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# The role of machine translation in translation education: A thematic analysis of translator educators' beliefs

Celia Rico
*Universidad Complutense de Madrid, Spain*
celrico@ucm.es

Diana González Pastor
*Universitat de València, València, Spain*
diana.gonzalez@uv.es

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**Abstract:** Discussions on the teaching of machine translation (MT) have usually remained confined to translation technology pedagogy. Syllabus design, models for competence development, methodologies and evaluation procedures in this area have benefited from advances in translation pedagogy, but findings relating to the teaching of MT have been slow to be implemented in the translation classroom. Numerous studies have reflected translators' perspectives on MT, including those of professional associations, employers, and institutional organizations. Students' perspectives have also been collected, but the voice of the translation instructors is yet to be heard. A number of questions arise: What do translator educators think of MT? Would they be willing to use it in the translation classroom? If so, how and to what purpose? To answer these and related questions, we present the results of a qualitative study conducted with a group of translation educators at Universitat de València (University of Valencia, Spain) in the context of a broader research project. We specifically investigated their beliefs and perspectives towards the introduction of MT into the translation classroom. We used open-ended questions to collect qualitative data, and subsequently analysed responses within the framework of Grounded Theory. Findings provide valuable insights for discussion on the following topics: MT literacy, the blurring of MT key concepts and categorizations, the effect of MT on the development of translation competences, agency in MT reaching a stage where there is no longer a place for the human translator, and the eventual eclipse of the translator.

**Keywords:** Translation pedagogy, machine translation; translator educators' beliefs; thematic analysis; qualitative research

## 1. Introduction

The unstoppable advance of machine translation (MT) in recent years has brought with it the gradual incorporation of MT systems into the translation process, reshaping the language industry and a market that is ruled mainly by pricing (Vieira, 2018). This scenario is due not only to an increase in the quality of the MT output itself, but also to a change of perspective in terms of quality, "a movable concept that directly depends on customer expectations" (Leiva Rojo, 2018, p. 278), which is closely related to the nature and characteristics of the source text and the purpose of the translated materials. From a technical point of view, a large number of computer-assisted translation (CAT) tools

already integrate neural MT engines and post-editing interfaces. In the near future, it is expected that boundaries among these technologies will become less clear, with MT as a fundamental part of CAT tools.

As already anticipated by Pym (2013, p. 487), this has brought about "changes in the skill sets required of translators", who are now gearing their role towards that of a post-editor. As far as we know, and for teaching purposes, translation technology (and MT) have been conceived of as a form of instrumental competence, and, as such, have traditionally been taught in specific and separate courses in the translation curriculum (Rico, 2017a). It is our contention that the teaching of technology (and, thus, of MT) should find ways of mirroring what is already happening in the professional landscape. We understand this might involve a significant transformation in translation pedagogy, but before any change can be made, or even proposed, the perspectives of translator educators need to be taken into account.

The present work reports findings from a qualitative study conducted with a group of translation educators at Universitat de València (University of Valencia), aimed at investigating their perspectives on the introduction of MT in translator training. This work was carried out in the framework of the research project DITAPE, as part of a broader research work in translation pedagogy[1]. One of the aims of DITAPE was to explore how (and if) translator educators can benefit from the teaching of translation technology as a core element included all along the student curriculum. In the experience reported in this paper, we concentrated in gathering the beliefs of translation educators in the following aspects: what tasks MT involves, what role the human translator plays when using MT, how MT can be best put to use in the translation classroom, and what competences they think MT fosters in students. Our focus was on eliciting qualitative data that could be used to lay the foundation for further studies in this direction. We first present the background to our work, introduce, then, the methodology we followed for the design of the study, and describe the characteristics of the participating instructors. The core of our work lies in describing our findings and discussing them in relation to previous studies. We will conclude by suggesting recommendations for further research.

## 2. Background

There has been much discussion as to how digitization and the numerous developments in translation technology —tools, methods and content— affect the traditional translation model. The concept of text itself has already been put to question (Pym, 2011). Such reflections have naturally moved towards the role that technology plays in translator education with a review of the traditional competence model in the translation curriculum in higher education. Far from the traditional existing multi-layered translation competence models (see, for instance, NAATI 2015 and PACTE 2003), which are based on the assumption that technology is a piece of instrumental knowledge that must be acquired, there is a movement towards "minimalist approaches" where technology is considered as a capacity to be developed in three basic competences (Pym, 2013, p. 489-491): 1) learn to learn; 2) learn how to trust or distrust data; and 3) learn to review translations as texts even if they are phrases segmented by a translation memory. In this connection, Austermühl (2013) puts forward two

[1] The DITAPE Research Project (2021/GV/080) is funded by the Regional Government of the Valencia Community.

metacompetences: 1) the ability to review texts in the target language, and 2) the ability for documentary research. Interestingly enough, the issue of translation competence as related to technology was addressed later than original proposals in Translation Studies (Neubert, 2000; PACTE, 2000; Pym, 1998 & 2003; Risku, 1998). This probably may be due to a reductionist perspective supporting the idea that technology can be only served as an artifact (Rico, 2017b). The prevailing viewpoint in Translation Studies still seems to be one that considers technology as a new element to be incorporated in translation programmes as "an alternative tool to boost the translator's efficiency" (Díaz Fouces, 2019, p. 65). However, following Rozmyslowicz (2014), a change of paradigm is needed in order to account for the many advances in translation technology so that teaching it to students is no longer viewed as an option, but as a path to simulating and improving the translation process.

On a methodological side, recent studies advocate for the use of real projects in the learning of translation technology (Mitchell-Schuitevoerder, 2020), moving translator training into a situated learning framework (González Davies & Enríquez Raído, 2016). Other approaches implement the learning portfolio (Calvo, 2017; Rico, 2017b), which serves as a tool for student's empowerment (Kiraly, 2012). Similarly, Samson (2013) believes that the acquisition of general technology skills begins with the use of appropriate IT tools to carry out projects and solve problems in professional situations or well-contextualized simulations, which in turn promote student's autonomy. Accordingly, translation programmes must therefore be adjusted to the needs of the market by integrating MT in a broad range of situations (Gaspari, Almaghout & Doherty, 2015). In this respect, studies on the use and perception of statistical machine translation reported that it is necessary to incorporate it intensively in stand-alone courses (Kenny & Doherty, 2014; Doherty & Kenny, 2014). Other proposals have emerged in favour of incorporating MT across the translation curriculum (González Pastor & Rico, 2021), since stand-alone courses on translation technologies seem to be insufficient to prepare students, "as language professionals are involved in multiple stages of MT implementation: terminology management, pre-editing and post-editing content, and recommending changes to MT service providers" (Mellinger, 2017, p. 290). The general outlook of how MT has affected the translation profession is completed by recent market reports containing the latest figures and forecasts (Vasiļjevs et al, 2019), user studies and translators' opinions (Cadwell et al. 2017; Moorkens et al. 2018; Ginovart Cid, 2020) or insights into the changing role of the translator (García, 2011; Ive, Max & Yvon, 2018; Way, 2018; Vieira, Alonso & Bywood, 2019).

In view of all this wealth of information we reconsidered the translation classroom and asked ourselves a simple question: How is MT influencing our students' learning process? And: Should MT really affect the way we teach translation? If so, how? With these issues in mind, we conducted a qualitative study among a group of translator educators in order to analyse their views on the consequences MT might have on the configuration of the translation curriculum and in translation pedagogy.

## 3. Research design and methodology for analysis

The group of participants in the survey was made up of 17 translation educators who attended an introductory course on MT and post-editing at Universitat de

València[2]. Participants were members of the Department of English and German Languages. The following table presents some of the socio-demographic characteristics of each sample member: age, gender, academic position, number of years in translation education.

Table 1. Socio-demographic characteristics of participants in the study[3]

| Participant No. | Age | Gender | Academic Position | Experience in Translation Instruction (years) |
|---|---|---|---|---|
| 1 | 30-40 | Female | Ayudante Doctor | 10-15 |
| 2 | 30-40 | Female | Ayudante Doctor | 5-10 |
| 3 | 50+ | Male | Catedrático | more than 15 years |
| 4 | 40-50 | Female | Ayudante Doctor | 10-15 |
| 5 | 40-50 | Male | Titular | 10-15 |
| 6 | 30-40 | Male | Ayudante Doctor | 0-5 |
| 7 | 40-50 | Female | Ayudante Doctor | 10-15 |
| 8 | 40-50 | Female | Ayudante Doctor | 10-15 |
| 9 | 40-50 | Male | Catedrático | more than 15 years |
| 10 | 50+ | Male | Catedrático | more than 15 years |
| 11 | 30-40 | Male | Contratado Doctor | 0-5 |
| 12 | 40-50 | Male | Contratado Doctor | 5-10 |
| 13 | 25-30 | Female | Contratado Doctor | 0-5 |
| 14 | 50+ | Female | Titular | more than 15 years |
| 15 | 40-50 | Female | Ayudante Doctor | 10-15 |
| 16 | 40-50 | Female | Ayudante Doctor | 5-10 |
| 17 | 40-50 | Male | Titular | 10-15 |

[2] The course was organised by Universitat de València and IULMA (Instituto de Lenguas Modernas Aplicadas de la Comunidad Valenciana) from 30 to 31 May 2019.
[3] We keep academic titles in Spanish since there are no direct equivalences.

On the first day of the course, participants completed a 25-item questionnaire just before the actual training started. The questionnaire was self-administered (implemented in Google Forms) and included open-ended questions so that participants could write about their perspectives on the different aspects of MT. This type of instrument allowed us to explore the importance that each participant assigned to each question (in terms of depth of the answers and comments), even if it at some point it required a greater effort on their part when they had to write extensively. We are aware that the choice of a structured survey rather than an interview as the instrument for collecting data cancels the ability to probe deeper into the topics. Nevertheless, the chosen format presented a clear advantage, allowing us to collect a great amount of information and offering respondents more time to complete the survey and control the pace at which they did so, making it easier and more convenient for them to respond.

The questions were developed with the purpose of collecting participants' beliefs and perspectives towards MT before they had the opportunity to receive formal training. The use of open-ended questions allowed us to collect responses that a close-ended questionnaire might not have elicited, as open-ended schemes do not suggest fixed answers. Questions were drawn up with the purpose of getting responses to our main research question: *What is the lecturers' stance towards the introduction of MT in the translation classroom?* In this respect, the following six groups of questions were devised (see full list of questions in the Appendix):

- Experience with MT software: Q1 to Q3.
- Opinion about MT: Q4 to Q8.
- Training received in MT: Q9 to Q12.
- Using MT in the classroom: Q13 to Q15.
- Specific aspects of post-editing: Q16 to Q20
- The role of the translator and associated competences: Q21 to Q25.

Participants were given a time limit of 60 minutes to complete the questionnaire. They took an average of 40 minutes to respond, without the aid of an interviewer, so as not to introduce any bias in the questions that were asked. We collected a total of 17 responses for each of the 25 questions and conducted a thematic analysis based on Grounded Theory (Birks and Mills, 2015). We believe this methodology provides an adequate framework to approach social reality from a qualitative perspective. This sort of research methodology has been long used and has proved valid within various fields of higher education (Den Outer, Handley & Price, 2013; Lichtman, 2013). More specifically, this method has been incorporated in the field of Applied Linguistics to better understand how students interpret their reality and gain insight into teaching and educational issues (Hadley, 2017). In brief, Grounded Theory methods "consist of systematic, yet flexible guidelines for collecting qualitative data to construct theories 'grounded' on the data themselves" (Charmaz, 2006, p. 2) using the inductive approach. Thus, Grounded Theory requires the identification of theoretical categories derived from the data through the use of a constant comparative method (Kolb, 2012). In this context, our analysis of data ("coding" in Grounded Theory terms) involved three levels of analysis: (a) open coding, (b) axial coding, and (c) selective coding, with a view to completing the picture of the information obtained during the data collection process (Corbin and Strauss, 2008).

In order to proceed with the coding protocol, we followed the three levels of analysis[4]:

a) Open coding. The initial step was to read and re-read the questionnaires to gain a general understanding of what the participants were reporting. At this point, we already started to get ideas of the main points expressed by participants. The coding started with an initial open coding of relevant portions of text to capture data related to the research question. During this first phase of the coding process, we compared data by examining parts or the whole data set in a systematic manner to establish categories.

b) Axial coding. This second step explored the relationship of categories: data were pieced together after open coding allowing connections between categories with a view to forming more precise and complete explanations.

c) Selective coding. This consisted in reducing codes to themes by searching for common elements in codes and producing a discursive set of theoretical propositions by connecting the categories, thus building a set of research outcomes. This thematic analysis based on the content provided by the respondents not only allowed for the examination of possible links between concepts to draw inferences, but also for the identification of their suitability in connection with our research aims.

Unlike quantitative research that requires data to fit into preconceived standardized codes, Grounded Theory allows for an analysis where different levels of coding are recognized until they reach "theoretical saturation". This is a process whereby "you reach a point where there is no further point in reviewing your data to see how well they fit with your concepts or categories […] and where new data are no longer illuminating the concept" (Charmaz 2006, p. 515). In this sense, in order to provide code reliability, we maintained a close connection between data and conceptualization, so that the correspondence between concepts and categories with their indicators was not lost. We placed specific attention on the constant comparison between data and codes to allow a theoretical elaboration of each category to emerge. This took us to a period of constant comparison until each of the categories springing from codes were saturated, and all possible relationships and connections between them had been explored. The resulting themes (codes) are reported in the following section.

## 4. Findings

Participants' beliefs towards MT evolved around four main themes: a) instruction and practice on MT received by educators; b) how MT works and what it entails, c) MT in the translation classroom; and d) professional aspects of MT. Themes were intertwined with sub-themes, both in a direct and an inferred relationship, as shown in Figure 1. For instance, the theme "instruction and practice on MT" has a direct link to the subtheme "no formal training received", and an inferred relationship to the proposition that "Educators could

[4] All coding was performed manually by the authors of the paper, as this was a small-scale project, following Saldanya's (2015) recommendations. Each author first coded data separately and final categories were decided and agreed upon once codes were saturated and subsequently discussed.

introduce MT in the translation classes (but with some difficulties)". Each theme will be described below in the following four subsections, supported by representative quotes from participants[5].

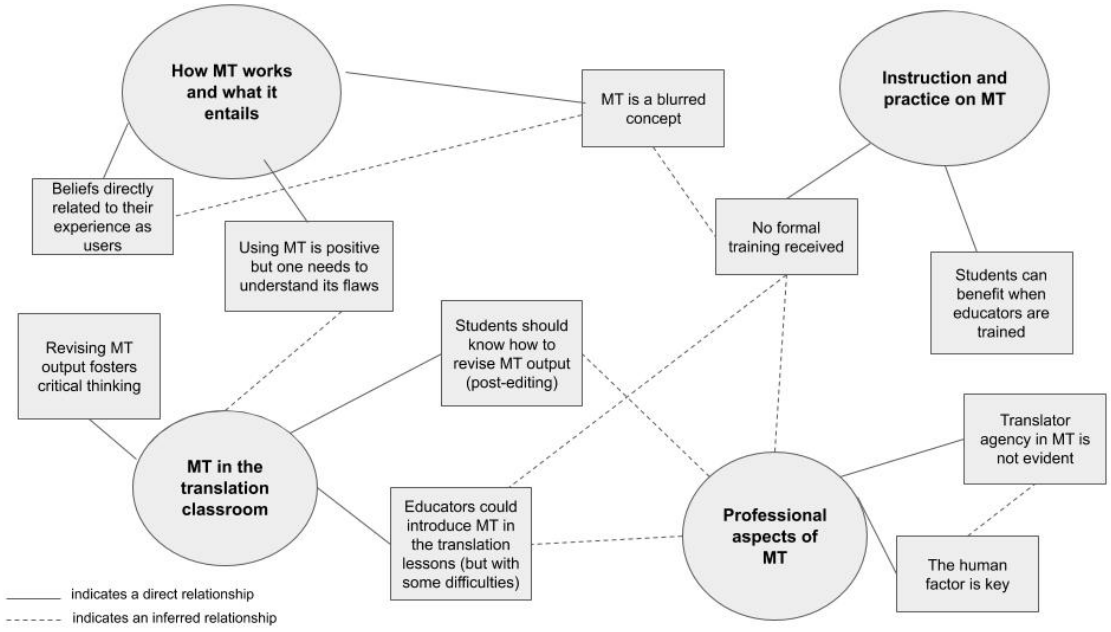


Figure 1. Visual representation of themes and sub-themes

### *4.1. Instruction and practice on MT*

The first theme we identified encompasses several issues related to training received by educators which, in turn, directly affects their knowledge about MT and related tasks, as we will see below. On the whole participants reported informal knowledge about how MT engines work, mostly based on their own experience as non-specialist users of this technology. None of them reported specific formal training in this area. Yet, they are willing to receive training on MT.

#### *4.1.1. No formal training*

Participants acknowledged not having had any formal training on MT and recognised the potential benefits of getting instruction on MT. There was a general consensus that it was essential for them to be trained in this technology on professional grounds, as MT is a tool already incorporated in the translation profession. Respondents wrote:

> to be a good lecturer, one needs to keep pace with the professional practices (Respondent 10)

> MT is a central tool and a reality in the market (Respondent 5)

Some even mentioned they could introduce it in their courses:

> I need [training] in order to teach my students how to use MT (Respondent 7)

[5] The original answers were in Spanish. We have translated them for this article.

Initial willingness to receive training by educators was supported by the fact that they saw a myriad of benefits in MT instruction. On the one hand, respondents appreciated the fact of learning and practicing the different MT tools, to understand their functionality, applications, efficiency and limitations, when they wrote:

> I'd get useful information to know more about these tools, how they are used (Respondent 10)

A response which referred to current practices in the market, while another participant wrote:

> To get first-hand knowledge on the technological dimension of the profession (Respondent 6)

*4.1.2. Students can benefit when educators are trained*

Educators establish a clear conveyance of their instruction in MT to their teaching classroom activity and believe that being trained in MT could be helpful for teaching purposes. Particularly, respondents believe that receiving instruction in MT will offer various insights to incorporate new teaching methodologies:

> Above all, it will be useful to practice those systems with my translation students (Respondent 8)

> (...) knowledge that I can further use with my students and new ways to approach the subject (Respondent 12)

On the other hand, as well as representing an opportunity for educators to upskill, as a form of professional development, MT serves the purpose of overcoming fear of technology and suppressing preconceptions towards technology. Respondents wrote:

> (…) helps me to stay updated with the development of these new tools (Respondent 2)

> (…) to open my mind towards these new systems (Respondent 3)

> (…) to remove my fear and the feeling of rejection towards MT (Respondents 6 and 7)

### *4.2. How MT works and what it entails*

Responses reflected participants' lack of formal training on MT, betraying a lay user perspective. Their responses showed that for them the notion of MT was still 'fuzzy' in some respects. However, they generally reported a positive attitude towards the use of MT, with a warning as to the key role the human translator plays in the translation process. They also mentioned the need to pay attention to the disadvantages and weaknesses of MT, especially with regard to particular text types and language combinations (e.g. creative and cultural texts or languages that are not well-represented in MT).

*4.2.1. The concept of MT is blurred*

Participants were asked about the kind of MT software they were familiar with. They mentioned free online engines with Google Translate being especially frequently mentioned; no reference was made to MT-related issues and technologies (i.e. plans and pricing on online platforms, integration of MT with CAT tools, use of APIs, implementation of MT engines in institutional contexts). It is also interesting to note that respondents tended to blur the different categories of MT tools, as some of them referred to translation memories or online dictionaries as MT software. Respondents reported:

> I know Google Translator, Babelfish and Reverso (Respondent 1)

> (…) free online MT are websites (Respondent 5)

When asked explicitly about which post-editing software they were aware of, educators' answers did not relate to any particular software. Additionally, the concept of post-editing seemed to be mixed up with that of translation revision[6].

*4.2.2. Beliefs directly related to their experience as users but not as part of their translation courses*

When asked how they liked the experience of translating with MT, participants thought of themselves mainly as users rather than as translation educators. Respondent 2 stated:

> There are always errors to correct, but it was handy for occasional needs

Respondents generally did not relate their own experience to their translation courses when explaining how they used MT and whether they liked it or not. Their answers showed that they possessed the technical and procedural competence to use MT for scholarly purposes (Bowker and Ciro, 2019) and only one of them related its actual use in the translation classroom, describing it as:

> positive, students were engaged and eager to know about its functionality and usefulness (Respondent 15)

Nevertheless, it is also important to note that several respondents showed some informed (but informal) knowledge about the possibilities of MT in the following terms. They referred to text typology and content use as well as error correction and rapid translation for informative purposes:

> MT works well with short texts containing frequent vocabulary (Respondent 8)

> (…) suitable for inbound, arguable for outbound, it depends greatly on text type (Respondent 5)

> (…) useful to get a quick account of the text content (Respondent 17)

[6] Post-editing is essentially "the correction of raw machine translated output by a human translator according to specific guidelines and quality criteria" (O'Brien, 2011, p. 197).

Respondents also mentioned the advantages of using less common language combinations and compared among the quality of the output of machine translation engines. Respondents stated:

> Language combination German-Spanish was a disaster (Respondent 1)

> The professional [engine] from DeepL was much better (Respondent 16)

*4.2.3. Using MT is positive but one needs to understand its flaws*

In general, there was a positive attitude towards MT, but participants also observed different kinds of MT flaws. First, those arising from MT performance (as mentioned above): variety of errors, lack of naturalness of the target text, MT not being appropriate for all text types. Second, those stemming from the use of MT by students: loss of creativity, overuse of post-editing, and overconfidence in MT results leading to poor error detection. Finally, participants also noted some social flaws. On the one hand, these were related to intellectual property rights and data protection issues when using MT in "the cloud" (Mitchell- Schuitevoerder 2020, p. 113-127). On the other, respondents were worried that MT forces post-editing rates down causing low quality texts. Respondents presented the following arguments:

> (…) resulting text is artificial and inconsistent (Respondent 1)

> There is a risk of getting too *comfortable* with MT and not polishing the text (Respondent 8)

### *4.3. MT in the translation classroom*

There was a general consensus among educators on the idea that students should learn to use MT as this would help them in their future professional life. They specifically mentioned the following aspects: students would get convenient preparation for completing MT tasks in a professional setting, they would have better labour market prospects, and they would gain a competitive advantage. Again, educators also indicate this training should take into account MT limitations regarding text type, language pair and the effort placed on revising the output.

In contrast to this general opinion, there were three participants who did not recommend the introduction of MT in the translation classroom on the grounds that it produces many serious errors and, thus, considered it an obstacle for students developing translation skills. As Respondent 12 stated:

> I would not recommend students to use it [MT] because I think it can be an obstacle for them. First, they will not develop their skills, as it is very easy to get used to it and feel comfortable with this translation. MT is a tool but not the final product

*4.3.1. Students should know how to revise MT output (post-editing)*

Further to the question on the introduction of MT in the translation classroom, participants were asked whether students should know how to post-edit MT output, the reasons why and the type of activities that could be used for this type of training. In this connection, instructors agree that it is important that students receive training in revising a text translated with MT and, again, justify this for

professional reasons. Three respondents stress the idea that this training should take place at the end of the training period. This point is demonstrated in this quote from respondent 13, who identifies a two-priority ranking in students training:

> First, knowing how to translate and mastering the two working languages. Second, knowing how to use translation technology, both machine translation, and translation memories, and then post-editing, also adequately using parallel texts

Educators also recommend a series of activities that could be used for training purposes and these refer to practical exercises comparing the different outputs of MT, identifying and classifying MT errors, evaluating translations, contrasting human translation vs. MT, and doing post-editing practices. They do not mention which methodology they would use and their answers in this respect are not conclusive. In any case, it is interesting to note that these activities are suggested as separate instances of knowledge not specifically related by participants to their courses on translation.

*4.3.2. Revising MT output fosters critical thinking*

Critical thinking is identified as the key competence students develop when confronted to the task of revising MT output. This is an interesting finding, particularly since instructors see this directly related to the translation competence, describing it in the following terms:

> Ability to analyse texts in view of their translation. Ability to evaluate texts translated with MT. Ability to satisfy a translation task, depending on the client's requirements (Respondent 3)

> Knowing how to evaluate MT and understanding the errors it produces (Respondent 4)

> Being able to translate manually and knowing when to use MT (Respondent 9)

As we will discuss later, this might support the contention that revising MT output (i.e. post-editing) should be introduced in the translation classroom as part of the other tasks students learn to perform.

Together with critical thinking, lecturers also identify the following instrumental abilities: using the different MT software, how they are implemented in a professional context and how translators actually use it, and the type of texts that can be best translated with MT.

*4.3.3. Educators could introduce MT in the translation lessons (but with some difficulties)*

When asked about their willingness to introduce MT in their translation courses, educators are very positive. In this regard, respondent 17 states:

> It's something new and we need to keep pace with technological advances

Yet, some difficulties are also identified. First and foremost, instructors fear different student reactions to MT: they may not use it correctly (its use may lead

to over-use as they might feel "too comfortable" with the results of translation) or, conversely, they might feel sceptical about it, showing some prejudices. Second, lecturers are worried that they may not be trained adequately themselves and, therefore, ask for further training in MT. Third, the actual time for delivering the complete syllabus in their translation courses is tight and they fear that incorporating MT related activities might have a negative influence for students completing actual translation exercises.

### *4.4. Professional aspects of MT*

Out of all respondents, six reported some kind of direct contact with the translation profession (the actual context for this relationship was not elicited from the questions). In any case, all acknowledge MT is having a strong influence in the translation profession and mention issues such as the debate on translation fees vs. post-editing fees, and the role the translator actually plays in the translation process. For instance, respondent 9 indicates the following:

> I don't know the numbers in the translation market related to the use of MT and, therefore, those requiring post-editing, but assuming those numbers are high, it is natural that students get the adequate training

*4.1. The human factor is key but translator agency in MT is not evident*

It is interesting to note that the human factor is perceived as essential in order to guarantee the final quality of the translation when using MT. This, in turn, raises the question whether the human translator is to be eventually replaced by the machine, supporting, in a way, the idea that translation is either human or mechanical. As Respondent 13 puts it:

> There is still a long way...there are many tools, but they can't replace the human eye yet

In this respect, and drawing on Vieira's (2019, p. 328) notion of agency in MT, referred as "whether translators are able to act upon the extent and nature of MT use in post-editing", we asked participants which is the translator's role when MT is incorporated in the professional process. The answers show that there is not a general consensus on this. The following ideas are advanced:

- the translator is central to the translation process, but her role depends on the final quality of the output
- the translator now has the role on advising (and educating) the client on the best service needed, administering the best use of MT
- the translator has a secondary role as she is now in charge of revising translations generated by a machine
- the translator is key and her "holistic" value should precede the use of any auxiliary technology
- the translator is a user of technology.

## 5. Discussion

In exploring lecturers' stance towards the introduction of MT in the translation, classroom our study has revealed a key aspect: the acknowledgement that

educators have not received formal training on MT and how this has a direct consequence on their perspectives and understanding of this technology. As mentioned above, translator educators participating in our research based their knowledge of MT on their own experiences as informal users. They have the technical competence but somehow missed the opportunity to become informed and critical users of MT tools, integrating this expertise in their translation courses. In this connection, we agree with Bowker (2019) when she says that "just because machine translation is easily accessible […] this doesn't mean that we instinctively know how to optimize it or even to use it wisely in a given context". This concept of *MT literacy* has been explored by Bowker and Ciro (2019) in the framework of scholarly communication, advocating for a scholar's ability to go beyond the mere technical (and procedural) competence and becoming a critical and informed user. Ideally, this involves three main aspects: a) comprehending the basics of how MT systems process texts; b) understanding the implications of the use of MT, and c) evaluating the possibilities of this technology for the purposes of scholarly texts. It is true that using MT in translator training cannot be compared to its use in academic writing when scholars use MT to translate their work to be published in a language other than their mother tongue. In this respect, we fully agree that "MT literacy is primarily a cognitive issue, rather than a techno-procedural one" (Bowker, 2019). We have the intuition, then, that when translator educators are not given the opportunity to develop this competence themselves, students would also be missing something in their training.

In this respect, it is worth mentioning the EMT report (2013, p. 3) when it offers clear directions in its outline for translator trainers' competences. It specifically mentions the "operating procedures and tools used in professional translation", which we might easily refer to as techno-procedural knowledge in MT. However, the EMT report's recommendations also include these procedures to other sets of competences —instructional, organizational, interpersonal and assessment. Among other aspects, the report mentions the following three competences: a) the ability to evaluate a curriculum as a self-reflective practitioner, re-assessing practices, knowledge, and competences; b) the ability to use existing professional and specialist tools and integrate them into training; c) the ability to develop in students a critical approach during the execution of tasks, drawing on the relevant theoretical knowledge. It is our contention that only by acquiring MT literacy would educators be able to meet these conditions.

Ideally, translation educators should be "practisearchers", i.e. a balanced combination of a practitioner and a researcher, incorporating both the experience of the professional translator and the theories, methodologies and models of the academic[7].This involves knowledge about "current practice in the translation industry, various tools and technologies used by professionals, and about professional strategies and techniques" (Orlando, 2019, p. 5-7) with a sound theoretical education, research trends, developments and methodologies in the discipline. This combination allows for pedagogical cohesion in process and product-oriented approaches to translator training, one that matches the needs of today's markets and the new realities of higher education, including not only methodological and theoretical elements but also the "professional reality of the professionals" (Orlando, 2019, p. 5-7).

[7] The term 'practisearchers' was originally used in interpreter education (see, for instance, Pöchhacker 2010 or Napier 2011) and is used here in the sense advanced by Orlando (2019) for translator training.

In line with the observation that educators are informal users of MT, our study has also elicited their positive attitude towards this technology, notwithstanding their awareness of its possible flaws and a general preoccupation as to how MT might affect the translator's role (or even lead to her disappearance). While it is true that we see a general agreement on how the human factor is key in the translation process, we cannot conclusively determine the exact place it holds in the views of our participants. This notion of *Agency in MT* has already been discussed by Vieira (2019) in relation to post-editing. He examines the interaction between the translator and the machine along a spectrum that ranges from MT centred automatic post-editing to human-centred interactive/adaptive MT (Vieira, 2019, p. 328), involving different degrees of human control. He concludes that in this setting, agency does not only depend "on the nature of the task" but also on other aspects such as client requirements, the nature of the commission and the translation company, among other factors.

For authors such as de la Fuente (2012), Sakamoto, Evans & Torres Hostench (2018) or Kenny (2018), the above interaction is seen as a paradigm shift. In this new paradigm, we could consider that MT has overcome its condition of tool, a condition that it shares with other translation technologies (such as translation memories, for instance). Thus, free from the "demonic guidelines" that consider MT as the ultimate externalization of the translator, teaching MT -and all other advances in translation technology - should look beyond the instrumentalist agenda that concentrates on the technical properties of the technologies involved (Rozmyslowicz, 2014, p. 148). In this sense, as pointed out by Vieira (2019, p. 319-320), the evolution in the early MT research paradigm changes the approach from human-assisted machine translation to machine-assisted human translation. This places the translator at the centre of translation production (a view shared by participants in our study), in a holistic approach that sees MT not only as an additional service but also as an activity that goes beyond the simple static cleaning of MT output. In this connection, it is worth mentioning the worry of *the eventual eclipse of the translator,* as mentioned by Respondent 3 (although it seems to be a latent idea among most of our participants). This concern is best discussed in the light Sakamoto's (2019) framework, who considers post-editors as a new category of workers whose position in the social system of translation is yet to be determined. In this system, translators are wary about post-editing, as they feel that the incorporation of this task leaves aside their professional skills and identities. This shift in expectations regarding translators' responsibility has been met with a strong sense of discomfort and resistance by many translators (Sakamoto, 2019, p. 201). In this sense, we can see a certain struggle between translators and post-editors when the most experienced translators working in a traditional environment (translation-edition-revision) are taken to a new model of MT + post-editing. On the other hand, end clients who request a post-editing service highly value the cost-saving property of post-editing rather than the intellectual property of the work (Sakamoto, 2019, p. 210). It is precisely this disjunction which causes feelings of restlessness, anxiety and, sometimes, resentment. While it is true that our study does not reveal conclusive data in this respect, we tentatively relate our respondents' concern about the disappearance of the translator to this disjunction between the categories of post-editor and translator. Ideally, this question should be addressed in the near future.

Closely related to the notion of Agency in MT and the associated "disjunction effect", the answers collected in our study have demonstrated *a certain blurring in the categorization of MT* and related concepts. In the

previous section, we have seen how some educators refer to translation memories or online dictionaries as MT software, and also how the notion of post-editing is mixed up with that of revision. This is in line with what Vieira, Alonso & Bywood (2019, p. 4) call the "terminological instability" of MT: from a taxonomic point of view, the integration of MT (and, therefore, of post-editing) in the translation process has somehow blurred the lines that determine what is proper to the machine and what corresponds to the translator. This is the case, for example, when post-editing takes place at the interface between translation memories, MT and human translation.

One further aspect that emerges from our study is how educators grant an important value to the teaching of MT in the translation classroom. Even from an informal perspective, they believe students can benefit from learning about MT as a way of mirroring what is already occurring in the professional landscape. The previous section outlined some of the training activities that educators suggested in this respect. However, these activities are not actually related to other translation assignments implemented in their translation courses. This finding is revealing in line with Kenny's (2019, p. 498) discussion on *translation technology didactics* when she argues "that a nuanced understanding of how technology and translation are intertwined should be a vital ingredient of any broad education in translation studies". In her review of the literature on translation pedagogy she finds that technology is mentioned "only fleetingly", with brief mentions to "instrumental competence" (Kenny, 2019, p. 499). A similar stance is maintained by Doherty, Moorkens, Gaspari & Castilho (2018, p. 97-99) who point to the fact that even if contemporary translation competence models include the general requirement for technical ability, "systematic studies on best practice to teach translation students about MT are difficult to find, with a few notable exceptions" [8]. Our findings seem to point specifically to this divide from what is theoretically put forward in translation competence models and the associated pedagogical discussions, and what is really taught in the translation classroom with regards to technology (and MT). In this context, we feel that the work of Krüger (2016a, 2016b) provides an excellent framework for the contextualization of translation technology tools from a theoretical and a professional perspective. He aims at "a holistic description of the LSP translator and the relevant factors influencing his/her cognition in real world translation environments" (Krüger, 2016a, p. 310), and illustrates translator's cognitive performance by means of the Cologne Model of the Situated LSP Translator, which is based on the theory of Situated Translation. In Krüger's model, MT is situated in the artefact group of "technology in the narrow sense" together with TM systems, terminology management, alignment tools and PM tools. This artefact group is essential to the translation process (Krüger, 2016a, p. 320). It is also worth noting the proposals of Moorkens (2018) for a practical in-class exercise in neural MT evaluation, Guerberof Arenas & Moorkens (2019) for course in MT and post-editing in a Master's programme at Universitat Autònoma de Barcelona, and Nitzke, Tardel & Hansen-Schirra (2019) describing ERASMUS+ DigiLing project on digitalization competences for translators, all of which present a hands-on approach to MT training. There is no doubt that these recent works capitalize on the practical side of technology training but, as our findings seem to suggest, the necessary link between technology and translation courses is yet

[8] The exceptions these authors refer to are Wältermann (1994), Kenny & Way (2001), Doherty, Kenny & Way (2012), Kenny & Doherty (2014), and Sycz-Opón & Galuskina (2017).

to be completed.

One such link worth exploring is the discussion of *how the use of MT in the translation classroom contributes to the development of translation competences*. In the views of educators participating in our study, critical thinking is identified as the key competence students develop when confronted with the task of revising MT output. However, empirical data seems to contradict this intuition. The works of Sycz-Opón (2021) and Sycz-Opón & Gałuskina (2017, p. 196) reveal, for instance, that "in the hands of the trainee translator the use of automated translation may sabotage the learning process, at least when introduced in the classroom without due preparation". Their study explores how trainee translators actually use MT, how critical they are towards the MT output and how perceptive they are during the post-editing process. Their findings show that for the average translation student the post-editing task is as demanding as a traditional translation one, as it appears that both processes require the same amount of knowledge and cognitive skills. The critical evaluation of the MT output is not a straightforward exercise as "the assistance of MT seems to distract the participants, overloaded by the task" (Sycz-Opón & Gałuskina, 2017, p. 207). In this respect, Massey & Ehrensberger-Dow (2017, p. 305) offer a complementary perspective when they suggest that "students might actually use MT output to kick-start their creative process". This view is also shared in the findings reported by Colominas and Oliver (2019) in their study on how students use MT in the translation classroom. They indicate that this technology is an aid when completing a translation assignment. There are no conclusive empirical results on the use of MT in the translation classroom and students' cognitive effort. Nevertheless, we agree with Massey & Ehrensberger-Dow (2017, p. 307) that a basic introduction to MT is indispensable as "only with such knowledge can informed judgements be made as to when and how MT might be used to the best effect".

## 6. Concluding remarks

The evolving industry landscape, together with the popularization of MT, has had an impact not only on the translator's daily work and professional activities, but also on their working conditions and role, which have changed considerably. In the future, it is expected that these changes will remain and even increase, in the search for ongoing improvements in productivity and cost savings. In this context, the concern for adapting the translation curriculum has focused on different actors (the profession, the student, the market), albeit with some notable exceptions (Massey, Kiraly and Ehrensberger-Dow, 2019), yet has somehow failed to explore the role and views of translator educators. Our research is novel in that we asked translation educators for their views and concerns when introducing MT in the translation classroom. The analysis of their perspectives has not received much empirical support in previous research, so we believe our study offers an advance in the field of didactics, as it puts forward an innovative aspect of translator training from the perspective of educators. Our work benefited from having direct access to the accounts of translator educators and we were able to collect fresh and unfiltered insights pointing to valuable data regarding MT literacy, agency in MT and the role of the translator, the categorization of MT and how MT might contribute to translation competence development.

In this respect, and in an attempt to further contribute to the advancement of MT pedagogy we put forward the following recommendations:

- Translator educators should receive formal training in MT (both theory and practice) so that they can incorporate this knowledge into their translation courses.
- Overall teaching of MT should look beyond the instrumentalist agenda that concentrates on the technical properties of the tool. This way educators will be able to share with students a holistic view of MT, one that evidences how the human factor is key in the translation process. This will also help students understand the shift from the traditional translation environment (translation-edition-revision) to the new model of MT+post-editing.
- Learning about MT should mirror what is already happening in the professional landscape, in other words, translation assignments should include the use of MT at some point. This implies the need for a systematic approach on how best to teach MT, relating it to competence models that go beyond the instrumentalist agenda.

We are aware of the limitations of our study, which spring mainly from the fact that we present the perspectives of only a small group of instructors within a limited teaching context - that of Universitat de València. A more comprehensive analysis would certainly reveal new data to complement our findings. In this respect, future research is needed to determine, for instance, under which conditions educators wish to introduce MT and whether this would effectively trigger actual changes in course design and course curricula. Some questions remain open: If MT is to be incorporated in the translation classroom, which contents would be prioritised? What activities/methodologies could be used other than the traditional ones?

As for the need of instructors to be trained in MT, a much more in-depth analysis should be carried out to identify the various knowledge and content areas of MT and post-editing and the different specialised courses in order to successfully train their students afterwards. To do so, a larger-scale survey with a wider scope of application should be conducted to map the international landscape. All in all, we estimate that the main contribution of our research lies in presenting the voice of translation instructors on an essential aspect of MT pedagogy.

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