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Training Translators in Spain: Key Elements for the Integration of Translation Technologies into the Specialised Translation Classroom

Formación de traductores en España: elementos clave para la integración de las tecnologías de la traducción en el aula de traducción especializada

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Abstract: The rapid evolution of technology and the increasing complexity of language services have fundamentally altered the landscape of the language industry. The disruptive changes that this industry has undergone in recent decades have direct and profound consequences for the training of future translators. In the Spanish context, university curricula have traditionally evolved at a much slower pace compared to the industry's dynamic nature. This lag in adaptation means that academic programmes are not updating as swiftly as necessary to meet new societal and market demands. From a didactic standpoint, it is particularly challenging to determine the training needed by future language industry professionals at a time of change and uncertainty, such as the present one, without knowing for sure what the future will be, at least as far as translation technology (TT) is concerned. Consequently, designing curricula that can adequately prepare students for the evolving demands of the industry is a complex task. This uncertainty underscores the need for a more agile and responsive approach to curriculum design. The main objective of this article is to identify the key elements of curriculum design necessary for training translators in Spain, specifically in relation to current practices in the industry concerning TT. Given the fast-paced changes within the language industry, it seems essential to consider a process that emphasises relatively immediate adaptations. These adaptations should be capable of being incrementally incorporated by trainers into the teaching and learning environments of specialised translation. By focusing on such immediate actions, trainers can ensure that their training programmes remain relevant and effective, equipping future translators with the skills and knowledge they need to succeed in a rapidly changing industry. This approach advocates for a

dynamic and flexible curriculum that evolves in tandem with technological advancements and industry trends.

Keywords: Translation technology, Curriculum design, Undergraduate translation programmes in Spain, Situated approach, Teaching and learning environments

Resumen:

Palabras clave: Tecnologías de la traducción, Diseño curricular, Programas universitarios de Traducción en España, Aprendizaje situado, Entornos de enseñanza-aprendizaje

INTRODUCTION

The language industry clearly reflects the evolution of markets towards increasingly technological environments, as clearly acknowledged for many years by key industry stakeholders, such as Slator, CSA or Nimdzi, as well as by successive European Language Industry Surveys (ELIS) (Sánchez-Castany, 2024). Over the past four decades, the translation market has undergone unprecedented changes instigated by the evolution of globalisation and technological environments (O'Hagan, 2020, pp. 1-2; Sin-wai, 2023, p. XXXI). These changes have undoubtedly resulted in a redefinition of translators' roles and responsibilities and the emergence of new dynamics and forms of employment linked to the technologisation of society (Kenny, 2020; O'Connor & Benţa, 2022). This evolution over time has been accompanied by the exponential changes that have occurred recently, and the alarm generated, both in the language industry and in academia, by the emergence of disruptive technologies. In addition to translation technologies (TT)[1] that have been widely adopted in the profession of translation for decades, the language industry has already extensively embraced disruptive technologies (Buysschaert *et al.*, 2018; Pym & Torres-Simón, 2021; Van der Meer, 2020), such as neural text to speech, real-time voice cloning, natural language processing (NLP), neural machine translation (NMT), large language models (LLM), artificial intelligence (AI), machine learning (ML), and remote interpreting, among others.

[1] For the purpose of this study, the concept and definition of *translation technologies* is based on O'Brien and Rodríguez Vázquez's (2019) proposal: "In its broadest sense translation technology is understood to include a large array of computer tools that help translators do their jobs, including word processors; spell, style, and grammar checkers; the World Wide Web; corpus compilation and analysis tools; terminology management tools; translation memory tools (TM); translation management systems (TMS); and machine translation (MT)" (p. 264).

Among the many industries that show the penetration of technology into workspaces, translation is one of the most susceptible to automation (Schäffner, 2020, p. 80; Van der Meer, 2020). The degree of automation in the language industry could be increased to a considerable degree by the adoption of certain disruptive technologies –such as NMT or LLMs–, particularly as compared to previous TT –such as statistical machine translation (SMT) or computer-assisted translation (CAT). In this sense, authors such as Li (2018) and Pym and Torres-Simón (2021) propose more or less optimistic scenarios for the future of this profession. They all point to the automation of professionals' tasks (management, translation, revision, etc.) taking hold in the industry. However, it is not clear precisely what the future scenario will be like. All these factors have had a significant impact on the language industry, which, according to some authors, only fuels the erroneous perception that this is an industry that can offer a cheap, low-value labour force (Giustini, 2022).

Moreover, it is important to keep sight of the fact that technological evolution and the automation of the translation profession have direct consequences for the training of future translators (Kenny, 2020; Aiping & Deliang, 2017, p. 404). However, from a teaching point of view, it is challenging to determine the training needed by future professionals at a time of change and uncertainty such as the one we are experiencing. We do not know for sure what the future will be, as far as TT is concerned, and we should bear in mind that the regulations and dynamics of administrative processes in Spanish universities entail lengthy curriculum renewal processes. Accordingly, many trainers are currently wondering whether we should continue to train translators for *yesterday* or whether we should look for alternatives that allow us to train them to be prepared for *today* or, even better, for *tomorrow*. At the international level, these concerns can be reflected in numerous initiatives providing didactic resources for TT training. Examples of these are DigiLing (DigiLing, 2024), MultiTraiNMT (MultiTraiNMT, 2024), DataLit^{MT} (DataLit^{MT}, 2024) or MATEO (Vanroy, Tezcan & Macken, 2023), to name but a few. These types of initiative reflect that translation didactics is to some extent aware of the rapid technological changes happening in the profession and is reacting accordingly by developing corresponding theories, models, methods, and resources.

The study presented here is part of a broader research project focused on the description and analysis of the training in TT offered in Spanish undergraduate translation programmes, as well as its level of adaptation to the reality and trends of the industry. Since the first undergraduate programmes in translation and interpreting were introduced in Spain in 1990 (Muñoz Raya & ANECA, 2004, pp. 14-15), slow evolution in

the incorporation of TT into undergraduate translation curricula could be observed (Plaza-Lara, 2014). Based on the data and information empirically obtained, we have been able to conclude that TT currently offered in undergraduate translation programmes, at least in Spain and despite the above-mentioned initiatives, does not respond to the demands of the language industry and is often based on practices that are obsolete and do not meet real needs (Sánchez-Castany, 2022, 2023a, 2023b).

In light of these findings, it seems necessary to think of a two-speed process: 1) the one set by the official curricula updates; and 2) the more immediate adaptations that we can incorporate through the integration of TT into the teaching and learning environments of specialised translation. This second option is the proposal we will analyse here. Thus, the main objective of this paper will be to identify the key elements of undergraduate curriculum design for integrating TT into the specialised translation classroom.

1. How are translation technologies currently taught in undergraduate translation programmes in Spain?

There are many pedagogical initiatives that have taken into account training in TT since the 1980s (see Kenny, 2020 for an exhaustive list of early adopters of TT in translator training). Nowadays, there are other initiatives to encourage a shift towards a more significant presence of TT in translation studies, such as that of the EMT Network, with the latest update of its competencies' framework (EMT Network, 2022). From a general point of view, the models of translation competency (TC) that explicitly include TT (see, for example, Kiraly, 2000, 2016; Kelly, 2002, 2005; Muñoz Raya & ANECA, 2004; Katan, 2008; PACTE, 2003, 2005; González & Robert Wagenaar, 2003; Fernández Rodríguez, 2005; Nord, 2005; Göpferich, 2009; Bowker & Corpas Pastor, 2015) stress the need for students to be able to critically evaluate TT and not be carried away by an excessively utilitarian discourse. They should also be aware of the ethical aspects of the profession that arise with the use of certain tools, as in the case of MT (Moorkens, 2022; Forcada, 2023; Guerberof-Arenas & Moorkens, 2023; Nousias, 2023; Rico Pérez & Sánchez Ramos, 2023). Furthermore, we note TT occupy a very relevant place in these models of TC and, in many cases, they are considered fundamental cross-cutting elements.

Since the adaptation of the Spanish education system to the European Higher Education Area (EHEA), autonomy, lifelong learning and student involvement in the teaching and learning process have been promoted as factors that support greater competitiveness (Kenny & Doherty, 2014; Shuttleworth, 2017; Vieira Nunes, *et al.*, 2021; Márquez Garrido, 2022, p. 6). TT is, in fact, a field in which these factors are essential for

students to develop the necessary competencies to be able to practise translation in the future (Hurtado Albir, 2019, p. 66).

Thanks to the above-mentioned broader research project of which this article is a part, we could identify that, in Spain, for the 2019-2020 academic year, there are 32 undergraduate translation programmes, with a great deal of diversity between syllabi contents. The Spanish legislative framework and the *Libro blanco. Título de Grado en Traducción e Interpretación* (Muñoz Raya & ANECA, 2004) emphasise the generalist nature of the programmes (Haug, 2015). However, many centres are committed to including specialised translation or interpreting modules, often organised into specialisation tracks. In other words, students must take two to four specialised translation modules from the same professional field to complete their academic training. During the first two years of the programmes, training usually focuses on reinforcement of initial interdisciplinary blocks in order to address, later on, the fundamental components of the specialised tracks, which are usually taught in the second stage courses (third and fourth years) (Sánchez-Castany, 2022). The existence of higher education programmes offered after undergraduate programmes in our field (*i.e*. master's and PhD studies) may provide a sense of continuity of undergraduate studies and specialisation in some areas of translation or interpreting, among both trainers and students (Hao & Pym, 2022b).

In order to contextualise our reflection and subsequent discussion from the perspective of curriculum design, it is essential to understand the specialisation tracks in translation and interpreting that we have identified in all the Spanish undergraduate translation programmes. We have observed that all syllabi classify specialised translation modules according to textual genres and professional fields (García-Izquierdo, 2005). In addition, modules are usually six ECTS credits, although some are variable and range from three to twelve ECTS credits. The range of specialisation tracks offered in these programmes varies greatly among them. Generally speaking, some tracks stand out, such as Translation in the fields of Law, Economics and Finance, Technical and Scientific translation, Literary and Humanistic translation, Audio-visual translation, Localisation, and Interpreting and Intercultural Mediation (Sánchez-Castany, 2022).

Moreover, it is necessary to find a middle ground that moves away from the extremes of humanism versus. efficiency. We must bear in mind that the evolution of language industry to even more digital, connected and technologised environments requires the use of technology by all professionals. In the specific case of translators, instrumental skills, i.e. those related to information mining, terminology or technology (Muñoz Raya & ANECA, 2004, p. 122), must be combined with other knowledge, including

linguistic and cultural knowledge. In fact, according to Hurtado Albir (2019), one of the main curricular challenges in translator training is correctly incorporating TT into undergraduate programmes. In the author's own words:

> Training must prepare future translator for the effective use of specialised search engines, computer-assisted translation tools, text alignment, accounting and budgeting management, etc., developing the student's ability to adapt to new documentation resources and technological tools, given the speed at which they are changing. (Hurtado Albir, 2019, p. 66)

On the one hand, we agree with this idea and maintain that TT should be presented to students in an applied and –preferably– situated manner. Otherwise, lack of use and practice with the tools proposed in technological modules, beyond the compulsory activities carried out within the framework of these modules, may lead students to pass courses or even to graduate without knowing how to use specific tools or understanding why they should master them (Alcina, Soler & Granell, 2007, p. 232). On the other hand, we must also be aware that the indiscriminate use of this type of technology in specialised translation modules may not bring direct benefits to students, as we risk losing sight of the main focus of teaching these modules, i.e. translation.

In the case of TT's presence in Spanish undergraduate translation programmes, first of all, it has been analysed in Sánchez-Castany (2022) when technological modules are taught and how many of them are taught. Technological modules are considered to be those that belong to the areas of Information mining, Project management, Proofreading, Editing and Layout design, Technology and Terminology, according to the classification made by Sánchez-Castany (2022, p. 30). It has been thus observed that, in the first stage of undergraduate programmes (*i.e.* first and second year), the most common technological modules are those of Information mining. In the second stage (*i.e.* third and fourth year), the modules related to Terminology and Proofreading, Editing and Layout design stand out. It has also been observed that all the undergraduate translation programmes analised offer some technological modules, although in very different quantities. Finally, modules that are based on the teaching of TT tend to be taught mostly in the first and third years, and the programmes usually include one or two modules of this type (Sánchez-Castany, 2022, p. 36-37).

As a rule, TT-related content is addressed in the curricular design of undergraduate translation programmes in a simplified way, out of context and in the watertight compartments that technological modules represent (Rico Pérez, 2017a, p. 82). This classic separation of technological content

and other content into independent modules often means that students do not establish links between all of them, do not understand the advantages of using the tools taught beyond the practices that they can carry out in these compulsory modules (Kelly, 2005, p. 157; Alcina, Soler & Granell, 2007, p 232; Rico Pérez, Sánchez-Gijón & Torres-Hostench, 2018) or perceive that, as professionals, those tools will add little value in their daily lives (Mahfouz, 2018, p. 80). Consequently, students know and learn how to handle certain tools, but do not always have the opportunity to use them in an applied way in a specialised translation class (Schmidhofer & Mair, 2018, p. 178; Zhang & Vieira Nunes, 2021, pp. 118-119). That is also reflected by the Spanish translation trainers interviewed in Sánchez-Castany (2023b). O'Brien and Rodríguez Vázquez (2019, p. 270) mention that the usual tendency is for TT to be offered as an introduction in undergraduate studies (see, for example, the work of Rodríguez Castro, 2018) and for postgraduate studies to include technical and professional aspects linked to TT and the evaluation of tools according to different contexts of use (see, for example, the work of Doherty & Kenny, 2014). The authors also comment that it is risky to make generalisations in this respect, as not all university studies, both undergraduate and postgraduate, include the same type and quantity of tools, as is the case of translation undergraduate programmes in Spain.

In short, as we will see below, the heterogeneity in the design of the undergraduate programmes in Spain and the different local factors that affect each programme (such as the existence of different translation specialisations and language combinations or the capacity to recruit adequate training staff, among others), complicate the task of generalising when making proposals on the most appropriate way to offer TT in a cross-cutting way in undergraduate translation programmes. Consequently, this situation forces us to review the teaching approaches used to train translators with technological skills adapted to the new scenario as quickly and efficiently as possible.

1.1 Situated learning in translation technology training

According to the translation trainers interviewed in Sánchez-Castany (2023b), a clear balance should be sought between two key elements: on the one hand, technological competence and preparing future professionals who will have to face the demands of a constantly evolving industry; on the other hand, acquisition of all the other skills needed to work as professional translators (O'Brien, 2012). Indeed, no standard TT teaching and learning approach fits all possible scenarios (Zhang & Vieira Nunes, 2021, p. 119). However, among the many teaching approaches that exist (see, for example, Hurtado Albir, 2019), one is very suitable for the objective pursued with the reflection developed here: situated learning.

This methodology is based on exposure to actual or simulated tasks and working environments in a realistic way inside and outside the classroom (Olalla-Soler, 2019, p. 68). It is very similar to other teaching approaches, such as the socio-constructivist approach (Kiraly, 2013) or the task and project approach (Rico Pérez, 2017b). Among the research on TT teaching and learning environments that follow this approach, we should stress the works of Ramírez Polo and Ferrer Mora (2010) and González-Davies and Enríquez-Raído (2016) on TT, in general; those of Bowker and Marshman (2010), Mellinger (2017) and Vieira Nunes *et al.*(2021) on computer-assisted translation (CAT); those of Pym (2013) and Mellinger (2018) on machine translation (MT); and that of Borja Albi (2019) on corpora. According to this teaching approach, in addition to the technology modules themselves, TT would be presented to students in translation environments that are as similar as possible to those they will face in the future as professionals in the industry. In other words, TT should not only be offered as part of a separate technology module but integrated into practical translation modules due to its transversal nature.

The proposals of some researchers and trainers who advocate the integration of TT in practical translation modules in a situated way stand out, as in the case of Pym (2013), Mellinger (2017) or Hu (2018). However, as these same authors comment, putting this situated approach to TT into practice in the translation classroom is challenging. As mentioned by O'Brien and Rodríguez Vázquez (2019, p. 271), these include, among others, the availability of adequate infrastructure, funding, group size, students' previous knowledge of TT, language combinations, the field of specialisation and the teaching approach adopted.

Taking this proposal as a starting point, widely endorsed by authors such as Alcina (2008), Sánchez Nieto *et al.* (2009), Enríquez-Raído (2013), Díaz Fouces (2013), Kiraly (2013), Pym (2013), Kenny and Doherty (2014), Plaza-Lara (2014), Mellinger (2017, 2018), Hu (2018), Torres del Rey (2019), González Pastor (2021) and Sánchez-Castany (2023b), it is necessary to conduct an in-depth analysis of some elements of curriculum design, such as the availability of physical and digital media, content sequencing, trainers' training and coordination, and collaboration between academia and industry (see section 3).

2. KEY ELEMENTS FOR CROSS-CUTTING INTEGRATION OF TRANSLATION TECHNOLOGIES IN THE SPECIALISED TRANSLATION CLASSROOM

In the main models of undergraduate translation curriculum design (see Kelly, 2005 or Hurtado Albir, 2019, among others), we observe a series of general trends regarding the phases that should be followed to plan

undergraduate programmes: analysis of learning needs, determining the competencies and learning objectives, selecting the contents, designing the methodology, selecting the media, establishing the sequencing and designing assessment procedures. Covering all these phases or elements is essential to achieve an effective curriculum design that fosters integrated and practical learning, both in translation and in TT. The methodology design phase is particularly relevant in this context.

As mentioned in the previous section, adopting a situated approach with significant technological content in specialised translation classes would allow students to internalise the conceptual and procedural knowledge of TT studied in technological modules and understand its usefulness in an applied way, as suggested by Alcina, Soler and Granell (2007) or Vieira Nunes *et al.* (2021), among others. In line with these authors, who suggest applying situated learning as a TT teaching approach and based on the results of the previous studies by Sánchez-Castany mentioned above, in this paper we will analyse the key elements for such integration from the point of view of curriculum design. After analysing the aforementioned models of curriculum design, we observed that combining some elements of curriculum design would help recreate the real working conditions of a translation professional using the necessary TT tools. As can be seen in Figure 1, we will focus on four elements: availability of physical and digital media, sequencing of TT-related contents, trainers' training in TT and coordination between them, and collaboration between academia and industry, which we will analyse in detail below.

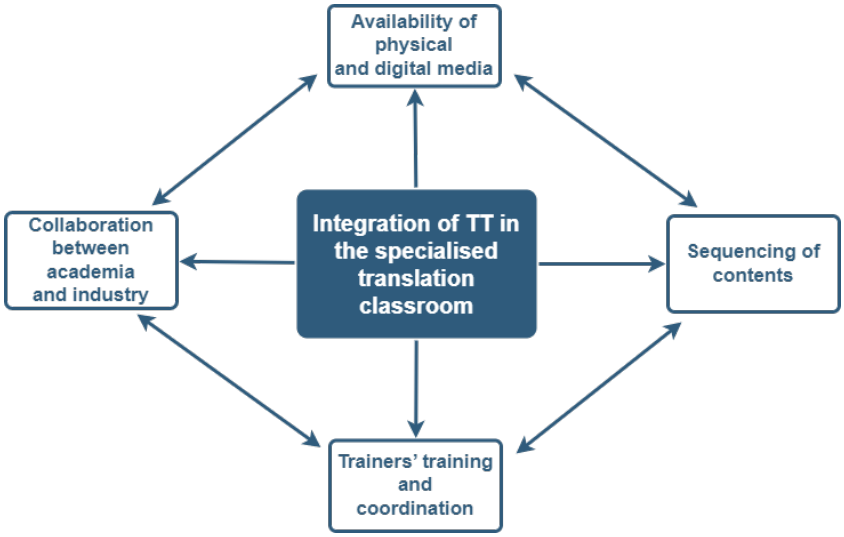

Figure 1. Proposal of key elements for the integration of TT in the specialised translation classroom
Source: Elaborated by the author

2.1 Availability of physical and digital media

The first element we have selected for our analysis is the physical and digital media available to an undergraduate programme. The fact that, at present, professional translation environments work almost exclusively with digital materials (Hickey, 2022) means that undergraduate programmes must adapt the means available to them for teaching translation. Practical sessions in technology modules should take place in computer rooms (Doherty & Moorkens, 2013, pp. 127-128; Pym, 2019). However, this is not always so evident in the case of practical translation classes. In fact, learning to translate does not necessarily involve the use of digital media, and some authors even consider that it may be beneficial if learners' first contact with translation practice does not involve the use of computers (Mossop, 2003, p. 20).

However, learning to translate as it is currently done in the professional world requires the use of a minimum of physical and digital resources, such as a computer with general and specific software and an Internet connection (Akhulkova, Hickey & Hynes, 2021; Sánchez-Castany, 2022). We must bear in mind that, in Spain, especially in public universities, higher translation training centres do not always have the necessary funding to have adequate resources, as reflected by the Spanish translation trainers interviewed in Sánchez-Castany (2023b, p. 8). This means that there is not always availability of classrooms equipped with computers so that students can carry out the activities proposed in class, emulating real working environments as far as possible. Besides, this lack of funding means that it is not always possible to buy licences for paid TT-related software. Fortunately, this could be partially addressed thanks to open-source tools available for didactic purposes today. Great examples of that are Peter Sandrini's collection of open-source TT (Sandrini, 2024), the OPUS corpus collection (Tiedemann, 2011), Google's free Colab Jupyter notebook offering (Google Colaboratory, n.d.), or the free academic plans offered by some leading companies in the language industry, such as Phrase (Phrase, 2024) to mention just a few.

All in all, the availability of adequate physical and digital media would favour students' autonomous learning, which is essential in a learning process such as TT, a field that requires many hours of practice to internalise routines and processes (Matamala, 2006; Austermühl, 2013; Vieira Nunes *et al.*, 2021).

2.2 Sequencing of TT-related contents

The second element of our analysis is the sequencing of TT-related content within undergraduate translation programmes. From a general point of view, the competencies and contents of university undergraduate programmes should not only cover the professional sphere but also the social, interpersonal and personal spheres. Currently, university education has a clear professionalising orientation (Katan, 2011; Hurtado Albir, 2019), but there are more and more voices that advocate an approach that accommodates the comprehensive training of people. In this vein, we agree with Mossop (2003, pp. 20-21) when he stated, more than 20 years ago, that if a person does not know how to translate with a pencil and paper, they will not know how to translate with the latest technologies. However, this does not in any way exclude the possibility that, once the translation competence to translate without the aid of technology has been achieved, learners cannot also do so using, in this case, TT.

The sequencing of content is key in curriculum design and directly impacts the training of undergraduate translation students (Hurtado Albir, 2019). Key factors that should be taken into account when sequencing the TT-related contents of an undergraduate translation programme include defining the specialisation, the structure of the tracks and the acquisition of cross-cutting competencies (not only technological, but information mining, linguistic, etc.) pedagogically prior or subsequent to training in translation. There is great variation in the sequencing of the content and the technological and specialised translation modules in undergraduate translation programmes in Spain for the 2019-2020 academic year. However, some general trends can be observed. On the one hand, it could be said that, on paper, the content included in the technological modules covers the minimum technological needs of a professional translator (see Akhulkova *et al*., 2021, for further reference on professional uses of TT). On the other hand, the conceptual, procedural and attitudinal content included in technological modules (especially those taught in the first cycle) tends to be taught long before students will need to use them in an applied way in specialised translation modules, typically taught in the second cycle of the programme (Sánchez-Castany, 2022, p. 36).

As mentioned at the end of section 2, many authors argue that the teaching of TT should be approached as a cross-cutting element or one that runs horizontally through the curriculum. In order to introduce TT in the specialised translation classroom in a situated and transversal way, it is first necessary for the modules traditionally considered instrumental (see section 2) to fulfil that role in practice—that is, they should not only be labelled as instrumental in theory, but also function as such in actual teaching and

learning settings. There should be a transfer of content from these to the practical modules of specialised translation. On the other hand, the selection of tools to be used in practical translation sessions should take into account that they should not represent a technical challenge either for trainers or, of course, for students, among other factors (for example, using tools that do not require installation); or that their use and learning from previously-acquired knowledge is simple (Aiping & Deliang, 2017, pp. 403-405)—as is the case of some cloud-based CAT tools, such as MateCat (https://www.matecat.com/) and Phrase (https://phrase.com/es/).

2.3 Trainers' training and coordination

To analyse the third element, we will need to explore on the one hand, trainers' training in TT and, on the other, coordination between them when teaching within the same undergraduate programme.

One of the main factors that directly affect translators' training is undergraduate programme trainers themselves and their training, in this case, in TT (Kelly, 2005, pp. 53-60 and 150-156). Generally speaking, and depending on the institutional, local or national contexts, trainers' training in higher education institutions is set out more or less strictly in various regulatory frameworks (*e.g.* regulations, directives, or legislation) (Massey, 2019, p. 386). However, as Kelly (2008, p. 101) noted more than 15 years ago, "most TS [Translation Studies] literature about training is written in general terms about processes and activities, but much less about the people involved, whether they be students or teachers", something which, apparently, has not changed much over the years (Klimkowski, 2015, p. 231; Massey, 2019, p. 386).

Among the research about trainers' competencies and their training in areas related to the professional practice of translation, we should mention the works of Kelly (2005, pp. 150-156), Gouadec (2007, pp. 350-356), Klimkowski (2015, pp. 231-253), Orlando (2016, pp. 17-38), Huang (2019), Massey (2019), and Hao and Pym (2022a). We fully agree with these authors, who argue that it is vital for translation trainers to receive adequate and continuous training in order to carry out their teaching work, both inside and outside the classroom. Although this is a general idea and might seem obvious, if we apply it to TT and its rapid evolution, the technological updating of translation trainers becomes even more important. In fact, in order to carry out their training task effectively, translation trainers need specific and continuous training to keep up with changes in the industry, which is not always the case (Krajcso, 2011, p. 271; Aiping & Deliang, 2017, p. 403). In this same vein, although this is a study focused on master's degrees and not on undergraduate programmes, it is worth noting the work

of Li (2018), who observed that 99 translation master's degree programmes in China do not include any TT module. In most cases, this is because universities do not have training staff adequately trained for this purpose. The training and knowledge that trainers have in both TT and TT training will directly impact the possibility of integrating TT into the specialised translation classroom.

As for the second aspect of this element, coordination between trainers, this is a *sine qua non* for the successful integration of TT in specialised translation modules. Good coordination between trainers of different modules within the same programme contributes to knowledge transfer from instrumental modules to translation modules themselves (Kelly, 2005, pp. 58-60). According to the information provided by the universities on their curricula (*i.e.* that stated in module syllabi), some transfer of content between instrumental and translation modules can be observed (see Sánchez-Castany, 2022, pp. 37-38). This might lead us to think that trainers in charge of these modules are minimally coordinated to present the content to students so that their learning is as progressive and adapted as possible to the training, skills and competencies of the students at that time. However, other studies show that such coordination is not always present in undergraduate translation programmes (see, for example, Ramírez Polo & Ferrer Mora, 2010, p. 35 and Sánchez-Castany 2023b in the case of Spain; or Sánchez-Castany *et al.,* 2022 in the case of Switzerland).

2.4 Collaboration between academia and industry

Finally, in our analysis is the collaboration between two fields often conceived as independent: academia and industry. According to the aforementioned models of translation curriculum design (Kelly, 2005; Hurtado Albir, 2019), the first step in designing a university curriculum is to analyse the social and professional demands of the context for which students are to be trained and their learning needs, *i.e*. the industry.

As a natural response to the globalisation and technologisation that characterises the society in which we live, the language industry and, by extension, the translation market have undergone profound structural changes in recent decades (O'Hagan, 2020, pp. 1-2). This evolution is not always reflected in undergraduate translation curricula, at least in Spain (Austermühl, 2013, p. 327; Cid-Leal, Espín-García and Presas, 2019; Sánchez-Castany, 2022, pp. 39-40). The truth is that academia cannot keep pace with technological advances in the same way as companies in the language industry do due, among other things, to financial or knowledge constraints (Rodríguez de Céspedes, 2020, p. 124).

The efforts made by academia to bridge this gap include the organisation of talks, courses and conferences by the universities themselves or by companies and professionals in the industry (see the initiatives of TAUS, 2017); the offer of curricular and extracurricular internships provided by some university translation programmes; and mentoring programmes. The last include those offered by professional associations (see also the initiatives of Spanish associations such as ASETRAD or ACE Traductores, or international ones such as ATA or ALTA), by the universities themselves in collaboration with them (for example, the collaboration programme between APTIC and two Catalan universities, in Olalla-Soler 2019), or by companies and organisations in the industry (see the Proz.com mentoring programme or the MEPROACTI Project, in Bolaños Medina & Rivas Güida, 2022). From a teaching point of view, these programmes apply a situated learning approach and are usually based on collaborative learning, where the main role of the mentor (professional) is not to instruct but to accompany the mentee (student) in the learning process (Olalla-Soler, 2019, p. 68). The collaboration between trainers and professionals in these initiatives can be very varied. For example, it may be the case that the trainer is professionally engaged in translation on a part-time basis and offers professional mentoring; or that the industry professional is involved in a translation project in the classroom, helping with the shaping of the project or the translation quality assessment (Marczak & Bondarenko, 2022, p. 120).

As we have seen, the measures taken to bridge the gap between academia and industry can be very diverse. It is crucial that any such initiative considers the interests of both parties and is developed systematically, taking into account all factors affecting the market (professionals, companies, associations, etc.) and the academia (translation centres themselves and undergraduate translation programmes) in each specific teaching and learning situation. Accordingly, for this collaboration to work correctly, it is vital not to lose sight of the ethical issues involved not only in the use by professionals of specific tools, such as neural MT or AI-based applications, but also in their training and learning by trainers and students. In this field, we should mention the work of Baker and Maier (2011) on ethical issues in the training of translators and interpreters; Moorkens (2022) on ethical issues in MT; and the volume edited by Moniz and Parra Escartín (2023) on ethical and legal considerations in MT, in which the contributions of Forcada (2023), Guerberof-Arenas and Moorkens (2023), Nousias (2023) and Rico Pérez and Sánchez Ramos (2023) stand out for their relevance and contribution to the field.

CONCLUSIONS AND FUTURE WORK

Teaching and learning environments for specialised translation in undergraduate translation programmes are one of the most suitable training spaces for integrating TT into the classroom in a situated way. If this integrated and coordinated approach were to be adopted in undergraduate translation programmes, students would acquire a realistic and global vision of the profession, as well as adequate training in TT and the current translation process.

To achieve this goal, TT should not be relegated to the watertight compartments of the current technological modules in which they are usually included in the Spanish undergraduate translation programmes, but should run horizontally through the whole curriculum. The analysis presented in this study identifies four essential elements of curriculum design that have allowed us to better understand how TT could be successfully integrated into specialised translation teaching and learning environments. From the analysis of these elements, we highlight, on the one hand, the need to have the appropriate physical and digital means to achieve a teaching and learning environment for specialised translation with TT as the main technological tool. On the other hand, we believe it is essential to apply a sequencing of content that allows students to reach the final years of the undergraduate programme with the necessary technological knowledge to face working environments that include the TT that they will use in real professional environments in the near future. Furthermore, there must be adequate training for the training staff to design and develop a training proposal like the one presented in this paper. Likewise, coordination between the trainer in charge of technological modules and specialised translation modules will be essential to encourage a sequencing of content that is as closely aligned as possible with the training needs of students at each stage of the undergraduate programme. Finally, it is essential to establish good communication between industry and academia, so that the former informs the latter about issues so that higher education centres for translators can take the pulse of the industry, adjust their offer as much as possible, and promote initiatives to try to bridge the existing gap between both of them.

These four elements lead us to put forward a generic and circular proposal for integrating TT in the specialised translation classroom. The viability and success of this integration depend not only on the existence of these four elements but also on the design and development of a cross-cutting curriculum.

Finally, we should remember the fact that a proposal of this nature will pose a series of challenges for any undergraduate programme that wishes to integrate TT into a specialised translation classroom. For this reason, it would be very appropriate for the continuity of our reflection to delve deeper into what these challenges will be from the point of view of curriculum design and university planning.

To conclude, we must bear in mind that there are aspects of undergraduate curriculum planning that will determine the viability of proposals such as the one we have presented in this paper. All in all, we believe that the only way to avoid delaying the adaptation of undergraduate translation programmes to the technological needs of the language industry is to carry out a series of curricular adaptations that can be relatively immediately incorporated into the reality of the classroom, with all the provisos we have described and analysed above, without having to wait for the formal renewal of curricula.

REFERENCES

Aiping, M. & Deliang, M. (2017). The ecosystem of translator workstation: Learning electronic tools in a training program for professional translators in China. Babel, 63(3), 401-422. https://doi.org/10.1075/babel.63.3.06aip

Akhulkova, Y., Hickey, S. & Hynes, R. (2021). Nimdzi Language Technology Atlas: the Definitive Guide to the Language Technology Landscape. Nimdzi. https://www.nimdzi.com/language-technology-atlas/

Alcina, A. (2008). Translation Technologies: Scope, Tools and Resources. Target, 20(1), 79-102. https://doi.org/10.1075/target.20.1.05alc

Alcina, A., Soler, V. & Granell, J. (2007). Translation technology skills acquisition. Perspectives: Studies in Translatology, 15(4), 230-244. https://doi.org/10.1080/13670050802280179

Austermühl, F. (2013). Future (and not-so-future) trends in the teaching of translation Technology. Revista Tradumàtica. Tecnologies de la Traducció, 11, 326-337. https://doi.org/10.5565/rev/tradumatica.46

Baker, M. & Maier, C. (2011). Ethics in Interpreter & Translator Training. The Interpreter and Translator Trainer, 5(1), 1-14. https://doi.org/10.1080/13556509.2011.10798809

Bolaños Medina, A. & Rivas Güida, L. (2022). Hacia un programa de mentoría profesional para estudiantes de máster en traducción. In C, M. Travieso González, S. T. Pérez Suárez, J. M. Canino Rodríguez, J.

B. Alonso Hernández, A. Ravelo García & D. C. Sánchez Rodríguez (Eds.), Libro de Actas de las IX Jornadas Iberoamericanas de Innovación Educativa en el Ámbito de las TIC y las TAC (InnoEducaTIC 2022) (pp. 105-114) Universidad de Las Palmas de Gran Canaria. https://accedacris.ulpgc.es/handle/10553/119597

Borja Albi, A. (2019). How corpora can assist legal translation learners: The GENTT TransToolsCorpora platform and Sketch Engine. Quaderns de Filologia: Estudis Lingüístics, XXIV, 21-38. https://doi.org/10.7203/qf.24.16297

Bowker, L. & Corpas Pastor, G. (2015). Translation Technologies. In R. Mitkov (Ed.), The Oxford Handbook of Computational Linguistics (2 ed.) (pp. 871–905). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199573691.013.007

Bowker, L. & Marshman, E. (2010). Toward a Model of Active and Situated Learning in the Teaching of Computer-Aided Translation: Introducing the CERTT Project. Journal of Translation Studies, 13(1-2), 199-226.

Buysschaert, J., Fernández-Parra, M., Kerremans, K., Koponen, M. & van Egdom, G. (2018). Embracing Digital Disrupitonin Translator Training: Technology Immersion in Simulated Translation Bureaus. Revista Tradumàtica. Tecnologies de la Traducció, 16, 125-133. https://doi.org/10.5565/rev/tradumatica.209

Cid-Leal, P., Espín-García, M. C. & Presas, M. (2019). Traducción automática y posedición: perfiles y competencias en los programas de formación de traductores. MonTI. Monografías de Traducción e Interpretación, 11, 187-214. https://doi.org/10.6035/MonTI.2019.11.7

DataLit^{MT}. (n.d.). Welcome to the DataLit^{MT} Project. DataLit^{MT}. Retrieved June 6, 2024, from https://itmk.github.io/The-DataLitMT-Project/

Díaz Fouces, Ó. (2013). Algunas consideraciones sobre el papel de las tecnologías en los Estudios de Traducción y en la formación de traductores. Hikma, 18(1), 57-84. https://doi.org/10.21071/hikma.v18i1.11188

DigiLing. (n.d.). About. DigiLing. Retrieved June 6, 2024, from http://www.digiling.eu/

Doherty, S. & Kenny, D. (2014). The design and evaluation of a Statistical Machine Translation syllabus for translation students. The Interpreter and Translator Trainer, 8(2), 295-315. https://doi.org/10.1080/1750399X.2014.937571

Doherty, S. & Moorkens, J. (2013). Investigating the experience of translation technology labs: pedagogical implications. Journal of Specialised Translation, 19, 122-136.

EMT Network. (2022). European Master's in Translation Competence Framework. European Commission. https://ec.europa.eu/info/sites/default/files/about_the_european_commission/service_standards_and_principles/documents/emt_competence_fwk_2022_en.pdf

Enríquez-Raído, V. (2013). Teaching Translation Technologies 'Everyware': Towards a Self-Discovery and Lifelong Learning Approach. Revista Tradumàtica. Tecnologies de la Traducció, 11, 275-285. https://doi.org/10.5565/rev/tradumatica.52

Fernández Rodríguez, M. (2005). El enfoque por tareas en la enseñanza de la tradumática (Traducción y Tecnologías de la Información y la Comunicación). Propuesta pedagógica. In M. L. Romana García (Ed.), Actas del II Congreso Internacional AIETI 2005. Formación, investigación y profesión. AIETI. https://www.aieti.eu/wp-content/uploads/AIETI_2_MFR_Enfoque.pdf

Forcada, M. (2023). Licensing and Usage Rights of Language Data in Machine Translation. In H. Moniz & C. Parra Escartín (Eds.), Towards Responsible Machine Translation. Ethical and Legal Considerations in Machine Translation (pp. 49-69). Springer Cham. https://doi.org/10.1007/978-3-031-14689-3

García-Izquierdo, I. (2005). El género textual y la traducción. Reflexiones teóricas y aplicaciones pedagógicas. Peter Lang.

Giustini, D. (2022). The Language Industry, Automation, and the Price of Finding the Right Words. Futures of Work, 21. https://futuresofwork.co.uk/2022/02/10/the-language-industry-automation-and-the-price-of-finding-the-right-words/

González Pastor, D. (2021). Introducing Machine Translation in the Translation Classroom: A Survey on Students' Attitudes and Perceptions. Revista Tradumàtica. Tecnologies de la Traducció, 19, 47-65. https://doi.org/10.5565/rev/tradumatica.273

González, J. & Wagenaar, R. (2003). Tuning Educational Structures in Europe. Informe final. Fase uno. Universidad de Deusto.

González-Davies, M. & Enríquez-Raído, V. (2016). Situated learning in translator and interpreter training: bridging research and good

practice. The Interpreter and Translator Trainer, 10(1), 1-11. https://doi.org/10.1080/1750399X.2016.1154339

Google Colaboratory. (n.d.). About. Google Colaboratory. Retrieved June 6, 2024, from https://colab.google/

Göpferich, S. (2009). Towards a model of translation competence and its acquisition: The longitudinal study 'TransComp'. In S. Göpferich, A. L. Jakobsen & I. Mees (Eds.), Behind the Mind: Methods, Models and Results in Translation Process Research (pp. 11–37). Samsfundslitteratur.

Gouadec, D. (2007). Translation as a profession. John Benjamins. https://doi.org/10.1075/btl.73

Guerberof-Arenas, A. & Moorkens, J. (2023). Ethics and Machine Translation: The End User Perspective. In H. Moniz & C. Parra Escartín (Eds.), Towards Responsible Machine Translation. Ethical and Legal Considerations in Machine Translation (pp. 113-133). Springer Cham. https://doi.org/10.1007/978-3-031-14689-3

Hao, Y. & Pym, A. (2022a). Teaching how to teach translation: tribulations of a tandem-learning model. Perspectives, 30(2), 275-291. https://doi.org/10.1080/0907676X.2021.1913197

Hao, Y. & Pym, A. (2022b). Where do translation students go? A study of the employment and mobility of Master graduates. The Interpreter and Translator Trainer, 17(2), 211-229. https://doi.org/10.1080/1750399X.2022.2084595

Haug, G. E. (2015). Grados y másteres en España y el espacio europeo de educación superior (EEES). Monografías CRUE Universidades Españolas. https://www.crue.org/wp-content/uploads/2020/02/Gradosymasteres_GuyHaug.pdf

Hickey, S. (2022). The 2022 Nimdzi 100: The Ranking of Top 100 Largest Language Service Providers. Nimdzi Insights, LLC. https://www.nimdzi.com/nimdzi-100-top-lsp/

Hu, W. (2018). Education, Translation and Global Market Pressures. Curriculum Design in China and the UK. Palgrave Macmillan.

Huang, Z. (2019). What Makes an Effective Translation Teacher? A Qualitative Exploration of Effective Translation Teaching and Teachers in the University Classroom [Doctoral dissertation, Macquarie University]. Macquarie University Theses. http://hdl.handle.net/1959.14/1282123

Hurtado Albir, A. (2019). La investigación en didáctica de la traducción. Evolución, enfoques y perspectivas. MonTI. Monografías de Traducción e Interpretación, 11, 47-76. https://doi.org/10.6035/monti.2019.11.2

Katan, D. (2008). University Training, Competencies and the Death of the Translator. Problems in Professionalizing Translation and in the Translation Profession. In M. T. Musacchio & G. Henrot (Eds.), Tradurre: Formazione e Professione (pp. 113-140). CLEUP.

Katan, D. (2011). Occupation or profession. A survey of the translator's world. In R. Sela-Shefy & M. Schlesinger (Eds). Identity and Status in Translational Professions (pp. 65-87). John Benjamins. https://doi.org/10.1075/tis.4.2.04kat

Kelly, D. (2002). Un modelo de competencia traductora: bases para el diseño curricular. Puente, 1, 9–20.

Kelly, D. (2005). A Handbook for Translator Trainers: A Guide to Reflective Practice. St. Jerome.

Kenny, D. & Doherty, S. (2014). Statistical Machine Translation in the Translation Curriculum: Overcoming Obstacles and Empowering Translators. The Interpreter and Translator Trainer, 8(2), 276-294. https://doi.org/10.1080/1750399X.2014.936112

Kenny, D. (2020). Technology in Translator Training. In M. O'Hagan (Ed.), The Routledge Handbook of Translation and Technology (pp. 498-515) Routledge.

Kiraly, D. (2000). A Social Constructivist Approach to Translator Education: Empowerment from Theory to Practice. St. Jerome.

Kiraly, D. (2013). Towards a view of translator competence as an emergent phenomenon: thinking outside the box(es) in translator education. In D. Kiraly, S. Hansen-Schirra & K. Maksymski (Eds.), New Prospects and Perspectives for Educating Language Mediators (pp. 197-222). Gunter Narr.

Klimkowski, K. (2015). Towards a Shared Curriculum in Translator and Interpreter Education. Wydawnictwo WSF we Wrocławiu, PAN o. we Wrocławiu, International Communicology Institute.

Krajcso, Z. (2011). Fostering social competence in translation studies. Babel, 57(3), 269-282. https://doi.org/10.1075/babel.57.3.02kra

Li, D. (2018). Teaching of Translation Technology: Curriculum, Methods and Teacher Education [Paper presentation]. Fourth International Conference on Research into the Didactics of Translation, Barcelona, Spain. http://grupsderecerca.uab.cat/pacte/en/node/585

Mahfouz, I. (2018). Attitudes to CAT Tools: Application on Egyptian Translation Students and Professionals. Arab World English Journal, 4, 69-83. https://doi.org/10.24093/awej/call4.6

Marczak, M. & Bondarenko, O. (2022). Translator education in Poland and Ukraine: does the academia vs industry gap persist? The Interpreter and Translator Trainer, 16(1), 115-134. https://doi.org/10.1080/1750399X.2021.1891516

Márquez Garrido, R. (2022). Análisis de las competencias traductológicas de los egresados de estudios de Posgrado especializados. Panorama actual en España y expectativas del mercado laboral [Doctoral dissertation, Universidad de Córdoba]. Tesis Doctorales UCO. http://hdl.handle.net/10396/23287

Massey, G. (2019). Translation teacher training. In S. Laviosa & M. González-Davies (Eds.), The Routledge Handbook of Translation and Education (pp. 285-399). Routledge. https://www.taylorfrancis.com/books/e/9780367854850

Matamala, A. (2006). Les noves tecnologies en l'ensenyament de la traducció audiovisual [Paper presentation]. X Jornades de Traducció i d'Interpretació. Tecnologies a l'abast, Vic, Spain.

Mellinger, C. D. (2017). Translators and machine translation: knowledge and skills gaps in translator pedagogy. The Interpreter and Translator Trainer, 11(4), 280-293. https://doi.org/10.1080/1750399X.2017.1359760

Mellinger, C. D. (2018). Problem-based Learning in Computer-assisted Translation Pedagogy. HERMES. Journal of Language and Communication in Business, 57, 195-208. https://doi.org/10.7146/hjlcb.v0i57.106205

Moniz, H., & Parra Escartín, C. (2023). Towards Responsible Machine Translation. Ethical and Legal Considerations in Machine Translation. Springer Cham. https://doi.org/10.1007/978-3-031-14689-3

Moorkens, J. (2022). Ethics and machine translation. In D. Kenny (Ed.), Machine translation for everyone. Empowering users in the age of artificial intelligence (pp. 121-140). Language Science Press.

Mossop, B. (2003). What should be taught at translation school? In A. Pym, C. Fallada, J. R. Biau & J. Orenstein (Eds.), Innovation and E-Learning in Translator Training. Reports on Online Symposia (pp. 20-22). Universitat Rovira i Virgili.

MultiTraiNMT. (n.d.). Presentación del Proyecto. Retrieved June 6, 2024, from https://www.multitrainmt.eu/index.php/es/inicio/presentacion-del-proyecto

Muñoz Raya, E. & ANECA. (2004). Libro Blanco. Título de Grado en Traducción e Interpretación. Agencia Nacional de Evaluación de la Calidad y Acreditación. https://www.aneca.es/documents/20123/63950/libroblanco_traduc_def.pdf/c597839f-973e-5e7c-86b1-e61dea66c628?t=1654601712731

Nord, C. (2005). Training functional translators. In M. Tennent (Ed.), Training for the New Millennium: Pedagogies for translation and interpreting (pp. 209–223). John Benjamins.

Nousias, A. (2023). The Ethics of Machine Translation. In H. Moniz & C. Parra Escartín (Eds.), Towards Responsible Machine Translation. Ethical and Legal Considerations in Machine Translation (pp. 29-48). Springer Cham. https://doi.org/10.1007/978-3-031-14689-3

O'Brien, S. & Rodríguez Vázquez, S. (2019). Translation and technology. In S. Laviosa & M. González Davies (Eds.), The Routledge Handbook of Translation and Education (pp. 264-277). Routledge.

O'Brien, S. (2012). Translation as human – Computer interaction. Translation Spaces, 1(1), 101-122. https://doi.org/10.1075/ts.1.05obr

O'Connor, P. & Benţa, M. I. (2022). The Technologisation of the Social. A Political Anthropology of the Digital Machine. Routledge.

O'Hagan, M. (2020). Introduction. Translation and technology: disruptive entanglement of human and machine. In M. O'Hagan (Ed.), The Routledge handbook of translation and technology (pp. 1-18). Routledge. https://doi.org/10.4324/9781315311258

Olalla-Soler, C. (2019). Bridging the gap between translation and interpreting students and freelance professionals. The mentoring programme of the Professional Association of Translators and Interpreters of Catalonia. The Interpreter and Translator Trainer, 13(1), 64-85. https://doi.org/10.1080/1750399X.2018.1540741

Orlando, M. (2016). Training 21st century translators and interpreters: At the crossroads of practice, research and pedagogy. Frank & Timme.

PACTE. (2003). Building a Translation Competence Model. In F. Alves (Ed.), Perspectives in Process Oriented Research (pp. 43-66). John Benjamins.

PACTE. (2005). Investigating Translation Competence: Conceptual and Methodological Issues. Meta, 50(2), 609-619. https://doi.org/10.7202/011004ar

Phrase. (n.d.). How to Get the Academic Plan (TMS). Phrase. Retrieved June 6, 2024, from https://support.phrase.com/hc/en-us/articles/5881369075612-How-to-Get-the-Academic-Plan-TMS

Plaza-Lara, C. (2014). La enseñanza de la traducción asistida por ordenador: análisis didáctico-curricular y propuesta de integración de la subcompetencia instrumental profesional en el aula [Doctoral dissertation, Universidad de Málaga]. Repositorio Institucional de la Universidad de Málaga. http://hdl.handle.net/10630/8126

Pym, A. (2013). Translation Skill-Sets in a Machine-Translation Age. Meta, 58(3), 487-503. https://doi.org/10.7202/1025047ar

Pym, A. (2019). Teaching translation in a multilingual practice class. In D. B. Sawyer, F. Austermühl & V. Enríquez Raído (Eds.), The Evolving Curriculum in Interpreter and Translator Education. Stakeholder perspectives and voices (pp. 319-340). John Benjamins. https://doi.org/10.1075/ata.xix

Pym, A., & Torres-Simón, E. (2021). Efectos de la automatización en las competencias básicas del traductor: la traducción automática neuronal. In A. Vidal Suñe & A. Alarcón Alarcón (Eds.), Ocupaciones y lenguaje. Indicadores y análisis de competencias lingüísticas en el ámbito laboral (pp. 475-506). Publicacions de la Universitat Rovira i Virgili.

Ramírez Polo, L., & Ferrer Mora, H. (2010). Aplicación de las TIC en Traducción e Interpretación en la Universidad de Valencia: experiencias y reflexiones. Revista Electrónica de Didáctica de la Traducción y la Interpretación, 4, 23-41. https://hdl.handle.net/10550/77235

Rico Pérez, C. & Sánchez Ramos, M. del M. (2023). The Ethics of Machine Translation Post-editing in the Translation Ecosystem. In H. Moniz & C. Parra Escartín (Eds.), Towards Responsible Machine Translation. Ethical and Legal Considerations in Machine Translation (pp. 95-112). Springer Cham. https://doi.org/10.1007/978-3-031-14689-3

Rico Pérez, C. (2017a). La formación de traductores en Traducción Automática. Revista Tradumàtica. Tecnologies de la Traducció, 15, 75-96. https://doi.org/10.5565/rev/tradumatica.200

Rico Pérez, C. (2017b). The ePortfolio: Constructing learning in translation technology. The Interpreter and Translator Trainer, 11(1), 79-95. https://doi.org/10.1080/1750399X.2017.1306995

Rico Pérez, C., Sánchez-Gijón, P. & Torres-Hostench, O. (2018). The challenge of machine translation post-editing: An academic perspective. In G. Corpas Pastor & I. Durán-Muñoz (Eds.), Trends in E-Tools and Resources for Translators and Interpreters (pp. 203-218). Rodopi.

Rodríguez Castro, M. (2018). An integrated curricular design for computer-assisted translation tools: Developing technical expertise. The Interpreter and Translator Trainer, 12(4), 355-374. https://doi.org/10.1080/1750399X.2018.1502007

Rodríguez de Céspedes, B. (2020). Beyond the Margins of Academic Education: Identifying Translation Industry Training Practices through Action Research. Translation and Interpreting, 12(1), 115-126. http://dx.doi.org/10.12807/ti.112201.2020.a07

Sánchez Nieto, M. T., Bachiller Martínez, J. M., Fraile Vicente, E., Carrera Fernández, J. & Frechoso Remiro, J. C. (2009). Desarrollo conjunto de competencias mediante la colaboración interdisciplinar. Algunas experiencias en la licenciatura de Traducción e Interpretación. @tic. Revista d'innovació educative, 3, 52-61. http://hdl.handle.net/10550/20717

Sánchez-Castany, R. (2022). Teaching translation technologies: an analysis of a corpus of syllabi for Translation and Interpreting undergraduate degrees in Spain. In G. Massey, E. Huertas Barros & D. Katan (Eds.), The Human Translator in the 2020s (pp. 27–43). Routledge. https://doi.org/10.4324/9781003223344

Sánchez-Castany, R. (2023a). Thematic analysis applied to translation research: analysis of technological contents in Translation and Interpreting degrees in Spain. Bellaterra Journal of Teaching & Learning Language & Literature, 16(3). https://doi.org/10.5565/rev/jtl3.1139

Sánchez-Castany, R. (2023b). Integrating Technologies in Translation Teaching: a Study on Trainers' Perceptions. The Interpreter and

Translator Trainer, 17(3), 479–502. https://doi.org/10.1080/1750399X.2023.2237330

Sánchez-Castany, R. (2024). Industry insights about translation technologies: current needs and future trends. In Y. Peng, H. Huang & D. Li (Eds.), New Advances in Translation Technology. Applications and Pedagogy. Springer Nature (pp. 99–119). https://doi.org/10.1007/978-981-97-2958-6_6

Sánchez-Castany, R., Rodríguez Vázquez, S. & Starlander, M. (2022). Towards a Technologized translation classroom: Practices and perceptions from trainers at a Swiss university [Paper presentation]. 44th Translating and the Computer conference (ASLING), Luxembourg, Luxembourg.

Sandrini, P. (n.d.). Free Translation Technology. Peter Sandrini. Retrieved June 6, 2024, from http://www.petersandrini.net/en-fsftrans.html

Schäffner, C. (2020). Translators' Roles and Responsibilities. In E. Angelone, M. Ehrensberger-Dow, & G. Massey (Eds.), The Bloomsbury Companion to Language Industry Studies (pp. 63-89). Bloomsbury Academic.

Schmidhofer, A. & Mair, N. (2018). Machine Translation in Translator Education. CLINA Revista Interdisciplinaria de Traducción Interpretación y Comunicación Intercultural, 4(2), 163-180. https://doi.org/10.14201/clina201842163180

Shuttleworth, M. (2017). Cutting Teeth on Translation Technology: How Students at University College London are Being Trained to Become Tomorrow's Translators. Traduçao Em Revista, 22, 18-38. https://doi.org/10.17771/PUCRio.TradRev.30595

Sin-wai, C. (2023). Preface to the second edition. In Sin-wai, C. (Ed.), The Routledge Encyclopedia of Translation Technology. (2nd ed., pp. XXXI-XXXIX) Routledge. https://doi.org/10.4324/9781003168348

TAUS. (2017). Bridging the Gap Between Business and Academia. A report on the findings of a survey with the TAUS academic members and partners 2017. TAUS.

Tiedemann, J. (2011). News from OPUS - A Collection of Multilingual Parallel Corpora with Tools and Interfaces. In N. Nicolov, K. Bontcheva, G. Angelova & R. Mitkov (Eds.), Recent Advances in Natural Language Processing (vol V) (pp. 237-248) John Benjamins. https://doi.org/10.1075/cilt.309.19tie

Torres del Rey, J. (2019). The Proper Place of Localization in Translation Curricula: An Inclusive Social, Object-Driven, Semiotic-Communicative Approach. In D. B. Sawyer, F. Austermühl & V. Enríquez Raído (Eds.), The Evolving Curriculum in Interpreter and Translator Education. Stakeholder Perspectives and Voices (pp. 229-258). John Benjamins. https://doi.org/10.1075/ata.xix

van der Meer, J. (2020). Translation technology – past, present and future. In E. Angelone, M. Ehrensberger-Dow & G. Massey (Eds.), The Bloomsbury Companion to Language Industry Studies (pp. 285-309). Bloomsbury Academic.

Vanroy, B., Tezcan, A. & Macken, L. (2023). MATEO: MAchine Translation Evaluation Online. In M. Nurminen, J. Brenner, M. Koponen, S. Latomaa, M. Mikhailov, F. Schierl, T. Ranasinghe, E. Vanmassenhove, S. Alvarez Vidal, N. Aranberri, M. Nunziatini, C. Parra Escartín, M. Forcada, M. Popovic, C. Scarton, & H. Moniz (Eds.), Proceedings of the 24th Annual Conference of the European Association for Machine Translation (pp. 499-500). Tampere, Finland: European Association for Machine Translation (EAMT).

Vieira Nunes, L., Zhang, X. & Yu, G. (2021). 'Click next': on the merits of more student autonomy and less direct instruction in CAT teaching. The Interpreter and Translator Trainer, 15(4), 411-429. https://doi.org/10.1080/1750399X.2021.1891515

Zhang, X. & Vieira Nunes, L. (2021). CAT teaching practices: an international survey. The Journal of Specialised Translation, 36a, 99-124.