (O'Brien, 2002: 102–103; Rico & Torrejón, 2012: 169–170; Nitzke et al, 2019: 247–250) can be broadly classified into two different types depending on the function (either more limited or more extensive) attributed to the post-editor. One perspective assumes that the function of the post-editor consists merely in editing and validating the translation suggestions

obtained with an MT system, this being referred to as a 'downward migration' (Kenny, 2018: 66) or a 'limited or reductive role' (Kenny & Doherty, 2014: 290). This definition is applied by a considerable number of stakeholders in both the industry and the research community (Joscelyne & Brace, 2010: 24; KantanMT, 2014; Pym, 2013; Absolon, 2018). At the other extreme, authors such as Rico and Torrejón (2012), Sánchez-Gijón (2016), Rico (2017: 80), Blagodarna (2018: 4), Moorkens (2018b: 4) and Pym (2019) assume a more extensive job profile. In addition to editing MT segments, a professional post-editor performs other functions: linguistic pre-processing, augmenting systems with customized glossaries and managing MT systems and the overarching workflows. It is clear that new professional skills are needed, but neither the industry nor the research community seem to have reached consensus on their specific definition or delimitation. Furthermore, the question has been raised of when such training should be introduced and to what extent (basic introduction or advanced specialized knowledge) (Plaza Lara, 2019: 261–262; Nitzke, 2019: 45).

The lack of agreement on the skills involved is observed, for example, in ISO 18587 (2017). There the training perspective is added as an Annex to the standard. The Annex states the potential benefits of MTPE training in a general way and briefly describes the five topics training may cover (advanced use of translation memory and MT, advanced terminology work, advanced text-processing skills, practice in both light and full PE, and use of Quality Assessment tools). The need for consensus has already led to the emergence of survey-based research to learn more about the current profile of the post-editor in general (Gaspari et al, 2015), and particularly from the perspective of the industry (Ginovart et al, 2020).

2. Methodology

Participants

We emailed more than 200 educators in translation schools drawn from the EMT list of members, but also from other resources so as to include the non-EMT schools. For instance, a shared unpublished database of translation and interpreting schools in Europe is available on the Translation Commons' Learn/Resources Hub,[iv] and there is the list of approved schools published by the American Translators Association (ATA, n.d.). Alternatively, the Internet was browsed by country (European Union, 2020) to find the relevant schools. The method used for

dissemination of the questionnaire was therefore convenience sampling. One possible limitation of or bias in our preselected list of universities is that some translation schools were unknown to the authors and were therefore not contacted.

We sent the 53 educators who agreed to participate a consent form for signature and the link to the online questionnaire. After filling it in, they could agree to take part in an interview with the lead researcher, and 48 did so.

Data collection instruments

The quantitative aspect of our study stems from the data collected via the online questionnaire. We obtained 54 submissions from 53 educators (one of them filled it out twice, as she taught at two institutions[v]). They have different job profiles: while the majority have a full-time position as a professor, some of them come from the industry, that is, they work at an LSC and are guest instructors of the MTPE course (on a more or less regular basis).

The online questionnaire, entitled 'Survey for MTPE training providers'[vi] was available only in English, and was designed in Jotform[vii]. It was open for submissions from May to August 2019. To keep it as short as possible, we focused on three core topics:

1. PE training elements;
2. PE skills; and
3. PE tasks.

However, a series of short questions also broached general or related matters such as PE briefs and guidelines, PE feedback and translation technology tools (10 items in total, see section 3).

To design those parts of the online questionnaire where we present our three core topics (15 training elements, 11 PE skills and 14 PE tasks), we relied on previous work by researchers in the field. To name just a few: the list of 15 training elements was mainly inspired by PE training courses developed by SDL, Trágora (n.d.), DigiLing (n.d.), ASAP Translations (n.d.), TAUS (Van der Meer, 2015), and fellow researchers (for instance, Guerberof and Moorkens 2019). The list of 11 PE skills stems from a reading of work by the Post-editing Training network (Tradumàtica Research Group n.d.), Rico & Torrejón (2012), Guerberof (2013), Doherty and Kenny (2014), Koponen (2015, 2018), Moorkens & O'Brien (2017) and Pym (2011c, 2013), among others. The list of 14 PE tasks was created thanks to the following publications: Krings

(2001), Allen (2003), Temizöz (2016), Sánchez-Gijón (2016), Gaspari et al. (2015), do Carmo (2017), Vintar et al. (2017), Vieira & Alonso (2018) and Blagodarna (2018), among others.

The questionnaire contained 32 questions of different types: multiple-choice with radio button, checkbox (either with or without limited choices), free text, and matrix (a multiple-choice question/answer formed by a set of columns and rows). Even though we did not run a pilot for this specific questionnaire, the design benefited from the lessons learned from the questionnaire submitted to LSCs (Ginovart et al, 2020). For that questionnaire, we not only had a pilot, but we also requested a report on it from the Applied Statistics Service of the Universitat Autònoma de Barcelona. This report helped us improve the types and order of questions and possible answers in order to avoid bias and drop-out as far as possible.

The qualitative aspect of our mixed-methods research stems in the first instance from our reading of the syllabi. But, more importantly, the qualitative data are found in the 49 interviews with the 48 educators who agreed to discuss their course and syllabus with the lead researcher (the same person who filled out twice the questionnaire provided two distinct interviews). The interviews allowed the detailed views of the participants to be collected in order to help explain the initial quantitative survey responses. The interviews were conducted by email, telephone or the Internet (chat or, most often, videoconference), and one was a personal interview.

In the next section, the data collected via the online questionnaire are investigated. To analyse the data, we used the pivot tables function in MS Excel. We first present the outlook for Master's training in MTPE in Europe by probing the respondents on general and related topics: the weight of PE in MTPE-related courses; training materials and aids used in class; methods for MT output evaluation; whether the source text or the target text is read first; the pricing models; PE levels; PE risks; deontological issues; PE briefs, and PE guidelines (studied in more detail by other researchers such as Flanagan & Christensen, 2014). Then, in the last part of section 3 we delve into the core topics of the questionnaire: PE training elements, PE skills and PE tasks.

3. Quantitative results

A total of 61 questionnaires were submitted, of which 54 were considered valid for the present study. Seven submissions were excluded because they concerned courses at the undergraduate level or had another type of audience (such as 'Train the trainer' courses[viii]).

A total of 53 educators engaged in MTPE courses in 17 different countries responded to the survey. As already mentioned, one educator taught two different courses, so we had 54 submissions from the following countries: Austria (1), Belgium (4), Croatia (1), Czech Republic (1), Finland (3), France (6), Germany (8), Greece (1), Ireland (1), Italy (5), Latvia (1), Malta (1), Poland (2), Portugal (1), Spain (8), Switzerland (2) and the United Kingdom (8).

General or related matters

We investigated the following ten general or related matters in order to contextualize our three main topics (PE training elements, PE skills and PE tasks):

- Weight of PE in the syllabus
- Teaching methods and materials
- Evaluation of MT output
- Source or target text first
- Pricing models
- PE levels
- Relation between raw output and final quality
- PE risks
- Ethical and deontological practices
- PE briefs
- PE guidelines

Weight of PE in the syllabus: On Table 12.1, the weight of PE in the syllabi of the courses studied is displayed. However, one limitation must be acknowledged: the possible interpretation of 'syllabus' as either a whole course or part of a course. To deal with this ambiguity, more precise information was gathered when we analysed the syllabi (see section 4).

Weight of PE in syllabus	% of participants agreeing

25% or less	51%
26% to 50%	20%
More than 51%	29%

Table 1 What percentage of the syllabus focuses on PE?

Teaching methods and materials: We included a set of multiple-choice questions (checkbox type, with 9 possible answers, a free-text field, and no limit on the number of answers to be selected). The average respondent selected 5.2 answers. Slide presentations, hands-on PE, and MT output evaluation are the materials used most often in PE courses (see Figure 12.1, which shows the absolute number of times each item was selected and the percentage relative to the total of 277 selections by all respondents).

Category	Value
Presentation of slides	50; 18,05%
Hands-on PE task (full)	43; 15,52%
Hands-on PE task (light)	42; 15,16%
Hands-on MT output evaluation task	39; 14,08%
Readings	35; 12,64%
Hands-on MT training task	29; 10,47%
Hands-on TQA task	20; 7,22%
TAUS Post-Editing/Reviewing Course	10; 3,61%
Hands-on PE task (monolignual PE)	6; 2,17%
Other: Revision of post-edited texts	1; 0,36%
Other: Hands-on PE Project Management task	1; 0,36%
Other: Hands-on on analyzing MT projects	1; 0,36%

0,0% 2,0% 4,0% 6,0% 8,0% 10,0% 12,0% 14,0% 16,0% 18,0% 20,0%

Figure 1 - What training support(s) do you use for your MTPE training?

Evaluation of MT output: As shown in the previous item, the evaluation of the MT output seems to be an important activity (selected 39 times). Regarding methods for MT output evaluation, respondents could select one to four options. The average respondent selected 1.83 methods (nine respondents chose only one method, and two used the 'Other' field to enter their

own method). The content introduced in the 'Other' free-text field by these two educators was 'TAUS DQF'[ix] and 'Productivity measurement', which, in our opinion, are represented by 'Human task-based evaluation' even though the parameters of speed and quality should be added to the equation along with the editing distance. The findings are shown on Figure 12.2.
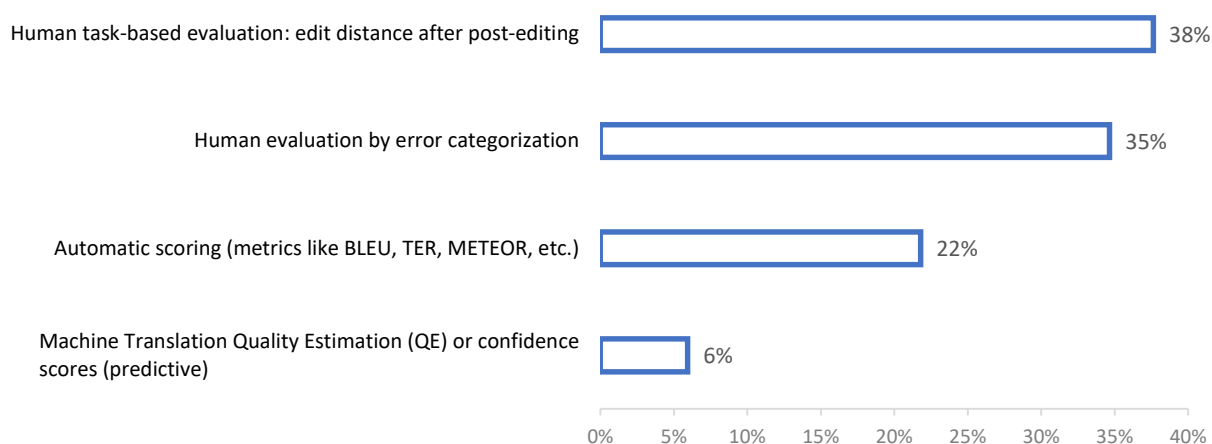

Figure 1 - What two methods would you choose as the most important to be presented to MTPE students, regarding the evaluation of MT output?

Quality estimation (QE), as a method with which users can evaluate MT output, is represented by only 6% of the total 101 selections by respondents. It would seem that QE is still a work in progress, and that no major use of it has been reported in the industry or within academia so far. A change of paradigm can be deduced from Figure 12.2: from automatic scoring (22%) to more human-centered methods such as error categorization (35%) and task-based evaluation (38%).

Source or target text first: We asked the respondents if they discuss what should be read first, the source or the target segment (radio button type of question). Among these educators, 33% advise reading the source segment first; 18%, the target first; and 49% do not hold a definite position on this: they give their students the opportunity to explore both approaches and discuss with them the advantages and disadvantages of both.

Pricing models: We asked the educators whether they discuss with students how to apply a rate for MTPE projects. Out of the 7 available options, the average respondent chose 1.33 types of rate.
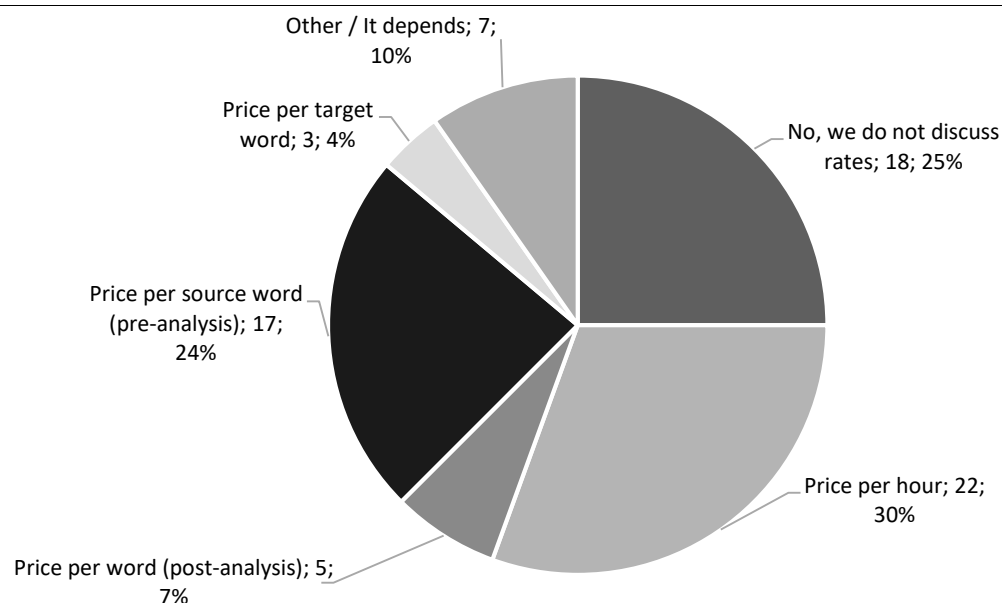
Figure 2 - Do you discuss with the students how to apply a rate on MTPE projects?

On Figure 12.3, it can be seen that 18 respondents do not discuss rates; 22 said that price per hour is the recommended model (this corresponds to 30% of the total 72 selections); 17 respondents selected 'Price per source word (pre-analysis)'; and only a few checked the post-analysis (5) or the target word option (3). It should be emphasized that 7 educators used the 'Other' free-text option to explain that they discuss various possible pricing scenarios and that the pros and cons of each approach are debated. For instance, one respondent said they present the possibility of having a 'price per project'. The possibility of having mixed-model pricing with a fixed rate (source words) and a variable rate (editing distance), as proposed by Bammel (2019), was not mentioned by anyone.

PE levels: When asked 'Which PE levels do you show[x] to your PE students?', given that it was a multiple-choice question, almost all the respondents chose both light and full PE. Indeed, the average respondent selected 1.83 answers. Of the total 99 answers selected, 'light PE' represented 43%, 'full PE' 52%, and 'Other' 5%. This corresponds closely to the hands-on full PE task and the hands-on light PE task seen on Figure 12.1.

Relation between raw output and final quality: To provide a more detailed response than the light–full PE dichotomy discussed in the previous item, we also asked which of the

three relations of Figure 12.4 the respondents explicitly mention during their course. Alternatively, the respondents could choose 'Other/It depends'. The average respondent chose two of these options (total answers=108).
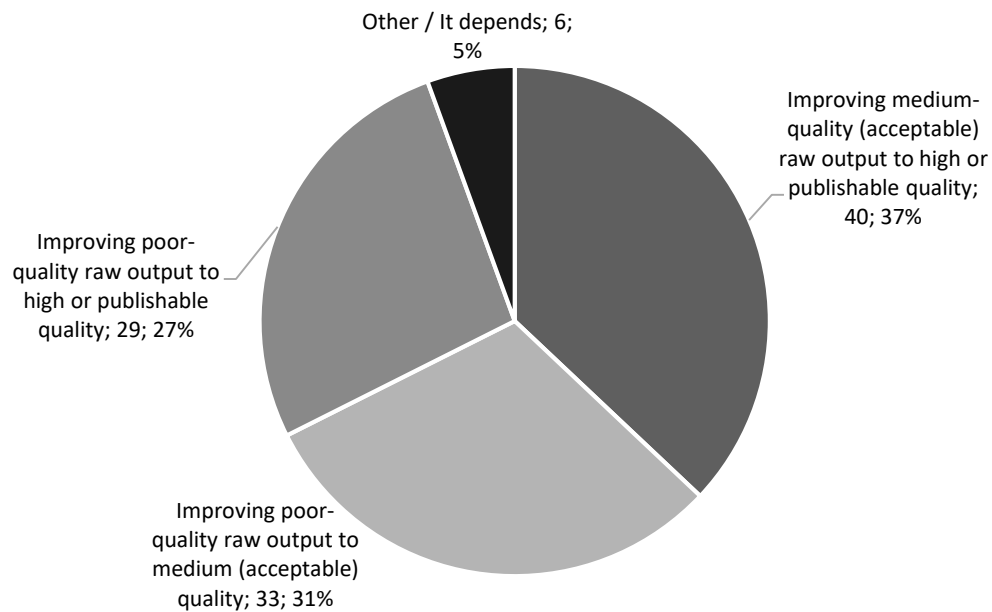

Figure 3 - Which of the following relations between the raw MT output and the final quality expected do you explicitly mention during the training?

PE risks: To deal with the varied correlations between MT output quality and the expected quality of the PE discussed in the previous item, several authors (Mossop, 2014b; Nitzke et al, 2019) have highlighted the need for problem-solving strategies and the trade-off between necessary changes and over-editing. Since this also seemed to be important to understanding the general situation at translation schools, we asked the respondents in a radio button type of question which of the three PE errors (under-editing, over-editing or pseudo-editing) they believe the students are more likely to commit. About half (49%) believe it is over-editing. Some interviewees would justify this at the interviewing stage. According to them, it could partially be explained by the fact that translation schools continue to stress the quality factor in their human translation classes as a general principle. However, 40% of the respondents say that under-editing is also quite often a problem. This percentage might be increasing with the advent of neural MT, as fluency is misleadingly improved (Castilho et al, 2017) and some accuracy errors can go unseen by translators in training. The remaining

respondents either do not have an opinion (7%) or believe their students tend to introduce errors into the MT output, or perform pseudo-editing (4%).

Ethical and deontological practices: We asked the educators whether they discuss the implications of using MT without informing the requester of the translation that it is being used. Only ten of them do not discuss it, and among those who do, one respondent used the free-text 'Other' field to specify that students are advised not to use MT without the agreement of the client.

PE brief: Another important aspect that has not been considered in previous research is how the translation brief may vary with the advent of neural MT, adaptive MT, predictive writing, QE, etc. In answer to the radio button question whether they present a PE brief to the students that is different from a translation brief, 43 (80%) respondents answered 'Yes' and 11 (20%) 'No'. We asked the 43 who answered affirmatively which elements should be present in a PE brief. Out of the ten available options (including 'Other'), the average respondent selected 5.76 elements in this multiple-choice question. On Figure 12.5, we present the absolute number of times an option was chosen and the percentage this represents of the total 248 responses. The responses ranged from 'PE level' (38 responses) to 'Examples of scenarios indicating when to discard a segment' (16 responses).
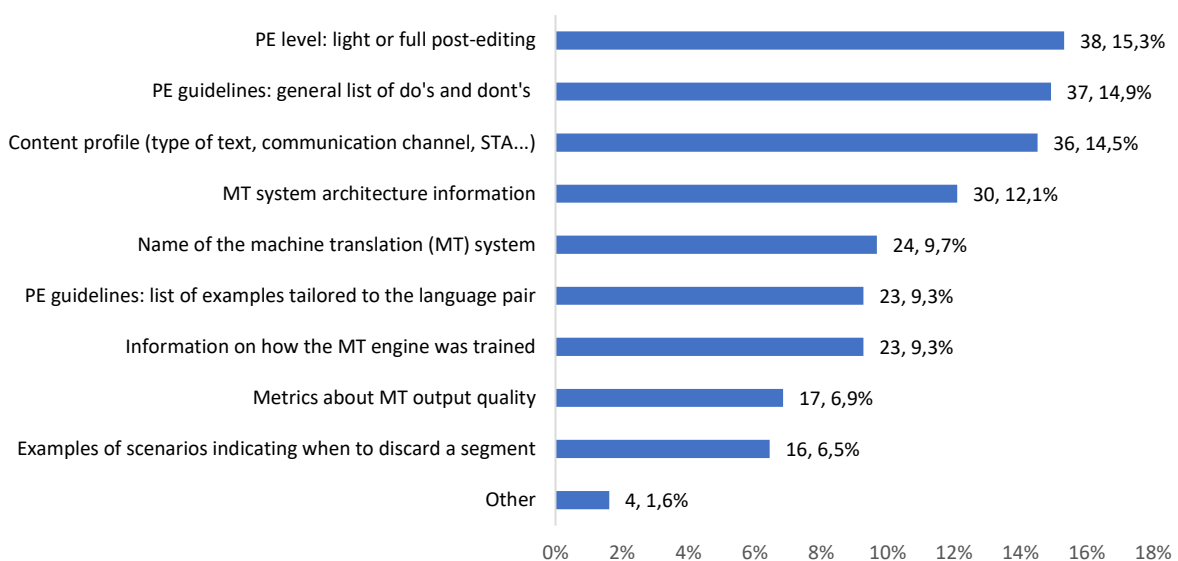

Figure 4 - Which of the following elements do you present to your students as being necessary or interesting in a MTPE assignment or brief?

PE guidelines: As shown in the discussion of the previous item, PE guidelines seem to be an important element in briefs (with 37 selections, guidelines received the second highest number of votes). Out of seven possibilities (including 'None' and 'Other'), we asked the respondents which PE guidelines they present to the students (see Figure 12.6). It was a multiple-choice question and the average respondent selected 1.5 answers (total answers=79). The most selected was 'TAUS post-editing guidelines' (30), followed by 'Only PE level indication' (15) and 'Other' (12). In this last free-text field, the educators explained that various types of guidelines may be presented: inspired by the market/clients or by previous research, or context-specific guidelines. Nine respondents design PE guidelines themselves.
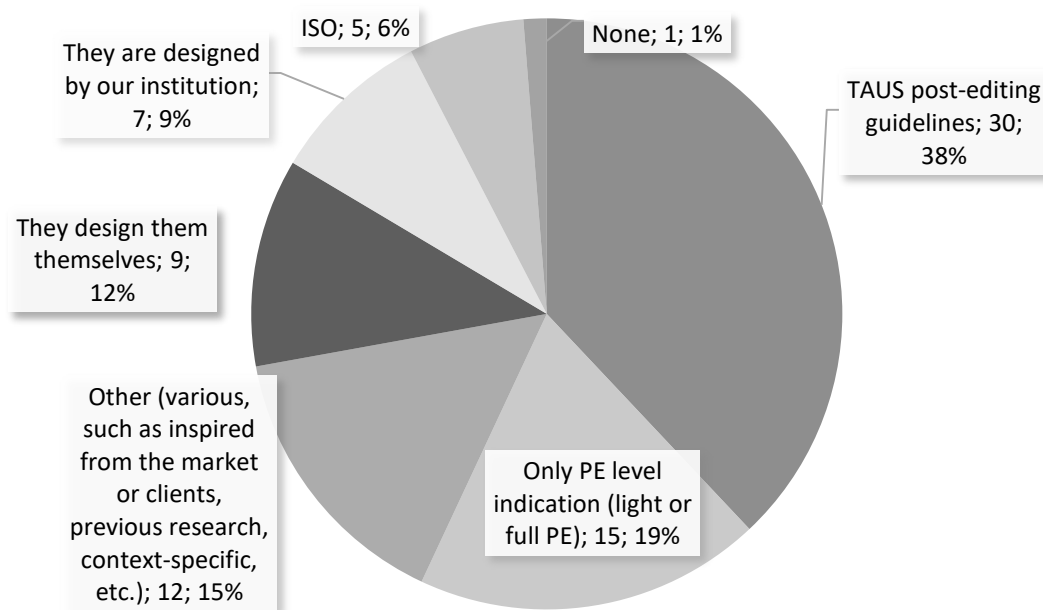
Figure 5 - Which PE guidelines do you present to your students?

Core topics

We will now discuss the core questions of the survey (PE training elements, PE skills and PE tasks).

PE training elements: We enquired, via a multiple-choice question, which topics were covered in the course (see Figure 12.7). With 15 options available, the average respondent chose 9.07 (total answers=490).
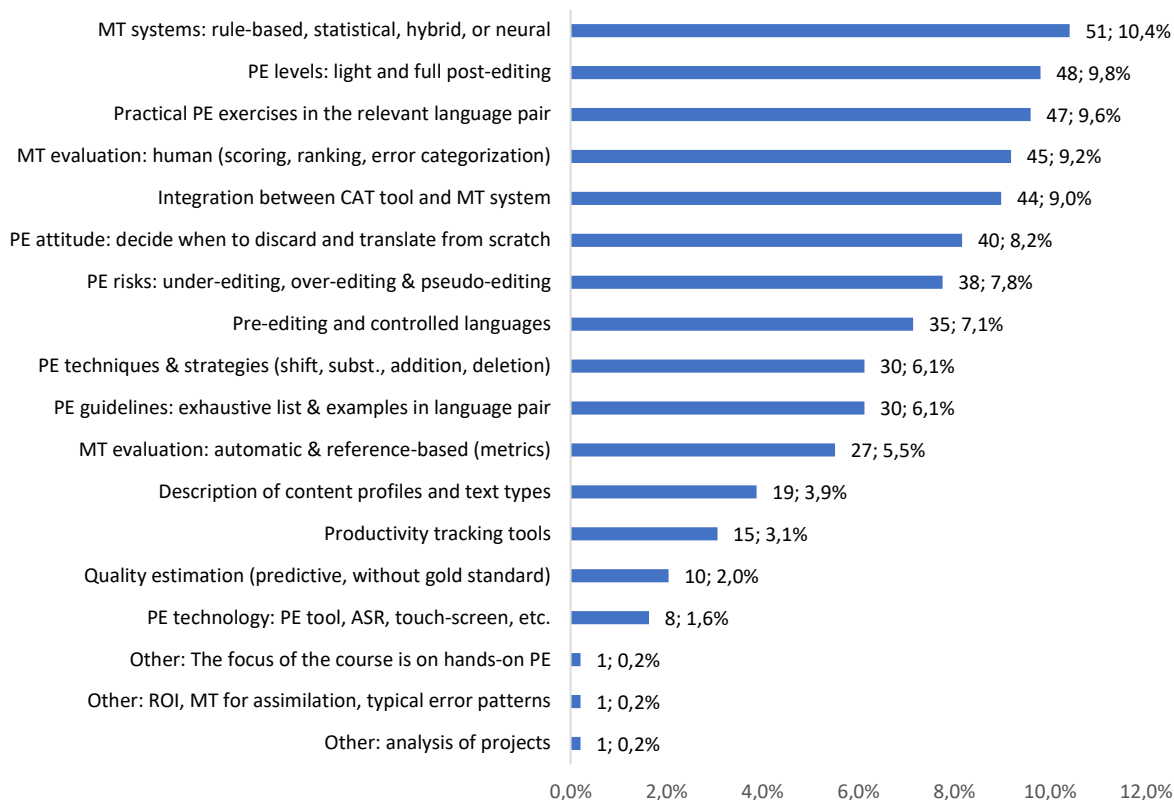
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Figure 6 - Which elements does the MTPE training include?

As seen on Figure 12.7, the most popular choice is 'MT systems' (51); only three participants failed to select it. The next most popular choices were 'PE levels: light and full post-editing' (48), 'Practical PE exercises in the relevant language pair' (48), 'MT evaluation: human (scoring, ranking, error categorisation)' (46), and 'Integration between CAT and MT system' (44).

PE skills: We then asked the respondents to rate the listed 11 PE skills according to their importance to a professional post-editor on a scale from 1 (slightly important) to 5 (very important); each skill could be left unrated (not important). Figure 12.8 shows the average score for each of the 11 skills, with the 'Capacity to post-edit up to human quality (full PE)' included only for reference.
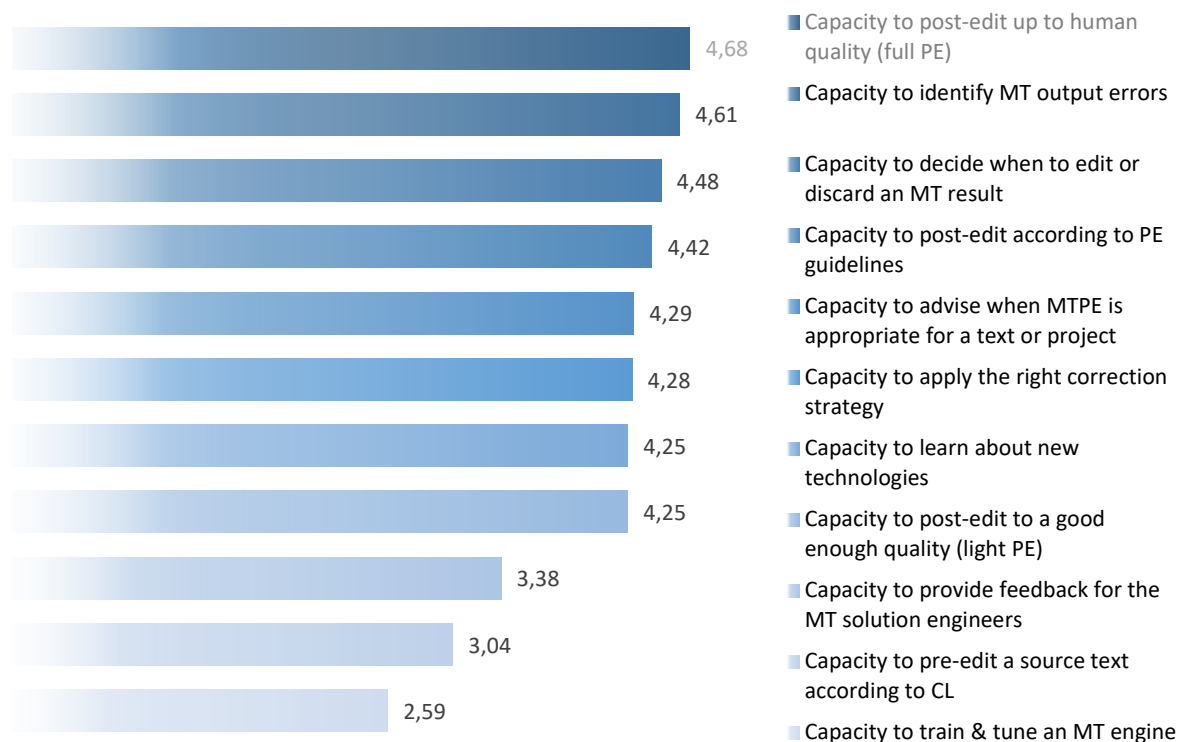
Figure 7 - Please rate the following MTPE skills and competencies according to the importance

As can be observed from the scores on Figure 12.8, MTPE educators claim that identifying MT output errors (4.61), decision-making about editing or discarding MT results (4.48) and applying PE guidelines (4.42) are the three most important PE skills, considering that the 'Capacity to PE up to human quality' (4.68) was present only to give focus to the question. It can be surprising that the 'Capacity to post-edit to a good enough quality (light PE)' is the fourth less voted one in the ranking, considering that 'PE levels' was the second element most covered in the courses (Figure 12.7).

PE tasks: We asked the educators' opinion about the load that PE-related tasks constitute in the everyday work of a professional post-editor. Each of the 14 tasks listed could be rated as main task (3), secondary (2), occasional (1) or not applicable (0). On Figure 12.9, the average score for each PE-related task is displayed. MTPE itself, which has the highest score (2.82) is only shown as a reference.
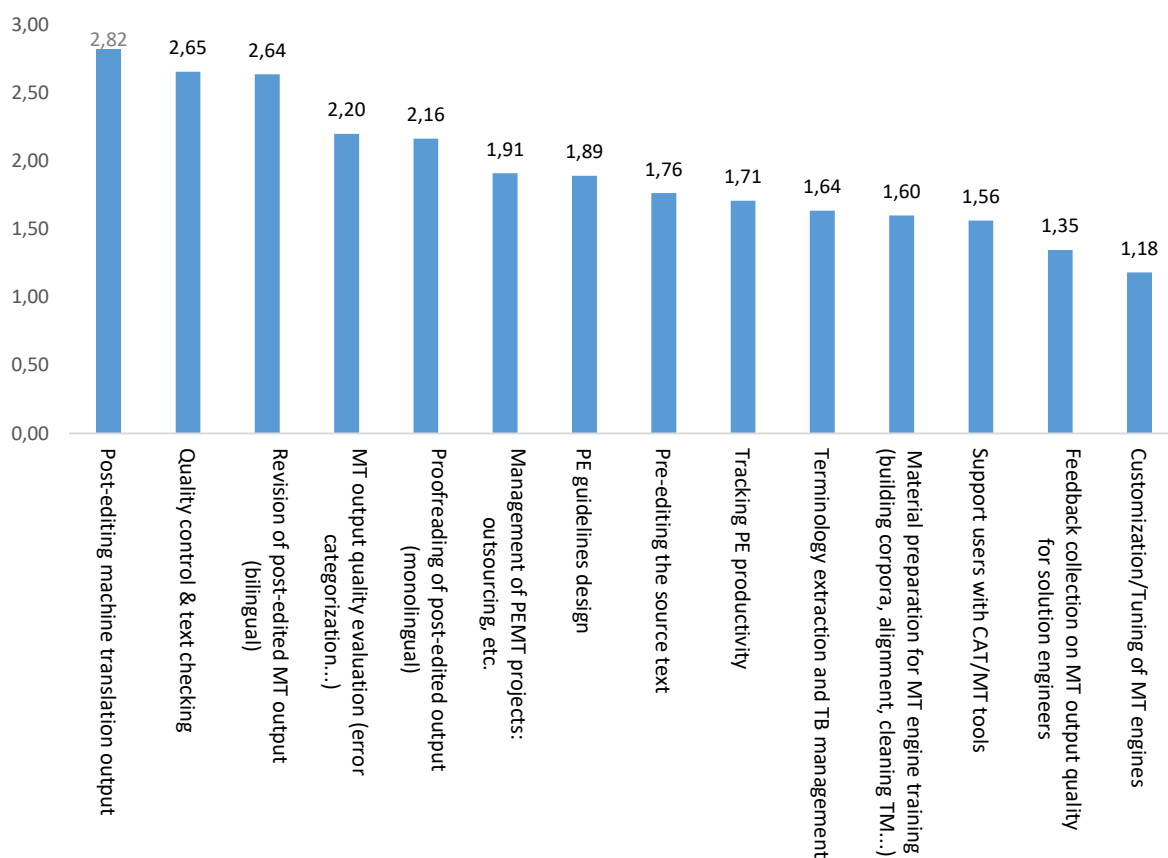
Figure 8 - What workload do you think the following PE-related tasks might carry in the everyday work of a professional post-editor?

According to the educators surveyed, the tasks of 'Quality control & text checking' (2.65), 'Revision of post-edited MT output (bilingual)' (2.64), and 'MT output quality evaluation' (2.20) are the most practised by professional post-editors.

To conclude the questionnaire, we wished to elicit the thoughts and determine the needs of the educators regarding PE courses: 20% said that current PE courses are adequate for meeting needs, 36% are of the opposite opinion, and 44% do not know. This may suggest that there is some uncertainty among educators about industry requirements or, at least, about the needs of their trainees. When asked if they would like to have access to a third-party platform where their students could practise real MTPE assignments, 76% of the respondents responded positively, 15% negatively and 9% said their choice would depend on the specifics of the platform and the assignments provided.

4. Qualitative results

The syllabi

After the educators had been contacted and they had expressed their interest in taking part in this study by signing the consent form, we requested their syllabus outline if it was not available at their institution's website. The 49 syllabi available at the time enabled us to gain insight into the way PE is currently being taught in translation master's programmes in Europe. We were interested in:

- the name of the course;
- whether it is compulsory or an elective module;
- the number of contact and study hours;
- the number of ECTS;
- whether it includes an examination;
- the language pair(s) that it covers;
- prerequisites for enrolling; and
- whether it has or allows for a distance-learning mode.

First, more than a half the syllabi are for EMT programmes. Second, the written outlines contain highly varied levels of information. While some of them are rich in content (name of instructor, teaching mode, teaching language, training activities, methodology, competences and subcompetences, learning outcomes and objectives, evaluation system, calendar), others contain general information only.

Course name: 20 out of the 49 syllabi mention 'post-editing' in their title. The remainder mention 'computer-assisted translation', 'translation tools' or 'translation technology'; others focus on localization, project management, the translation profession or the relevant language pair of the corresponding revision or editing course.

Compulsory or elective: Slightly more than 25% are elective; the remainder are compulsory. Some courses are taught in more than one postgraduate programme, and one possibility is that the same course was compulsory in one programme but elective in another.

Contact and study hours: According to the syllabus outlines, five modules offer 60 contact hours or more; the other 44 typically range from 12 to 50 hours of contact time. However, as was shown on Table 12.1, the hours dedicated exclusively to PE constitute, more often than not, less than half of the syllabus. For two courses, the study time is more than 300 hours; for the other 47, it ranges considerably, from 160 hours to eight hours, and in these courses, the study time on PE in particular presumably varies accordingly.

ECTS credits: The syllabi mostly range from 2 to 10 ECTS; only two syllabi are worth 1 ECTS, three are worth 14 ECTS, and one is a quarter of the Master's (22.5 ECTS).

Examination: 39 syllabi do not involve passing an examination or a test. For evaluation, other tools such as assignments, an essay or a portfolio are used. Ten syllabi include an examination but only four include PE in the examination. With or without an examination, we wondered whether the students' grades take into account to any extent the final quality of the post-edited texts they deliver, which is why we included this question in the interviews (discussed below).

Language pairs: Since PE has traditionally been more linked to courses on computer-assisted translation (CAT) tools, project management or localization, some of the syllabi are (or try to be), as some interviewees put it, 'language agnostic'. Two syllabi enable up to 14 language pairs to be handled. This may depend on the year and the students a course attracts but, in general, the syllabi and the subsequent interviews revealed that the educators have groups of students representing anything from three to eight language pairs. It should be noted, however, that approximately 20 syllabi cover one single language pair, either uni- or bi-directional. The fact that the population of students enrolled can be international either made it impossible to evaluate the quality of the post-edited text (if the educator had not mastered the target language) or led the students to post-edit languages in which they are not native.

Prerequisites for enrolling: Approximately 35 of the courses do not have any formal prerequisites, especially those that are compulsory, since the fact of being enrolled in the Master's programme, for example, or having successfully completed the first year of the Master's, should mean that the students have the basics (of translation, CAT tools or any field that is needed for the given syllabus) necessary to undertake the PE-related course. For the remaining courses, there is usually a recommendation, such as being able to use an MS Office

suite (word processing, spreadsheet and presentation software), being familiar with CAT tools or possessing other information and communication technology (ICT) skills. For a couple of courses, the completion of another, less advanced, course is a prerequisite.

Distance learning: 37 courses require the presence of the student at the university. This can probably be explained largely by the need for a laboratory equipped with licensed software and tools. Even if the students could be connected via a virtual private network (VPN), the educators would probably still need to give hands-on on-site support. For example, students may have technical issues with the VPN or the translation technology tools. Also, considering the content of the class, an answer to one student's question could be useful for the rest of the class, and the oral debate about the quality of different translation solutions probably is (or should be?) a major part of the course.

The interviews[xi]

The 49 interviews, which lasted between 15 and 25 minutes, were mostly held in English, but also in French, Spanish and Catalan. They took place between September and November of 2019 and provided qualitative insights into a number of interesting matters. The interviews allowed the lead researcher to become acquainted with the educator's profile and background, which by itself provided important information.

During the interviews, the lead researcher asked the educators:

1. how long PE has been included in their course ('Age of syllabus');
2. which tools and software they present to the students, and if they have a hands-on class about MT engine training ('Tools and software');
3. if they had or knew at the time of the interview of any plans to increase the PE presence in the curriculum ('Plans to increase MTPE');
4. if their colleagues encourage the use of MT in 'traditional' translation courses ('Use of MT in regular translation courses');
5. if they use the task-based or project-based approach as a pedagogical method in the course ('Teaching methods');

6. whether or not their students have hands-on practice in error categorization and, independently, what is their opinion of the error typologies with neural MT outputs ('Error categorisation of the MT output');

7. if they think trainee post-editors should be encouraged to read the source or the target segment first ('Source or target segment first');

8. if they include pre-editing of the ST in their course, and if they think this is useful to obtain a higher NMT output quality ('Pre-editing of the ST');

9. if they consider the final quality of the post-edited product in the students' assessment ('Evaluation of the PE text');

10. if deontological issues with MTPE are discussed in class and what their views are on this topic ('Deontological issues with MTPE'); and

11. whether they know the so-called 'split principle' as a training method for MTPE ('Split training').

Age of syllabus: In which year was the course first given? Since when has it included PE? Even though two courses go back to 2000 and 2005, the majority are more recent, and the most pioneering syllabi started tackling the matter of PE between 2012 and 2014. Especially in the past five years, from 2015 to 2020, PE has shown a clear growth trend: either new courses are being created from scratch or PE is gaining more weight in existing courses about CAT tools, MT, project management or related fields. This probably has to do with the introduction of standards such as ISO 18587 and the inclusion of PE-related skills in EMT, reflecting the reality of the market.

Tools and software: It is common practice to use more than one CAT tool during the course. The four most used are Memsource, SDL Trados Studio, Matecat and MemoQ. MS Excel and Word are used by six of the educators to practise the PE skill set in their courses. Finally, some mentioned Across, STAR Transit and Lilt. On the topic of MT providers, the most used is Google Translate, followed by DeepL. The remaining educators mentioned Microsoft and/or Bing, KantanMT, Tilde, e-Translation and SDL Language Cloud. The vast majority do not train MT systems in their courses.

Plans to increase MTPE: At the time they were responding to the online questionnaire (from May to August 2019), more than half of the participants surveyed already knew that their course would undergo modifications. Most changes would be to dedicate more ECTS and hours to PE; some would entail splitting a course and making one stand-alone course in revision and PE. A couple of participants said that PE would now be included in the undergraduate programme.

Use of MT in regular translation courses: We wanted to ascertain whether PE practice and the PE skill set are present throughout the whole programme and not only in one single course. There seems to be an ongoing effort to increase the use of CAT and MT tools in regular translation classes. Half of the respondents either do not know about their colleagues' use of MT in their classic translation courses or know that they do not introduce MT at all. The other half know at least one traditional translation course where the educator includes some practice with translation technologies. However, it is more often CAT tools than MTPE. Little research has focused on the evolution of traditional translation courses to include MTPE, and the authors are convinced that 'Train the trainer' courses would be helpful in moving in that direction.

Teaching methods: The project-based approach, in which the students perform 'multi-facetted learning activities in real (and not just realistic) working environments', held promise in the past decade (Kiraly, 2012: 84). The interviewees were asked whether they favoured a task-based or a project-based approach, or another teaching method. A significant number of educators claim that their course as a whole is not project-based, but rather task-based. Nonetheless, one of these tasks is to work on a CAT-tool project to some extent. Even when some interviewees first said that their syllabus had a project-based approach, in further discussion about Kiraly's model we agreed that it is somewhere in between: one exercise that has the shape and appearance of a real translation project may last over two weeks, but this is only *one* part of the course; before or after this specific assignment there are other exercises or activities on MT and/or PE which are task-based. Approximately ten of the studied syllabi are structured according to the project-based approach.

Error categorization of the MT output: Almost half of the interviewees do not currently have a structured exercise or one that involves comparing neural MT errors to other types of MT errors (rule-based, statistical or hybrid). Even if an exercise about error categorization is

not present in a course, we asked the interviewees if they had an opinion about the similarities and difference between the NMT outputs nowadays compared to other MT systems in the past. All except one agreed that the error typology has changed since the advent of NMT. One, for instance, says "we dedicate almost an entire class to the typical errors and advantages of RBMT, SBMT and NMT". In general, they also observed the "improvements regarding target language fluency that had already been reported in the research community, such as an increased quality of morphology and syntax", to quote one educator. Approximately 20 educators went further to state explicitly that the challenge now lies in the capacity to spot accuracy errors.

Source or target segment first: This seems to be a controversial topic. We asked the educators who had not chosen one or the other in the online questionnaire (49%) what would determine a preference for one method over the other, in their opinion, or whether they observed a tendency among the students. One explained:

> I would say I'm a bit 'old school' in the sense I tend to focus on the source text: in my opinion, ultimately, an MTPE task has the same basic goal of a 'traditional' translation task: to convey the meaning of the ST. Therefore, I tend to start reading the ST and only then the TT, trying to make the most of the MT output in order to convey the ST meaning. In my personal experience, reading first the TT can easily influence the way we understand the ST, thus leading to a more error-prone state of mind of the post-editor. However, I try not to influence my students, and I try to make it clear to them that both approaches have merits and flaws. And, despite the fact that I do not have the 'scientific' data to support my theory, I would say the students that have a stronger background in 'traditional' translation tend to focus more on the ST. The less experienced students are generally more open to try both approaches, and some of them prove the TT-focus to work nicely as well.

Pre-editing of the ST: Most respondents do not include any assignment or activity on pre-editing in their course. A few do have practice in controlled language or pre-editing, but those who said on the survey that they cover it in their class were mostly referring to a theoretical presentation of the concept or a mention of the possibility of doing it in the industry, not actual hands-on experience. This was clarified during the interview. It has to be emphasized that for the three cases (pre-editing not present, mentioned only, or practised too), there was the possibility, confirmed by some educators, that pre-editing is more extensively covered in

another syllabus. We also questioned the participants about their opinion of the usefulness of controlled language and pre-editing with neural MT outputs, and the general reaction was hesitant and sceptical. Predominantly, their feeling is that the need for pre-editing may be less significant with neural than with statistical MT (as has been suggested in Nitzke et al, 2019), but that it can still be useful or necessary, depending on the style and genre of the text and mainly to ensure high-quality originals. Some mentioned how difficult it can be to introduce pre-editing in a real scenario in the translation industry, when sometimes the LSC does not know who wrote the ST, or when the producer of the ST cannot anticipate that it is going to be machine-translated later. However, for those who still consider that pre-editing will, to some extent, benefit the MT output quality, it is striking that formatting corrections came up quite often as factors that could have an impact on the quality of the MT output. Some educators also referred to the profitability of pre-editing only when there are a certain number of target languages into which a text must be translated.

Evaluation of the PE text: We asked whether the final delivered quality of the post-edited text was considered when calculating a student's grade. One of the interviewees commented:

> The quality of the final texts is not (directly) evaluated, as we're more focused on checking if the students are able to identify the usual features of MT, its typical advantages and errors, and if they are able to properly take advantage of MT in a MTPE task. However, we do discuss how different approaches to MT influence the final quality of the text: for instance, we compare versions of the same texts where a student tried to use as much as possible of the MT output and other student chose to translate most of the text from scratch, and we discuss, with the whole class, if we can clearly state that one is better than the other, taking into account several factors that can influence that result (the translator him/herself, the type of text, the technology used, the intended purpose of the text, etc).

There are more instances of courses in which the quality of the post-edited text is not graded than courses where it is. Still, in 15 of the courses the quality of the product is taken into account for the purposes of evaluation. In some cases, even when quality cannot be a consistent variable for grading, a compromise is found: it is evaluated only for the target languages that the educator

can competently correct; colleagues help with evaluating other target languages, or groups or pairs of students review their peers' post-edited texts.

Deontological issues with MTPE: When asked about the ethical question of whether to inform a customer that MT is being used, some of the educators clearly regarded not informing as being intrinsically a violation of the code of ethics; a professional translator should always inform the customer about the tools they use. More often, the view among the educators was that MT tools should be available to translators without the prior agreement of the client, as long as they are used as one more resource for providing a product whose quality is not inferior to the one that would have been provided with human translation (which nowadays assumes the use of CAT tools). Adopting a similar position, some interviewees stated that they show their students how the use of an MT system remains embedded in the metadata of each translation unit or segment in a CAT environment. Only a couple of interviewees mentioned the potential dangers of sending confidential data to the MT providers. Confidentiality is still an important aspect of MTPE, one that providers such as Google seem to take seriously (Google Cloud, n.d.). However, the community of users still express doubts (Gheorghe, 2019), which probably means that educators should tackle these issues more often in their courses. Likewise, we enquired about the possibility of a translator post-editing the MT output in a language in which the translator is not native. It seems that the 'mother-tongue principle', which has already been progressively abandoned in the industry (Wagner et al, 2014: 103), is also not so important in MTPE training: more than half of the respondents have to 'accept' more than one language pair in their PE hands-on practice. This is just one more reason to start researching the best way to include MTPE in regular translation classes.

Split training: To conclude, we asked the interviewees about their knowledge of 'split training' (Absolon, 2019) because it appeared to be a quite unknown recent proposal. Only one of our interviewees knew about it. The lead researcher explained her understanding of it: it consists in dividing skills into subskills to a more or less granular level and in attributing a tailored practical exercise to each subskill. Once introduced to the concept, their opinions were diverse, ranging from a minority of positive views through a majority who did not express a view either way, to some interviewees who expressed their conviction that it would not be useful in their courses.

Finally, some educators introduced new topics that had not been foreseen in the interview but that are certainly of current interest in the MTPE field. One mentioned that, instead of focusing so much on classifying errors, it would be better to show the students processes from real scenarios – for instance, how to prepare good feedback after PE, so that engineers of MT systems can continuously improve their algorithms with sound training data and linguistic insights.

5. Concluding remarks

Recently, the Master's programmes in translation or related studies have been updated, especially regarding their MTPE content. Some of the educators in our study have found the same trend is affecting undergraduate programmes too.

In this chapter, we have discussed the outcomes of a survey-based study mixed with qualitative data from syllabi outlines and interviews with the relevant educators. In general, the customization or training of MT engines is excluded from MTPE courses in European postgraduate programmes. We have also learned that it is common practice to present more than one tool (CAT environment or MT system), which calls for task-based activities rather than a project-based methodology. According to our interviewees, few colleagues include practice in MTPE in their 'traditional' or 'regular' translation courses. This lack of intertwining of traditional translation techniques with the use of technologies may partially explain why 76% of our respondents say they would benefit from an online platform where their students could have PE hands-on practice, as this would allow to further combine these two skill sets, traditionally separated at translation schools. Only in a few cases is the final translation quality evaluated, since it is commonly understood that this is a competence to be learned in regular translation courses; the emphasis in MTPE classes is mostly placed on procedures and processes, the features of software, and maybe the techniques for efficient keyboard use. The interviews with the educators also highlighted their scepticism about the use of controlled language or pre-editing for MT.

Whereas our interviewees often expressed their wish for a more holistic pedagogical approach, this seems difficult to put it into practice. Indeed, ICT skills for translators, especially with regard to MTPE, are taught as a completely separate competence from translation

techniques aiming at quality deliverables. One remarkable observation by two interviewees was that PE is trying to be regarded as a different skill, distinct from translation, but for them it is not so different: the MT engine is just one more resource that, in the end, is similar to other translator resources, such as translation memory.

The concept of 'split training' elicited positive interest among a number of the educators, whereas others thought it was too 'mechanical'. However, we believe that further research into split training should not exclude the possibility of eventually integrating it into a holistic teaching methodology. In particular, it is possible that the greater the level of granularity to which split training in PE skills is researched, the easier it will be to build up modules tailored to any specific audience or context. For this reason, the next step in our work will consist of an experimental pretest-postest study similar to the one conducted by Dede (2019). In it, we will evaluate online split training built around the three main PE skills identified in this chapter and in the larger research project mentioned in our introductory remarks: the capacity to identify MT output errors, to decide when to post-edit or translate from scratch, and to apply PE guidelines (see Figure 12.6 in section 3).

We expect that professionals who successfully master core PE skills will be able to build their careers eventually to practise what Pym (2019) has described as "[an] 'authorizing' activity, somewhat akin to that of a notary in the field of official documents or a good copy editor in publishing […]". Such mastery may enable all stakeholders to devise a consensual definition of job descriptions so that *human-assisted* MT may be assimilated to 'a post-editing service' (assuming a good-quality MT output) and *machine-aided* human translation could in turn be assimilated to 'a translation service'.

Acknowledgements

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[i] We understand 'syllabus' to mean the 'summary outline of a course of study', and 'course' as 'a number of lectures or other matter dealing with a subject' (following the definitions of Merriam-Webster's), and we acknowledge that in certain places in the questionnaire and during interviews the meanings might overlap.

[ii] Following Massey, Kiraly, and Ehrensberger-Dow (2019: 212-213), the term 'educator' has been used in this chapter, even if in some cases (unfortunately, in our opinion) MTPE is still regarded as an isolated purely practical activity.

[iii] According to ISO 18587:2017, Translation Service Provider (TSP) and Language Service Provider (LSP) include single freelance professionals. We use 'LSC' as a more restricted term than TSP or LSP, but one more comprehensive than 'translation agency'.

[iv] Prepared by a Lille 3 student for the EUATC during his Master's 2 (TSM) internship at Nancy Matis SPRL. Available at http://xl8.link/List.

[v] The fact that she agreed to fill in the questionnaire twice, and to have two distinct interviews, shows that she was aware of reporting about two different courses. In the case of the more subjective questions that is, those that pertain to the instructor and were not course-related we have excluded her answers (53 submissions).

[vi] https://form.jotformeu.com/82844920241354.

[vii] https://www.jotform.com/.

[viii] A short professional course provided by an expert in a specific field to update the knowledge and practices of university educators.

[ix] Data Quality Framework of the Translation Automation User Society (TAUS).

[x] The word 'show' in the questionnaire was chosen on purpose to include, as far as possible, those courses in which time or other constraints may prevent actual practice, but still define theoretically the two levels of PE.

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[xi] Since the views shared by the educators sometimes were nuanced, vague modifiers such as 'majority' or 'some' are at times used when reporting the qualitative results.