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Édité par, a cura di, edited by

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De Europa Deuxième partie - Special Issue 2022

Artificial Intelligence and Machine Translation: perceptions, opinions and experiences of Italian Graduate Students of English as a Foreign Language

Alessandra Molino

Introduction

This article presents the results of two questionnaires administered to Italian graduate students of English at the beginning (Q1) and at the end (Q2) of a teaching module on Machine Translation (MT) in academic year 2020-2021 at the University of Torino (Italy). The MT module (18 hours) was offered as part of a course on corpora and computer tools for language analysis. Due to the COVID-19 pandemic, the whole course was held *via* video conference software and using Moodle. All activities were synchronous and required oral interaction or over the chat function. The objectives of the MT module were the following:

1) To familiarize the students with the underlying mechanisms of MT;
2) To raise their awareness of the potential risks of MT, such as inadequate output, language flattening and the so-called "algorithmic bias" (see Baeza-Yates 2018; Vanmassenhove *et alii* 2021);
3) To assess the effectiveness of MT applied to texts belonging to different genres;
4) To critically compare the output of different MT systems;
5) To perform adequate post-editing of the target text (TT).

In order to achieve these goals, theoretical classes were complemented with translation assignments (individual or in group) and subsequent discussions. At the end of the module, the students undertook an assessed activity consisting in the analysis and post-editing of MT output accompanied by a commentary on their revision choices.

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In the following sections the participants' profile is described based on the answers obtained in both questionnaires (Section 1); section 2 deals with Artificial Intelligence (AI) in general, and has the purpose of understanding the students' knowledge and use of digital tools in their daily and academic life; in section 3, the answers obtained in Q1 and Q2 in relation to MT are compared, focusing in particular on the challenges that MT still needs to face and the benefits and drawbacks of AI for natural language processing.

1. The students' profile

The two questionnaires obtained a rather consistent number of responses, namely 125 for the preliminary questionnaire and 128 for the end of course one[1] which approximately correspond to the number of students regularly attending the module. The sample is mainly composed of female students (86%) enrolled in the second year of the MA degree programme in either International Communication or International Communication for Tourism[2]. They are mostly aged between 23 and 25 years old and their mother tongue is almost invariably Italian (98%). The respondents declared to be able to speak a range of foreign languages (Fig. 1), with English being mentioned by nearly 100% of the participants, followed by French and Spanish with similar percentages (59% and 57%), and German (30%). Other languages mentioned in the open answers are, in order of frequency, Russian, Portuguese, Japanese, Arabic, Czech, and Italian Sign Language.

Since the module focused on MT applied to the English-Italian language pair, only the students' perceived competence in English is reported here. Overall, the participants are self-confident about their proficiency, predominantly reporting excellent knowledge at the level of receptive abilities and good competence at the level of productive skills (Fig. 2).

[1] The figures reported in this paragraph are the average of the data obtained in the two questionnaires. The slightly higher number of responses in Q2 is because some students answered the end-of-module questionnaire despite the request not to participate in the survey if they had not completed the preliminary questionnaire.

[2] Both programmes are offered by the Department of Foreign Languages, Literature and Modern Cultures at the University of Torino.

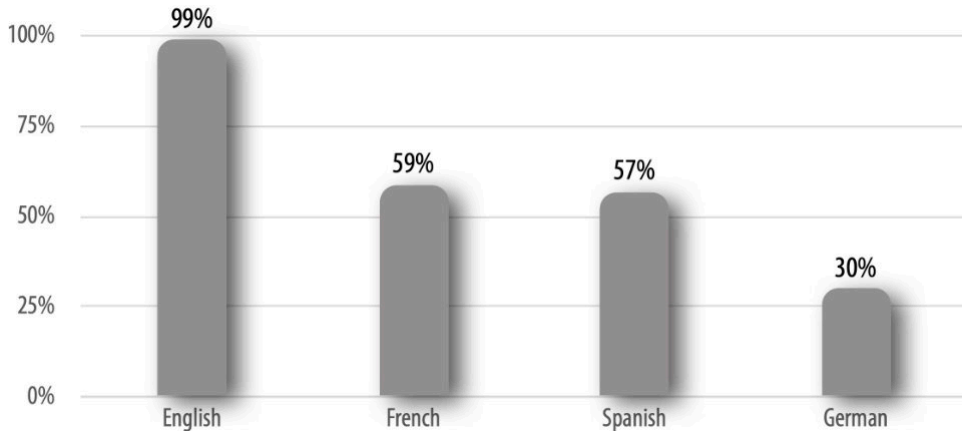

Figure 1: Main foreign languages spoken

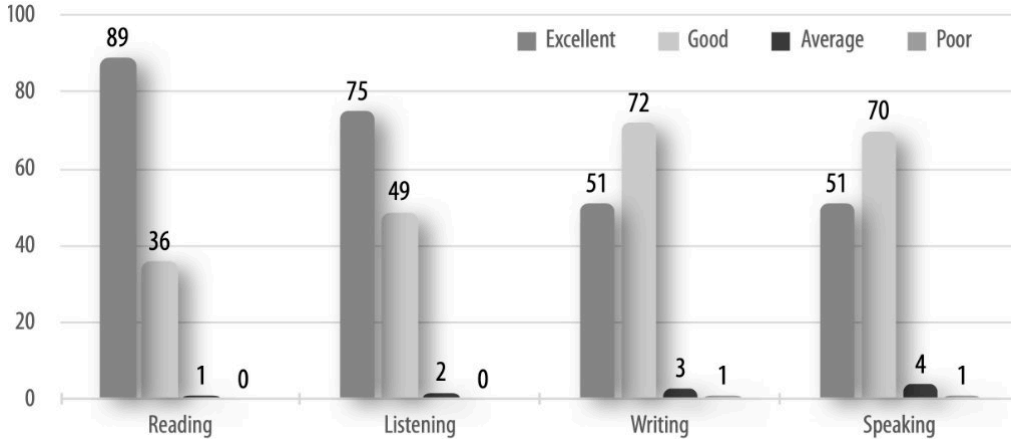

Figure 2: Self-reported ability in the four language skills

2. Knowledge and use of AI

Q1 included four questions on AI and digital tools. The first and second questions aimed at gathering information about the interest in AI and the range of instruments commonly used by the students. The two subsequent questions were about the role of AI in the respondents' field of study and future profession. These last two questions were maintained in Q2 to assess whether the students' perception changed after the activities in class.

According to the data obtained in Q1, the sample under scrutiny is interested in the development of AI, with 52% of the participants paying attention to this phenomenon and 42% expressing a very strong interest. Figure 3 provides a picture of the target population through their use of digital tools in their daily and academic life. First, the young age of the respondents is reflected in the references to social networks, cited 116 times. Their position as university students is also clear, as evidenced by the frequent mention of word processing and spreadsheet programmes (37). But it is the respondent's identity as foreign language learners that emerges strikingly compared to other student populations (see other papers in Part II of this book): the second most often cited tools are, indeed, MT systems and bilingual platforms (43). Online dictionaries appear quite frequently, too (30), and even corpora have been cited a few times (7). Finally, references to online conference platforms are present, clearly related to the pandemic and the experience of distance learning (29).

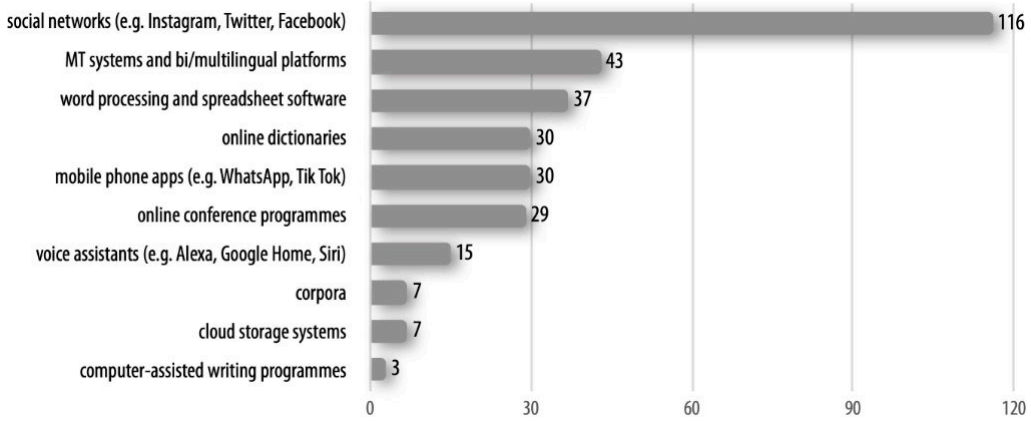

Figure 3: Digital tools most often used by students in their daily and academic life

In both questionnaires (Fig. 4 and 5), the students declared that AI will greatly contribute to the development of their field of studies. Overall, they also believe that AI will play an important role in their future profession. However, a small decrease in their degree of conviction is recorded in Q2 for both answers. Such more cautious attitude regards just a handful of respondents and is difficult to explain. One hypothesis is that the focus on MT during classroom activities led some Q2 participants to interpret these questions as referring to translation, a profession which may not be the aspiration of all the students in the sample.

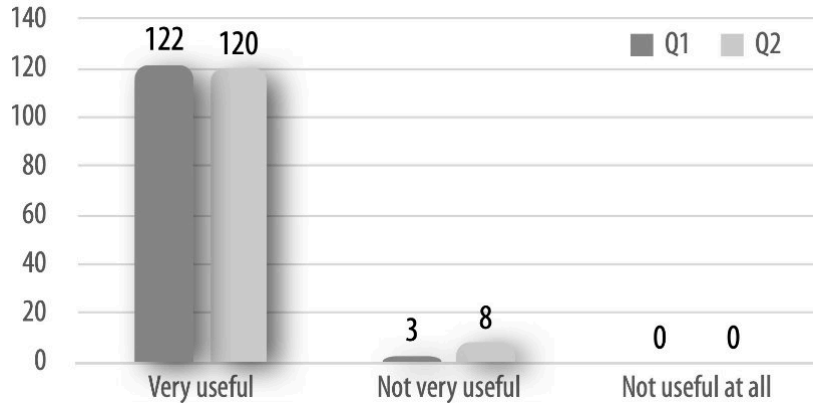

Figure 4: How useful do you think AI will be for your field of study?

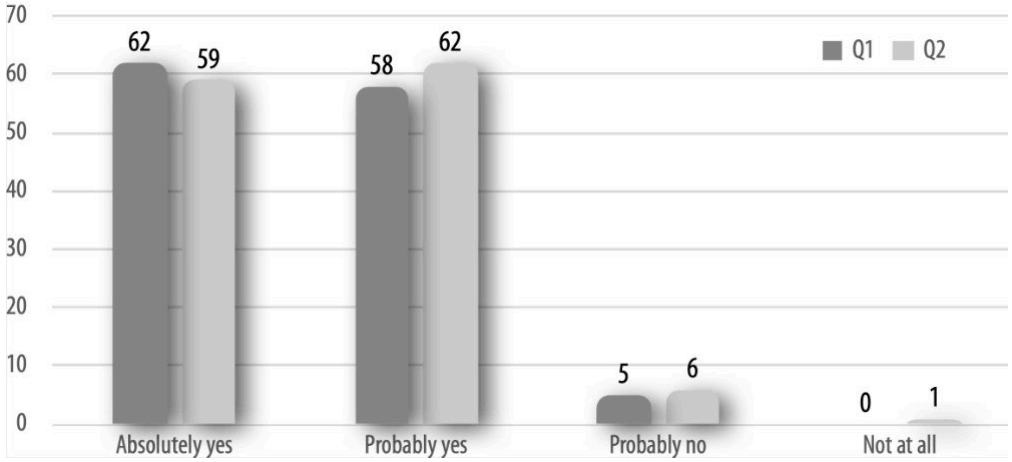

Figure 5: Do you think AI will play a major role in your future profession?

3. Machine translation: Opinions and experiences

Classroom discussions and activities aimed to help students recognize shortcomings in machine translated texts, learn how to amend inadequacies, and better understand the underlying mechanisms of MT. Therefore, in this section, only the questions related to MT will be analysed because the impact of the course can only be assessed in relation to this topic. Figure 6, from Q1, shows that the participants regularly resort to MT systems (54.4% "often"; 36.8% "sometimes"), with only 8% using them rarely and less than 1% never using them. Before the module, the most often cited system was Reverso (114 mentions), followed by Google Translate (41) and DeepL (15).

Figure 7 compares the students' degree of confidence in MT before and after the classroom activities. At the end of the module, the majority is more confident about the output produced by MT systems, which is considered "quite reliable" by 91% of the participants (116 students). During the course, the students could compare different MT programmes. For the texts analysed and the specific language pair and direction, i.e., English-Italian, there was general consensus on the greater overall effectiveness of DeepL and Google Translate than Reverso. The possibility of using and comparing new tools, some of which being relatively unfamiliar to many, could have contributed to this shift in perception. In addition, before the module, as some students declared in the open questions, MT systems were used to check the meaning of words, as an alternative to a dictionary, or to understand the gist of a short string or passage. The increase in confidence may therefore be connected with first-hand observations of the overall efficacy of automated systems with full texts, reaching "a quality that is (arguably) close to that of human translations" (Vanmassenhove *et alii* 2020: 2203), and to having experimented the usefulness of MT in terms of productivity (see Toral 2019).

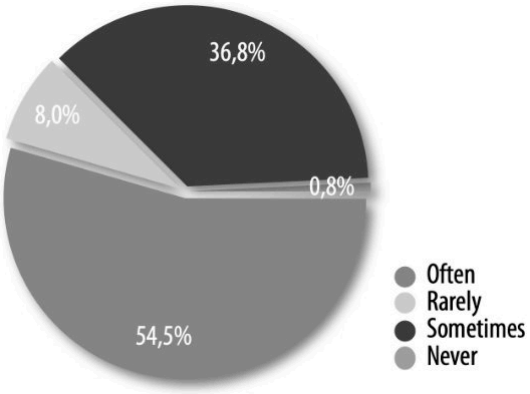

Figure 6: How often do you use free of charge or paid for MT systems?

The subsequent question was about the potential source of mistakes in MT output (Fig. 8). Before and after the course, most respondents identify the main cause for errors and inadequacies in the idiomaticity or complexity of source language expressions. It is interesting to observe, however, that in Q2 a higher number of students mention the role played by the algorithm used. These data are in line with expectations, as classroom discussions aimed at raising awareness of the challenges that MT still has to face in terms of correctness and fluency, and the implications of algorithmic bias (although it was a less central topic).

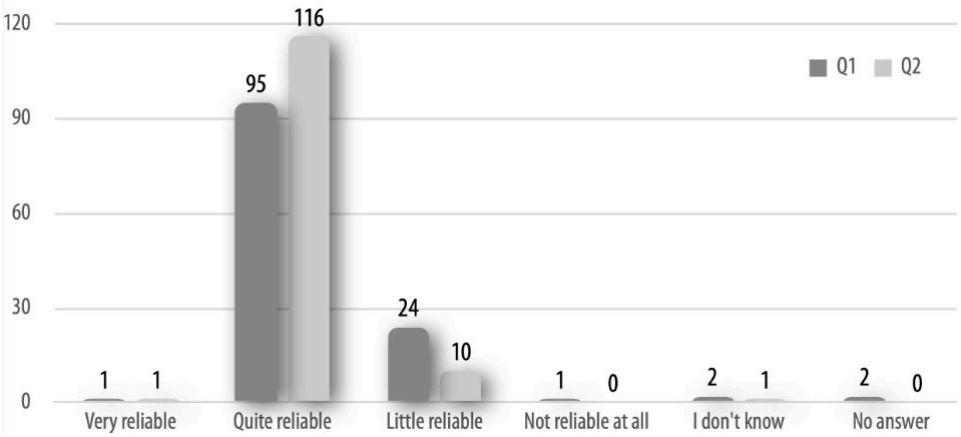

Figure 7: How reliable is the output produced by MT systems in your opinion?

3.1 Challenges for MT

Given the module's focus on the challenges for MT in terms of correctness, accuracy and fluency, a specific question on this topic was included in the end-of-course questionnaire. The students were asked which language features are more likely to be translated effectively based on the evidence gathered during activities and assignments. The selected phenomena were general lexis, specialized terminology, neologisms, polysemic words, lexical non-equivalence, collocations, long noun phrases, wordplays and culture-bound words or expressions. The results, reported in Figure 9, indicate that the students expect MT systems to be quite

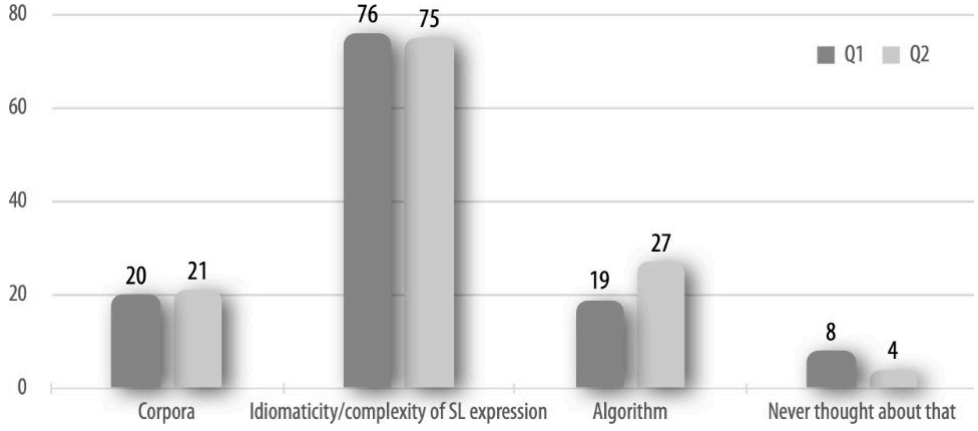

Figure 8: When MT output does not seem correct, what might be the reason for the mistake?

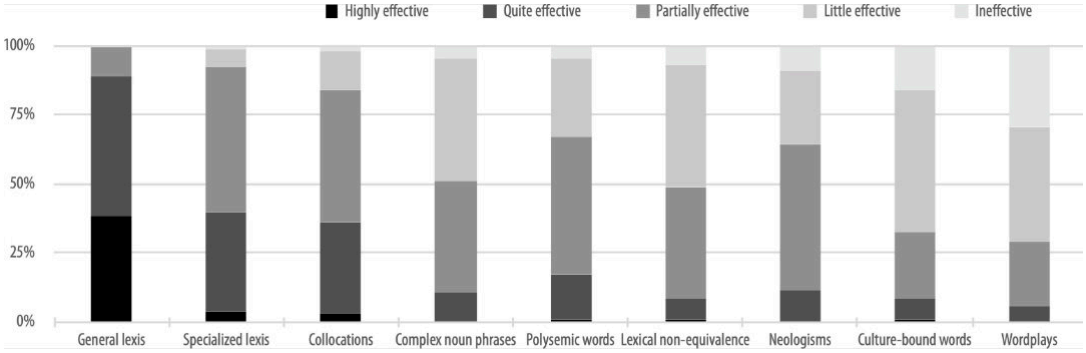

Figure 9: After attending the course, how effective do you think MT is in translating these phenomena?

effective, if not highly effective, with general-purpose lexis. They believe that MT is moderately effective with specialized terminology and collocations, while when it comes to complex noun phrases, polysemic words, lexical non-equivalence and neologisms, most respondents expect only partially or little reliable outcomes that will almost certainly require post-editing. Finally, regarding culture-bound expressions and wordplays, the students tend to believe that these phenomena do not lend themselves to be translated through current MT systems, which produce only minimally effective or totally ineffective output.

The students were asked to elaborate on this question through an open comment on what language aspects are likely to require more post-editing and why. Often cited reasons are the tendency of MT systems to translate expressions literally or the inability to correctly interpret the co-text. Inadequate sources of textual data to train MT systems and lack of creativity are also mentioned. Here are some extracts from students' answers:

1) *Perché i sistemi di traduzione automatica non riescono a riconoscere quando una frase o una coppia di parole è idiomatica ma traducono letteralmente*. [Because machine translation systems are not capable of understanding when a sentence or a pair of words is idiomatic, and they just translate it literally.]
2) *Neologismi, perché probabilmente non sono presenti nei database delle AI, quindi necessitano di una revisione.* [Neologisms, because they are probably not included in the databases of AI systems; hence they need post-editing.]

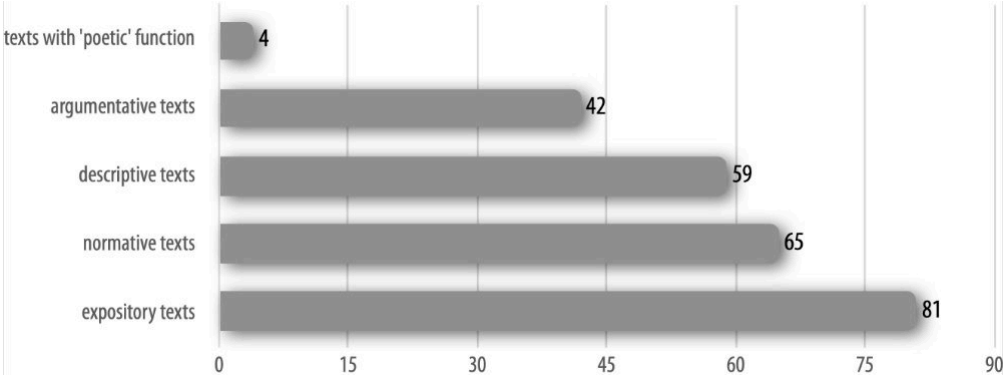

Figure 10: After taking the course, which text typologies in your opinion are effectively translated by MT systems?

3) *Sicuramente i giochi di parole e le parole connotate culturalmente […] per cui serve una creatività che l'IA non possiede.* [Definitely wordplays and culturally connoted words… for which creativity is needed, which is not possessed by AI.]

Another question introduced *ad hoc* in Q2 intended to assess whether the students could form reasonable expectations about the fluency and accuracy of MT output across different text typologies. Figure 10 shows that the students believe that argumentative texts and those with a "poetic" function are more likely to require post-editing; by contrast, more codified and less "creative" typologies, like the normative and the expository ones, tend to yield better results. Although sweeping generalizations should be avoided, the students' perception seems realistic and finds support in previous studies:

> MT performs better for standard, repetitive texts featuring characteristic terms and phrases (which is typical for legislative texts), while it does not give equally good results for texts containing new terminology or rare words, including idioms, metaphors or proper names (which occur more often in non-legislative texts). (Stefaniak 2020: 266).

The following question, only present in Q2, is about the degree of reliability of MT systems when translating isolated words *versus* full textual sequences. This was an open question, and the students were asked to motivate their answer. Of the responses obtained, 73% state that more reliable results are obtained when translating full textual sequences. Almost invariably,

the students refer to the importance of the context for MT to better disambiguate meanings and offer more appropriate results within a given string. However, students are also aware that the length of textual sequences may affect the output, with long stretches not always being translated consistently and cohesively. On the other hand, among the students who answered that MT gives better results with isolated words some argued that this way of using MT is more effective because online platforms offer the user a range of possible options to choose from, which promotes greater autonomy for the human translator. Following are examples of student responses:

4) *Ritengo funzionino meglio con sequenze testuali, non necessariamente troppo lunghe, in modo da poter fornire all'AI maggiore contesto [...].* [I believe they work better with full text sequences, albeit not necessarily too long, because they provide AI with more context [...]]
5) *Se si cerca una singola parola, di questa sono date più versioni, traduzioni (soprattutto in Google translate), che possono essere utili a una persona con un livello linguistico avanzato.* [If you are looking for a single word, you are given more versions, more translations (especially in Google Translate), which may be useful for someone with an advanced language level.]

3.2 Advantages and disadvantages of AI and MT

In both Q1 and Q2, participants were asked to list the positive and negative implications of the use of AI for natural language processing. The most frequently cited advantage is undoubtedly the speed with which computers can perform operations (Fig. 11). In Q1 the respondents tended to mention speed without referring to any particular task (e.g., "*velocità di risposta*"); by contrast, in Q2 the general understanding — albeit not encouraged by the lecturer — was that the advantages had to be interpreted in relation to MT, following the activities carried out during the module. Hence, most answers make explicit reference to translation and are more elaborate than those in Q1, showing a more nuanced and critical perspective:

6) *L'uso dell'intelligenza artificiale può essere utile per avere una prima traduzione veloce del testo di partenza e per potersi concentrare maggiormente sui passaggi che si ritengono più complicati.* [The use of artificial intelligence can be useful to have a quick first translation of the source text and to be able to concentrate more on complex passages.]

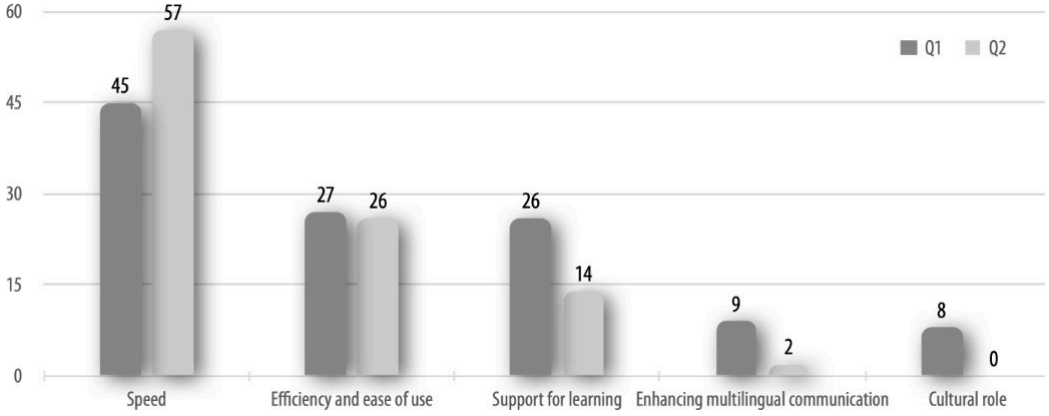

Figure 11: Indicate a positive aspect of AI in relation to language

7) *Sicuramente la velocità di esecuzione e di emissione di output sufficientemente corretti. A parte questo, se i database delle lingue target non sono aggiornati, non vedo molte note positive. Sono strumenti utili, sì, ma comunque ancora parzialmente fallaci.* [Definitely processing speed and sufficiently correct outputs. Apart from that, if the databases of the target languages are not up to date, I do not see many positive aspects. Of course, they are useful tools, but they remain partially flawed.]

In Q1 and Q2, a similar number of responses mention the efficiency and ease of use of AI tools as other advantages. In Q1, efficiency is related to the ability of machines to process large amounts of data, to make it easier for people to perform tasks and to do so through user-friendly applications. The fact that machines do not suffer drops in productivity is also mentioned. In Q2, efficiency is predominantly understood as increased productivity for translators, with MT systems allowing them to simplify their job and better concentrate on details:

8) *Un aspetto positivo è il fatto che siano un ottimo punto di partenza per traduzioni. La mano dell'uomo è fondamentale, ma comunque i traduttori riescono quasi sempre a fornire l'idea generale.* [A positive aspect is that they are a very good starting point for translation. The role of the human translator remains crucial, but MT systems almost always manage to provide the general idea.]

Much like the answers about speed, those referring to efficiency, too, appear more elaborate in Q2, underscoring the fundamental part of human post-editing and the importance of language competence to identify inaccuracies and mistakes:

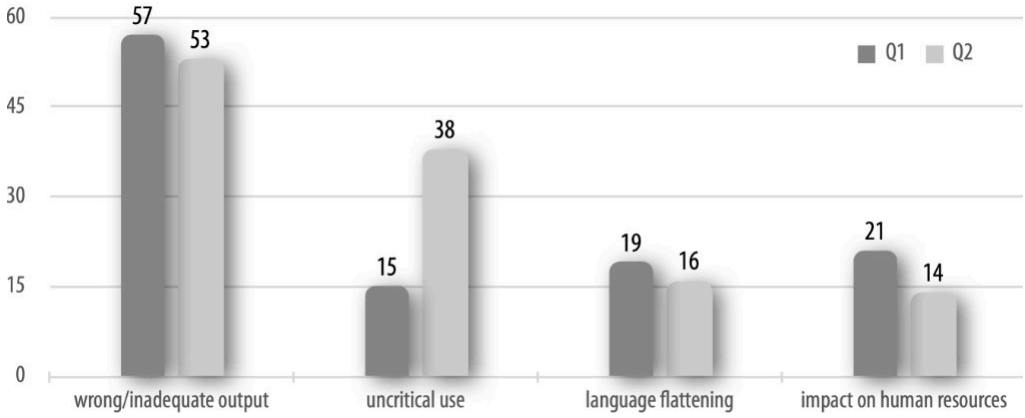

Figure 12: Indicate a negative aspect of AI in relation to language

9) *Penso possa essere sempre utile, soprattutto se si conosce la lingua straniera in cui si va a tradurre, altrimenti si rischia di copiare e incollare testi dove le frasi sono collegate senza una logica. Quando si ha una certa padronanza della lingua invece possono essere utili perché si individuano gli errori.* [I think it can always be useful, especially if you know the foreign language into which you are translating, otherwise you risk copying and pasting texts in which sentences are linked without any logic. When you have a certain command of the language, on the other hand, they can be useful because you can spot mistakes.]

The third advantage of AI, according to the students, is that it can support foreign language learning. This theme recurs more frequently in Q1 due to the broader understanding of AI in the preliminary questionnaire (examples 10-12).

10) *Potrebbe essere un valido supporto all'apprendimento di una nuova lingua.* [It could be a valuable support in learning a new language.]
11) *Correzione della pronuncia, miglioramento del lessico*. [Correcting pronunciation, improving vocabulary.]
12) *Imparare in maniera più efficace una lingua straniera e poterla confrontare con la lingua madre.* [Learning a foreign language more effectively and being able to compare it with your mother tongue.]

Finally, especially in Q1, some respondents suggested that AI can enhance communication across languages and perform what may be considered a "cultural" function, by granting access to information and promoting education:

13) *Ampliare la comunicazione tra parlanti di lingue diverse.* [Extending communication between speakers of different languages.]
14) *Può facilitare l'accesso all'informazione e all'educazione.* [It can facilitate access to information and education.]

Turning to the negative implications of AI (Fig. 12), the respondents identified four macro-issues: the production of incorrect or inadequate output; the uncritical use of AI systems; the risk of language flattening; and the negative impact that AI may have on certain professions. Output shortcomings are the most frequently cited problem in both questionnaires although the focus on this aspect slightly diminishes in Q2. In general, erroneous or inadequate translations are considered a drawback because they may disseminate incorrect information or because they still require considerable human effort.

In Q2 greater attention is paid to "how" AI is used. Responses underline that AI may cause mental laziness and affect the development of analytical skills if not supported by adequate training or knowledge (examples 15 and 16); it may encourage a shift of responsibility to the machine and a dependence on its services (example 17); it may also lead to superficial or erroneous uses, especially if accompanied by lack of language competences (example 18).

15) *Un maggior impigrimento di chi studia lingue, soprattutto nei novizi. Una tale velocità di esecuzione non credo sia utile per chi deve ancora sviluppare le proprie competenze linguistiche.* [Greater laziness among language learners, especially novices. I do not think such processing speed is useful for those who have yet to develop their language skills.]
16) *Diminuzione nella capacità di ragionamento ed analisi autonome.* [Diminished ability to think independently and carry out autonomous analyses.]
17) *Deresponsabilizzazione umana, totale affidamento all'intelligenza artificiale.* [Shift of responsibility away from human beings; complete reliance on artificial intelligence.]
18) *Mancanza di competenze linguistiche appropriate da parte della persona che traduce, nell'utilizzo di questi strumenti, poiché è necessario un livello*

alto di conoscenza della lingua. [Lack of adequate language skills on the part of the person who is translating through these tools, as a high level of language proficiency is required.]

AI and MT are believed to have a negative impact on languages themselves. In both questionnaires, the respondents expressed concerns for diminished lexical variety, excessive standardization, and the spread of forms of "machine translationese" (Vanmassenhove *et alii* 2021) or "post-editese" (Toral 2019).

19) *L'AI normalizza e rende standard molte frasi, e anche molte parole che potrebbero avere sinonimi utilizzabili, in contesti leggermente diversi potrebbero essere tradotte allo stesso modo […]*. [AI normalizes and standardizes many sentences; and many words that could have usable synonyms might be translated always in the same way even in slightly different contexts […]]
20) *[…] il rischio potrebbe essere perdere le caratteristiche peculiari del singolo parlante tendendo a una lingua "globalizzata"*. [[…] the risk might be that of losing the individual characteristics of each single speaker producing an increasingly "globalized" language.]
21) *Il traduttore potrebbe in qualche modo essere influenzato dalla traduzione proposta dalla MT e dunque l'esito potrebbe risolversi in un appiattimento della ricchezza lessicale*. [The translator might somehow be influenced by the version offered by the MT system, so the output may be characterized by poorer lexical variety.]

Another negative consequence of AI is that it may render human work unnecessary, thus affecting professions such as that of translator. Attention to this risk is more marked in Q1 than in Q2. This result may be partly due to the greater focus on uncritical uses of AI in Q2, and perhaps also to a heightened awareness of how much human post-editing in MT is still required, particularly in the case of professional translation.

4. Discussion

The students' profile emerging from both questionnaires is that of respondents for whom AI and MT are an integral part of their daily and study activities. The sample comprises students who have a good or advanced proficiency level of English (i.e., the source language) at least

based on their self-assessed abilities. Being foreign language specialists, they possess adequate metalinguistic knowledge and feel quite equipped with the skills needed to avoid an uncritical usage of AI technology and MT. Already in Q1, students showed to be conscious of potential risks of AI and MT for both users and languages themselves. Faced with this population, the teaching activities did not have an "eye-opening" impact but helped the students fine-tune their initial perceptions, dispel some misconceptions, and better articulate their views in the open answers.

The learning goals that seem most fully achieved are the recognition of the challenges that MT has yet to meet in relation to output correctness, appropriateness and fluency, as well as the awareness that different genres may be translated with varying levels of accuracy. The students also became more familiar with the mechanisms underlying MT, which made them attentive to the corpora selected to train programmes and to the algorithm used. One result worth mentioning is the students' change of perspective in Q2 regarding the negative sides of AI and MT, which are seen as more strongly connected to inexpert or superficial usage of these tools and less dependent on intrinsic factors.

Post-editing was practiced during classroom activities although, admittedly, the limited number of hours allocated to the module (i.e., 18) only allowed initial familiarization with this task. Hence, in the future, more time should be devoted to the training of post-editing skills and specific objectives should be set also considering the students' future professional profile. Similarly, it was only possible to scratch the surface of sensitive issues such as the implications of MT for socio-linguistic variation and gender representation, two topics that deserve greater attention in next editions of the module.

Conclusion

As the questionnaires showed, present-day foreign language university students exploit AI technology as part and parcel of their academic activities. This finding is confirmed by Jiménez-Crespo (2017: 190), who observes that software tools such as Google Translate, DeepL or Reverso "are here to stay; current language learners who are digital natives [...] already use them". However, they may not be fully aware of the risks and limitations of such digital resources; they may employ MT programmes in

a way that negatively affects the development of their language skills, textual analytical abilities, or translation competence. Therefore, it becomes essential to face the challenges posed by AI and MT to foreign language learning and translation training turning these resources into useful pedagogical allies. For instance, Lee (2020) reports that the integration of MT in the foreign language classroom may have positive effects on the development of writing skills, helping students think of writing as a process. Similarly, Kenny and Doherty (2014) and Mellinger (2017) argue for the inclusion of MT in the translation curriculum in a way that empowers rather than marginalises translators. For these reasons, ignoring today's role of AI and MT in foreign language teaching and translation training means losing the opportunity of teaching students how to best exploit this technology or not fully preparing them for an evolving language market which increasingly incorporates AI and MT in its workflows (Gaspari *et alii* 2015).

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Multilinguisme et variétés linguistiques en Europe à l'aune de l'intelligence artificielle

Multilinguismo e variazioni linguistiche in Europa nell'era dell'intelligenza artificiale

Multilingualism and Language Varieties in Europe in the Age of Artificial Intelligence

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