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Introducing MTPE Pricing in Translator Training: A Concrete Proposal for MT Instructors

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Introducing MTPE Pricing in Translator Training: A Concrete Proposal for MT Instructors

In recent years, machine translation post-editing (MTPE or PE for short) has been steadily gaining ground in the language industry. However, studies that examine translators' perceptions of, and attitudes towards, MTPE paint a somewhat negative picture, with PE pricing methods and rates being a major source of dissatisfaction. While the European Master's in Translation Competence Framework stresses the importance of preparing translation graduates for market challenges, to date there have been no concrete suggestions for practical activities designed to introduce MTPE-pricing-related topics into the translation classroom. The present article aims to address this gap by describing a teaching unit developed for master's students. The activity includes comparing three MTPE pricing methods commonly used in the industry: word-based, time-based and effortbased rates. Using authentic performance data from individual PE tasks carried out in MateCat, students were able to discover the different levels of remuneration they would receive for the same task, depending on the pricing method applied. The results, which show wide variation across both methods and students, proved useful in raising students' awareness of the thorny issue of setting PE rates and sparking reflection on the financial implications of accepting PE assignments.

Keywords: translator training; machine translation post-editing (MTPE); PE pricing; PE rates; PE module

1. Introduction

In recent years, machine translation post-editing (MTPE or PE for short) has been steadily gaining ground in the language industry. For instance, according to the 2022 European Language Industry Survey (ELIS 2022), more than 75% of respondents who are freelance language professionals (n=745) now offer PE services, while language service companies (LSCs, n=264)

consider PE to be "the activity with the highest growth potential" for the coming years (ibid.,14). However, studies that examine translators' perceptions of, and attitudes towards, MTPE paint a somewhat negative picture (Cadwell et al. 2017; Läubli and Orrego-Carmona 2017; Moorkens 2020; Nunes Vieira and Alonso 2020). On the basis of an analysis of translators' forum and blog postings published between 2005 and 2017, Nunes Vieira (2020) finds that most of the criticism levelled at MT is not due to the technology itself, but rather to business practices such as how PE jobs are quoted for and billed. PE rates emerge as a major source of dissatisfaction from both academic studies (Álvarez-Vidal et al. 2020; Pérez Macias 2020) and professional surveys. For example, according to a recent survey by the French Society of Translators (*Société française des traducteurs*, SFT 2022), 57% of respondents (n=1204) simply refuse to take on PE assignments. Among them, 54% (n=686) mention that they do so because of the low rates (the second reason they give is that PE tasks are uninteresting). This shows not only that PE pricing is a major source of dissatisfaction for practising post-editors, but also that it prevents translators from undertaking PE assignments.

Despite its crucial importance, especially for young graduates entering the translation market, the topic of PE pricing is rarely discussed in translator training programmes. If it is included, it tends to be dealt with quite cursorily (Ginovart Cid and Colominas Ventura 2021). The aim of this article is to present a concrete pedagogical proposal on integrating PE pricing methods into PE training with a view to raising students' awareness of this topic, enhancing their critical-thinking skills and, ultimately, enabling them to face current and future market challenges. The teaching unit we describe was tested with a cohort of first-year master's students in spring 2022, which allows us to report on concrete findings and reflect on ways in which this initial proposal can be further improved in future iterations. The remainder of the article is structured as follows. Section 2 presents a brief overview of PE training in translator education, focusing on the most recent pedagogical trends. Section 3 deals with existing PE pricing methods. In Sections 4 and 5, we outline the MTPE-pricing teaching unit we have developed, and we discuss our main findings and observations. Section 6 concludes the article with further suggestions aimed at the inclusion of pricing in PE modules.

2. Machine translation post-editing training in translator education: current foci and gaps

MTPE training is now being increasingly integrated into translator training, especially at master's level (Plaza Lara 2019; Ginovart Cid and Colominas Ventura 2021). This trend is clearly reflected, for example, in the newly updated version of the *European Master's in Translation (EMT) Competence Framework* (EMT Expert Group 2022), which acknowledges that "MT literacy and awareness of MT's possibilities and limitations is an integral part of professional translation competence" (ibid., 7). Accordingly, the EMT framework includes competences directly related to MT and MTPE, such as "Post-edit MT output using style guides and terminology glossaries to maintain quality standards in MT-enhanced translation projects" (ibid., 8) and "Understand the basics of MT systems and their impact on the translation process, and integrate MT into a translation workflow where appropriate" (ibid., 9). Alongside translation competence models that incorporate MT and PE skills, PE-specific competence models have also been developed, such as the one described in Nitzke, Hansen-Schirra and Canfora (2019).

The first concrete, fully fledged pedagogical proposals aimed at the integration of PE training into translator training programmes emerged more than a decade ago (e.g. Doherty and

Kenny 2014; Kenny and Doherty 2014; Koponen 2015). Since then, proposals and initiatives directed at MT and MTPE training have mushroomed, taking many different forms. Broadly speaking, a distinction can be made between two main approaches (Kenny 2020: 509; Konttinen, Salmi and Koponen 2021: 189-190): on the one hand, stand-alone translation technology modules focusing (fully or in part) on MT and PE (e.g. Guerberof and Moorkens 2019; Nitzke, Tardel and Hansen-Schirra 2019) and, on the other, language-pair- and/or domain-specific practical MTPE tasks in translation courses (e.g. Kübler, Mestivier and Pecman 2022; Pavlović and Antunović 2021). Typically, MT- and MTPE-dedicated modules cover themes such as MT history and MT systems, MT quality evaluation, controlled languages and pre-editing, PE quality levels and PE effort (Ginovart Cid and Colominas Ventura 2021). Some educators have also devised modules that are attuned to students' specializations, such as public service interpreting and translation (e.g. Sánchez Ramos 2022). Even though the added value of stand-alone technology courses cannot be denied, Sánchez Ramos (2022: 304) shows that translation students are in favour of having more teaching hours devoted to MT and PE in order to fully develop and consolidate their PE skills. In particular, a balance needs to be struck between crosscutting theoretical considerations and language-pair-specific practical activities. For example, Koponen (2015: 13) acknowledges that "[t]he most important challenges relate to the fact that the [stand-alone] course is offered to students in all language and translation subjects, which makes it difficult to provide materials for all the language pairs they may be working in". Mellinger (2017: 280) goes one step further and argues that "[i]n order for translation graduates to serve as professional post-editors in the language industry, this content must be embedded in multiple courses across the curriculum, rather than concentrating the material in a stand-alone course or module" (see also Konttinen, Salmi and Koponen 2021 for a similar view). To achieve

true curriculum-wide implementation of MTPE training, several hurdles need to be overcome, such as the training of translation trainers not yet familiar with MT and PE (Rico and Gonzalez Pastor 2022). Another related pedagogical aspect of such cross-curriculum initiatives is quality evaluation of student PE products, as students need to benefit from structured feedback on their post-edited texts in order to acquire solid PE skills (see Lefer, Piette and Bodart 2022).

As can be seen, the scope of MTPE training has been extended in numerous ways in the last few years, with increasingly tight incorporation into translation curricula. However, despite these encouraging developments, there are still significant gaps in MTPE training. A particularly neglected topic is PE pricing. In their survey, Ginovart Cid and Colominas Ventura (2021) show that out of 72 educators surveyed, a quarter do not discuss MTPE pricing models at all, while the majority of respondents recommend either a per-hour or per-word pricing method. Only seven educators reported that they discuss several pricing scenarios in class and debate their respective pros and cons. Trojszczak (2022: 189), however, insists on the need to train students to "strategically adjust their post-editing actions in terms of purpose (high-risk or low-risk texts), price, cognitive effort required, and time limitations", so that students can "acquire knowledge and skills necessary for negotiating the value and price of their human responsibility with market stakeholders by taking into account various external circumstances and factors indicated in translation briefs". This view is echoed in the EMT Competence Framework (EMT Expert Group 2022) and other syllabuses (see for instance Doherty and Kenny, 2014). However, to date there have not been any concrete suggestions for practical activities to introduce pricing-related topics in translation curricula. The present article aims to address exactly this gap in translator training by describing and assessing a teaching unit on MTPE pricing devised and implemented at the Louvain School of Translation and Interpreting in spring 2022.

3. The quest for information on MTPE pricing

Several blogs and professional fora provide translators with an indication of the average rates charged to clients and agencies, which vary widely depending on language combination, content type and translator's country of activity. For instance, the well-known forum Proz.com has a dedicated webpage¹ listing the standard and minimum average rates (both per source word and per hour) that users report in their profiles. However, a disclaimer at the top of the page warns that these rates may not reflect the reality of local markets and can differ according to the services provided (translation, proofreading, etc.). In many countries, local laws prevent professional associations from publishing the minimum rates that their affiliates should charge (Lambert and Walker 2022). To circumvent this issue, associations regularly survey their affiliates about rates and remuneration methods applied – see for instance AITI (2018) in Italy, CBTI-BKVT (2018) in Belgium and SFT (2022) in France.

While it is relatively straightforward to obtain information on how translation rates are calculated², newcomers to the translation industry will find that information on MTPE pricing is rather sparse. What is more, there is absolutely no consensus among industry stakeholders on how – and how much – post-editors should be paid for MTPE assignments. In its MTPE guidelines, TAUS (Massardo et al. 2016) provides some guidance on this aspect. According to the report, a PE pricing model should be predictive – that is, able to set prices up-front –, fair for

¹ https://search.proz.com/employers/rates (accessed 3 November 2022)

² See for instance

https://wiki.proz.com/wiki/index.php/Determining_your_rates_and_fees_as_a_translator (accessed 3 November 2022)

all parties involved, and appropriate, i.e. it should take into account content type and language pair. To develop such a pricing model, the report suggests combining automatic metrics, manual evaluation and productivity assessment.

Setting MTPE rates is a thorny issue that raises concerns among freelancers and LSCs alike (ELIS 2020; Nunes Vieira and Alonso 2020). Drawing on common translation pricing methods, the industry has mostly applied rates per (source) word for MTPE jobs (Álvarez-Vidal et al. 2020; ELIS 2022; SFT 2022). Indeed, according to the results of the latest ELIS survey (2022: 26), the method most frequently used by LSCs is word rate, followed by discount percentages applied to the standard translation rate, which are set using various methods. Hourly rates lag far behind (ca. 11% of respondents), while only ca. 5% of respondents apply other remuneration methods. Interestingly, ca. 38% of LSCs carry out PE in house, thus avoiding the question of setting fair PE rates for the remuneration of external freelancers. Similar trends emerge from the SFT 2022 survey: 61% of respondents (n = 519), especially young, inexperienced translators, apply word rates, while 26% of them report the use of hourly rates.

Per-word rates applied to MTPE jobs are often discounted, starting from the corresponding translation rates. On their website, the SFT indicates that PE rates vary depending on the PE level applied: while rates for full PE correspond to 70%-80% of full translation rates, those for light PE go down to 30%. Lower rates are justified by the fact that MT reduces post-editors' work, compared to traditional translation³. While per-word pricing has the advantage of setting the price in advance, it does not consider post-editors' effort, be it cognitive, temporal or

³ https://www.sft.fr/fr/fiche-metier-post-edition (accessed 3 November 2022)

technical (Krings 2001). To account for this, in the RWS blog, Izabella Lizuka⁴ suggests a method of establishing per-word rates that take account of post-editors' effort: for long MTPE projects, the post-editor post-edits for an hour and then divides the usual hourly rate by the actual number of words post-edited in that time, thus arriving at the price per word to apply to the rest of the project.

Time-based methods can be particularly useful when working with interactive and adaptive MT (Nunes Vieira and Alonso 2020); they are, however, likely to penalize faster posteditors. A fairer method would also consider MT quality, which can be evaluated via the number of changes made by the post-editor to the raw MT output. This comparison is done using editdistance-based metrics, such as Translation Edit Rate⁵ (TER, Snover et al. 2006). Some proposals have suggested creating an MT-discount grid based on editing distance, similarly to what is done with TM fuzzy matches (Cattelan 2014; Nimdzi 2020). However, using pricing methods based on edit-distance alone is deemed unfair and misleading, as these metrics do not reflect the actual technical effort involved (Nunes Vieira and Alonso 2018). More generally, Cumbreño and Aranberri (2021) have shown that PE effort metrics associated with different effort types do not correlate with each other.

To minimize the drawbacks of existing metrics, several LSCs have developed more complex MTPE pricing schemes, introduced at various academic and industry events⁶. For

⁴ https://community.rws.com/product-groups/linguistic-ai/b/weblog/posts/isn-t-it-time-to-embracemachine-translation-post-editing-the-localization-use-case-for-mt (accessed 3 November 2022)

⁵ TER was designed to "[measure] the amount of editing that a human would have to perform to change a system output so it exactly matches a reference translation" (Snover et al. 2006:223).

⁶ See for instance GALA https://www.gala-global.org/events/events-calendar/gala-connected-2021pricing-impact-machine-translation-fairness-and (accessed 3 November 2022)

instance, Scansani and Mhedhbi (2020) present the pipeline developed at Acolad to compute MT engine-specific discounts. The process comprises three steps: the use of automatic metrics to assess whether the engine is ready to be used in production; human evaluation to estimate the amount of editing required for each sentence in a test set; and a PE productivity assessment which includes tracking temporal effort and editing distance. The final coefficient – computed by averaging the coefficients obtained at the end of the manual evaluation step and the productivity assessment – is then subtracted from the per-word rate for no-match segments⁷. Such discount, based on the evaluation and the performance of two different linguists, is then applied to all MTPE jobs carried out under the same conditions (i.e. using the same engine and language pair). Other LSCs have proposed applying a maximum and minimum charge for the client, with a more detailed calculation at the end of the process, based on the actual editing distance⁸. Although the exact final cost is not predictable, this method can help establish for each MTPE job the price range that is most acceptable to clients and post-editors.

Given the intricacies of MTPE pricing described above, we wish to argue that translation students need to be properly introduced and sensitized to this key professional aspect *before* they enter the language industry.

4. A proposal for the introduction of MTPE pricing in a PE module

The first year of the master's programme in translation at the Louvain School of Translation and

⁷ In their article, Scansani and Mhedhbi (2022: 397) report: "[The final coefficient] will be then subtracted from the per-word rate for no-match segments when MT is used". It is unclear, however, whether this rate corresponds to a full translation rate.

⁸ See for instance Hunnect <u>https://hunnect.com/mtpe_fair_pricing/</u> (accessed 3 November 2022)

Interpreting includes a compulsory course on revision and post-editing. In spring 2022 the two modules of the course, revision and post-editing, were taught separately by two instructors, both active in the translation industry, which enabled students to approach work on pre-translated texts from different perspectives. The PE module lasted 15 contact hours, with a one-hour introductory session followed by weekly two-hour sessions. The course was offered in hybrid mode, i.e. some classes were taught on line, while others took place in person and were also streamed via Microsoft Teams. Thirty-one French-native-speaker students were officially enrolled in the PE module, which consisted of two parts. The first (7 hours) covered an introduction to the functioning of various MT systems, common MT errors and MT evaluation methods. The second (8 hours) dealt with various aspects of MTPE, such as PE levels, guidelines, tools and post-editing effort. The last session of the module included a thorough comparison of MTPE and revision, and a discussion on this topic with both instructors. Practical exercises were offered throughout the module.

As part of the second half of the PE module, a session was specifically devoted to practical and ethical issues of working with MT, including a review of the most common MTPE pricing methods and an activity devised to raise students' awareness of the implications of applying different calculation methods when setting MTPE rates. Figure 1 represents graphically how this teaching unit was organized.

[FIGURE 1 HERE]

The analysis of MTPE pricing methods took place in the seventh session of the PE module, which was taught on line. During the previous session, students had been introduced to the concepts of light and full PE, and had been assigned two PE tasks to be performed in MateCat⁹, an online CAT tool that records data on the PE process and provides, for instance, the time spent on the task and the changes made to the raw MT output, automatically computing a TER score. This last is expressed as PE effort.

Students were asked to post-edit the French versions of two texts translated from English using DeepL¹⁰. The texts were to be post-edited to different levels. The text used for full PE (text A) was a description of an indoor garden kit to be sold on a popular e-commerce platform, while the text for light PE (text B) was a set of instructions for using an electric kettle. The two texts differed slightly in length (196 and 234 words respectively), and students were given a four-day deadline to carry out the tasks. Students were informed that MateCat records the time spent on each segment, and were therefore instructed to close the editing window after completing the task. Once finished, they were asked to fill in a form on the eLearning Moodle platform indicating how much they would have liked to be paid for each task and explaining how they computed these amounts.

In class, the two exercises were used as a starting point for engaging students in a discussion on practical aspects of offering post-editing as a service. This started with a brief introduction to three common MTPE pricing methods: word-, hour- and TER-based pricing. Then a live quiz was launched via Wooclap¹¹, a tool used at the Louvain School of Translation and Interpreting to engage students during online lectures. This questionnaire asked students to list the advantages and disadvantages of each method. A final question asked which pricing

⁹ https://www.matecat.com/

¹⁰ In order to provide all students with the same DeepL translation, we created a translation memory with the MT segments and deactivated the suggestions coming from other sources in MateCat.

¹¹ https://www.wooclap.com/

method seemed the best and fairest for all the stakeholders involved (agencies, clients and posteditors). After that, students were given a pre-compiled Excel file with which to calculate their rates on the basis of the three pricing methods introduced by the trainer. Rates were fixed starting from a per-word translation rate of $\notin 0.10$, which is an average translation rate in Belgium for the English-to-French language combination (CBTI-BKVT, 2018). Table 1 lists the MTPE rates that were applied.

Word-based	Time-based	TER-based
Light PE: €0.03/word	€30/hour or €7.5/15 minutes	0%: €0.01/word
Full PE: €0.08/word		1%-25%: €0.04/word
		26%-74%: €0.08/word
		75%-100%: €0.10/word

Table 1: MTPE rates applied by the students

Word-based rates for light PE were slightly lower than for full PE, as is often the case in real PE jobs (see Section 3). The time-based rate was set at €30 per hour, which corresponds to an average revision rate. However, to simulate a real-life scenario, and since the texts used were short, we asked students to calculate both a minute-based rate and a 15-minute flat rate. Finally, TER-based rates were calculated as word-based rates that take into account the percentage of raw MT output changed during the PE task (these were calculated over full texts). Students used the information collected in MateCat to fill in the Excel form, and could then see the extent to which amounts varied when different calculation methods were used for the same task.

Once finished, students were asked to answer another quiz about the pricing method they would like to apply in real life. They were also asked to write a reflective essay, on a voluntary basis, about this experience and to suggest new pricing methods that would mitigate the disadvantages of the three methods seen in class. This activity was to be performed in the week following the session.

5. Findings and discussion

In this section we discuss the students' PE performance in the two PE tasks, the results of the various quizzes they took before and during the teaching unit and the rates they obtained¹².

5.1 Post-editing tasks: students' performance

Twenty students carried out the PE tasks on MateCat. Data on average time-to-edit and percentage of raw output modified (PE effort) in each task are represented in Figures 2 and 3, respectively. For task A (full PE), students took on average 17:18 minutes to complete the task. However, the median value is 14:40 minutes. While the fastest student took slightly more than 4 minutes to complete the task, the slowest participant took ca. 65 minutes. A similar trend emerges for task B (light PE): the fastest student took ca. 1 minute and the slowest 50 minutes, with an average time-to-edit of 10:19 minutes and a median value of 7:49 minutes. Although text

¹² It is worth noting that not all the students enrolled in the module took part in the weekly activities, which were not compulsory. Furthermore, although 20 students performed the PE tasks described, not all of them participated in the MTPE-pricing session, nor answered all the live quizzes. For this reason, in this section we will include the number of participants (n) at each stage of the teaching unit.

B was slightly longer than text A, light PE allowed for faster task completion.

[FIGURE 2 HERE]

In terms of PE effort (Figure 3), for both tasks the minimum was 8%, while the highest effort was 28% for full PE and 27% for light PE. In full PE, students modified on average 16% of the raw MT output (median=17%), while in light PE, 14% of the output underwent modification on average (median=13%). It is worth noting that the fastest post-editors are not those who made systematically fewer modifications (e.g. P16 and P17).

[FIGURE 3 HERE]

Although participants were instructed to focus fully on the task and to close the MateCat window immediately after post-editing each text, it is possible that the two slowest students (P7 and P15 in Figure 2) did not comply with these instructions. An alternative explanation is that these two students carried out many more terminology searches than their peers. As for the fastest students, a reason for their swift completion of the tasks can be found in the way MateCat records the time spent on the task and the time spent on each segment: the platform starts recording time once the post-editor has selected a segment, i.e. has clicked on it, and stops recording once the user clicks on the "Translated" button (or presses Ctrl + Enter). If the segment remains unchanged, the time-recording function is not activated. In other words, the platform does not take account of the reading time spent on a segment if the latter is not modified. This method results automatically in underestimation of the time spent on the task – which is the sum of the time spent on post-editing

individual segments.

Regarding PE effort, the value indicated for the finished product corresponds to the average PE effort recorded for each segment¹³. Clearly, this value does not necessarily correspond to the actual technical effort – since if a student deletes the whole segment and then rewrites it exactly as it was, the system will not record any change. Furthermore, if the posteditor forgets to confirm a segment and just scrolls down to the next sentence, the changes made will not be recorded, and the PE effort recorded will be zero.

In conclusion, the platform is not particularly transparent as to how performance data are recorded, and students' behaviour during PE tasks can have a tremendous impact on their remuneration if a tool like MateCat is used to compute performance-based pricing.

5.2 Prior knowledge (quiz 1)

When asked how much they would like to charge for the two tasks they had just performed, students (n=18) provided answers that differed strikingly across the cohort. For the full PE task (text A), they reported that they would on average charge \in 11, with rates ranging from \in 4 to \in 21, while for the light PE task (text B) amounts were consistently lower, with an average of \in 8 (ranging from \in 2 to \in 17). Most students applied word-based rates to come up with these amounts, often having researched the topic themselves with internet searches (e.g. on the SFT website). Interestingly, the students who applied word-based rates did not start out from the same word counts: the majority (n=15) used English source words for their calculations but some

¹³ https://site.matecat.com/deliverables/d5-3/key-performance-indicators/ (accessed 15 November 2022)

students relied on the "payable words" reported by MateCat¹⁴, which resulted in extremely low rates. Here, clearly, they failed to exercise critical thinking. Other students, by contrast, applied time-based rates (n=2) or mentioned that they took account of the presence of technical lexis as well as segment length or topic complexity to set their rates (n=2). As can be seen from the results of this first quiz, our students had very little prior knowledge of MTPE pricing methods.

5.3 MTPE pricing methods: pros and cons (quiz 2)

After the trainer had briefly introduced in class three common MTPE pricing methods, namely word-, time- and TER-based pricing, the students took a second quiz. The results of the quiz indicate that around half of them (n=9/20) found that time-based pricing was the fairest method for the stakeholders involved, followed by TER-based (n=7/20) and, far behind, word-based (n=4/20). This finding is interesting, as time-based methods had only been mentioned by two students in the first quiz (see Section 5.2). Students were also asked to list the various advantages and disadvantages they saw in each of the three pricing methods. Their answers are summarized in Table 2.

Table 2: Pros	and cons of th	e three MTPE	pricing methods	introduced in class
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Word-based pricing	Time-based pricing	TER-based pricing
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¹⁴ In MateCat, payable words do not correspond to actual source words: they are the outcome of intricate calculations based on TM (translation memory) fuzzy matches and previously edited MT segments. See

https://guides.matecat.com/how-matecat-calculates-payable-words (accessed 15 November 2022)

Pros	Can be set in advance	Takes account of task	Precise calculation
	You can charge for	preparation	Automatic calculation
	unedited PE segments	Takes account of	
		terminology searches	
		Better quality because	
		you can spend time on	
		the assignment	
Cons	Does not take account	Cannot be set in	Does not take account
	of terminology	advance	of task preparation
	searches	Ethical issue =	You cannot charge for
	Does not take account	spending too much time	unedited segments
	of level of text	on the assignment to	even though they
	specialization or	earn more	require attention too
	difficulty	Concrete	Low rates for light PE
	Does not take account	implementation:	Ethical issue =
	of the actual time	hesitation about when	overediting MT output
	taken to complete the	to start counting time,	to earn more
	task	the need to use a	
	Based on source	stopwatch or take	
	words, which can be	breaks into account	
	an issue for language		
	pairs with a high		
	expansion rate		

As can be seen from Table 2, students raised a wide range of important issues. These mainly relate to clients (e.g. how to set rates in advance, how to make sure that post-editors adopt an ethical attitude by not spending too much time or making too many edits so as to earn more)

and the concrete implementation of pricing methods (e.g. how to measure the time spent on an assignment). Various aspects of the translation workflow were also mentioned, such as the time spent on administrative handling of PE assignments and terminological searches, which are typically disregarded in word- and TER-based pricing methods. Students were also attuned to the importance of being paid for reading MT segments that are ultimately unedited in the final PE and the unfairness of using source-word-based pricing for language pairs with high expansion rates (which is the case for the pair involved here). All in all, we see that the introduction of the three pricing methods sparked wide-ranging reflections on what choosing a fair PE pricing method entails for all the parties involved, and that the students mentioned a wide variety of practical and ethical aspects of PE.

5.4 Application of the three pricing methods: quantitative overview

The students were prompted to enter their individual time-to-edit and PE effort data recorded in MateCat in a pre-compiled Excel form. This allowed them to ascertain the remuneration they would receive for each PE task, depending on the pricing method used. Figure 4 shows the average amounts per task.

[FIGURE 4 HERE]

Word-based rates, set at $\notin 0.08$ per source word in full PE and $\notin 0.03$ per source word in light PE, generated the same remuneration for all student post-editors, namely $\notin 15.68$ for text A (196 words, full PE) and $\notin 7.02$ for text B (234 words, light PE).

Minute-based rates, set at $\notin 0.50$ per minute, reflect differences between students based on their performance. The average remuneration for post-editing text A was $\notin 8.63$ (median= $\notin 7.50$), compared with an average of $\notin 5.15$ (median= $\notin 4$) for text B. While the slowest students earned up

to $\notin 32.50$ (task A) and $\notin 25$ (task B), faster students were penalized for their speed and earned only $\notin 2$ (task A) or $\notin 0.50$ (task B). Flat rates (per 15 minutes) further exacerbated these differences: a post-editor who completed the task in, for example, 16 minutes was paid twice as much ($\notin 15$) as a peer who completed the task in 15 minutes ($\notin 7.50$). As the texts were fairly short, most students were paid $\notin 7.50$ or $\notin 15$. Only two students, one per task, were paid more than their peers ($\notin 37.50$ and $\notin 30$ for tasks A and B respectively).

Finally, although the average percentage of raw MT output changed is quite similar across the two tasks (see Section 5.1), the average TER-based rate for the light PE task is higher than that for the full PE task (\notin 9.83 and \notin 8.62 respectively). This is because (i) in this pricing method, we did not apply different per-word rates for full and light PE, and (ii) text B was longer than text A. As shown in Figures 5 and 6, TER-based amounts were the same for all students (light blue bars), except for two students who earned \notin 15.68 in task A (P09 and P16), and one student who was paid \notin 18.72 for task B (P07).

[FIGURES 5 AND 6 HERE]

While we acknowledge that some pricing calculation methods are less plausible in real-life projects (e.g. the minute-based rate, since post-editors would rather set a minimum rate per assignment), they were used for pedagogical purposes to bring to the fore the main advantages and disadvantages of these pricing methods in a practical teaching activity.

5.5 Best pricing method (quiz 3 and reflective essays)

Once students had calculated the rates they could apply, based on numerical data generated by MateCat, they were again asked which pricing method they would like to use. Contrary to the results of the first quiz (see Section 5.2), where time- and TER-based methods ranked first and

second respectively, here word-based pricing came first (n=10/15), followed by time-based pricing (n=5/15). None of the students chose TER as a pricing method, probably because of the low amounts they arrived at when calculating their TER-based rates (see Section 5.4). Interestingly, 13 students out of the 15 who participated in both quizzes changed their mind between the two (as shown in Figure 7). Even though we did not collect data on the reasons for these changes, it is apparent that the pedagogical activities developed to tackle the issue of MTPE pricing at least helped the students to reflect critically on the issues involved and to decide which method they preferred and would apply, if given a choice.

[FIGURE 7 HERE]

Five of the students provided reflective essays, in which they were asked to suggest alternative pricing methods. Even though few essays were received (given the voluntary nature of the task), the students proposed a number of alternatives with a view to addressing the weaknesses of the traditional methods. For instance, they suggested: adapting word-based pricing on the basis of level of text specialization and time spent on the assignment; providing a quote to clients that would include a price range rather than a specific rate; combining time- and TER-based methods.

6. Conclusion and implications

Anthony Pym (2022) rightly argues that one of the most crucial challenges for universities offering translator training programmes is that of addressing, and hopefully alleviating, the "extreme anxiety about technology" (ibid.) that some of our students experience, given the hype currently surrounding neural MT (see also Nunes Viera 2020 on the issue of automation anxiety). We strongly believe that the technological revolution that the language industry is witnessing calls urgently for new pedagogical initiatives directly geared towards empowering

translation students. Inter alia, students need to be made aware of the various ethical aspects and practical implications of working with technology as language professionals, including issues related to MTPE pricing methods and fair pay. This kind of awareness-raising training, which needs to take place before students graduate and enter the market, will allow them to become game-changing actors in the language industry (e.g. through their active involvement in professional associations, cf. Lambert and Walker 2022).

In this article, we have described a specific pedagogical activity designed to introduce MTPE pricing into translator training, at master's level. The teaching unit, which centres around a two-hour session, consists of a combination of practical tasks (PE assignments, rate calculations), frontal teaching (brief introduction to MTPE pricing schemes), live quizzes and reflective essay writing. We informed students about three PE pricing methods frequently used in the industry: word-based, time-based and effort-based rates. We first helped them to initiate a critical reflection on the advantages and disadvantages of each method. Then, using their own individual PE performance data collected via the MateCat platform, students were prompted to calculate the remuneration they would receive on the basis of the three pricing methods introduced by the trainer. The results showed wide variation across both students and methods, as individual students obtained very different amounts for the exact same task, depending on the method applied. This sparked much insightful thinking on the part of the students on a number of crucial ethical and practical aspects of MTPE. Interestingly, even though it was not our initial objective, the teaching unit also helped students pinpoint some of the technical challenges involved in the use of MateCat (and similar software) to obtain performance data (e.g. how timeto-edit is computed, lack of correspondence between PE effort percentages and actual effort, reliance on the construct of "payable words").

Future iterations of the teaching unit could include a thorough presentation of surveys conducted by national and international professional associations that focus on MTPE rates and pricing methods. Although some of the pricing schemes we used in our teaching unit are admittedly less utilized in real-life projects (e.g. minute-based rates, for which professionals would rather set a minimum flat rate), they turned out to be a useful way of helping students to identify the main advantages and disadvantages of the selected pricing methods. We also believe that an account of more complex pricing schemes would be a welcome addition, as they are becoming increasingly commonplace (and in some cases lack transparency). Second, we think it is important to use a software programme that records performance data transparently, for instance by taking account of the time taken to read segments that are not edited in the final product. At the same time, it must be stressed that the technical challenges posed by MateCat are likely to affect real-life projects. As such, the use of MateCat represented an interesting springboard for addressing these practical issues with the students. Finally, at a very practical level, our teaching unit was offered on line, and we found that fully engaging students presented quite a challenge, despite our use of Wooclap. Judging by the number of answers received for the second quiz, we suspect that some students left the online session before the end. The online format also made it more difficult to initiate a lively group discussion after students had computed their remuneration. Holding the session on site would definitely help to overcome these two limitations.

While we recognize that our proposal can be further improved and fine-tuned, given that what we have described in the article is its very first iteration, we believe that it has considerable pedagogical value: it is engaging and easy to implement, and requires relatively little effort on the part of the trainer. It is our hope that the teaching unit, adapted to suit different students' needs, will be used in other training contexts to raise students' awareness of the challenges of setting PE rates and to stimulate reflection on the financial implications of offering PE services.

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Figure 1. Overview of the teaching unit

- Figure 2. Individual time-to-edit (in minutes) per PE task
- Figure 3. Individual PE effort (percentage of raw MT output modified) per PE task
- Figure 4. Average remuneration per pricing method, per PE task
- Figure 5. Individual remuneration per pricing method (task A)
- Figure 6. Individual remuneration per pricing method (task B)
- Figure 7. Preferred pricing method in quiz 1 vs quiz 3