"I Looked It Up in DeepL": Machine Translation and Digital Tools in the Language Classroom

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Abstract   This article looks at a widespread yet erroneous use of machine translation (MT): looking up single words, thus treating MT systems as online bilingual dictionaries (ODs). After a literature review of this trend in research about MT, we consider data from a large survey that we carried out in 2021 at all Swiss universities on MT use and users' attitudes. When analysing users' metalinguistic awareness, we discovered that non-translators perceive the text to translate, mostly at word level, leading to the misuse of MT systems as ODs. Moreover, the survey results revealed confusion between the different digital tools for language learning, namely MT, online parallel corpora like Linguee and ODs. We therefore suggest broadening the scope of MT literacy to include training learners in general digital literacy to enable them to use such tools appropriately.

Keywords   Machine translation. Language learning and teaching. Online dictionaries. Online corpora. Tools.

Summary   1 Introduction. – 2 Use of MT as a Dictionary: What We Know. – 3 Metalinguistic Awareness of Mt Users: Data from DigLit Survey. – 4 The Jungle of Digital Tools. – 5 Conclusion: Towards a Global Literacy of Digital Tools for Language Learning.

1 Introduction

In the language classroom, tools used by students and teachers have changed considerably in recent decades. Print dictionaries have almost disappeared, although they seem to reign supreme in learners' attitudes (Cotelli Kureth, Kamber 2021), and have been replaced by online dictionaries (Domínguez Vázquez, Valcárcel Riveiro 2015), bilingual corpora like Linguee[1] (Buyse, Verlinde 2013) or smartphone applications (Nied Curcio 2015). Since the rise of neural machine translation (NMT), Google Translate (GT), DeepL[2] and other machine translation (MT) tools have been added to the increasing number of bilingual tools used by language learners.

Following surprising results from a recent large-scale survey on MT at Swiss universities, this paper explores the (mis)use of MT as an online bilingual dictionary (OD) and thesaurus. The literature review confirms that this is quite widespread and it raises questions about the level at which students grasp the text they translate, about teachers' and second-language acquisition researchers' attitudes towards MT, as well as about general digital literacy related to language learning tools. These issues have become more and more important as MT use has increased, particularly in the language classroom and in higher education. Researchers have emphasised the importance of developing machine translation literacy (Bowker 2020) and this is also the approach of this study. Drawing on data from our large survey and from literature on the use of MT in language classrooms, we highlight some of the points we believe an MT literacy programme needs to address, namely giving users some basic knowledge of how digital tools (MT, ODs, bilingual corpora, etc.) work, explaining the differences between the purposes of the tools and encouraging critical reflection on how tool providers market their products.

2 Use of MT as a Dictionary: What We Know

Before the rise of neural machine translation (NMT), MT systems were often used as "another de facto dictionary for language learners" (Jiménez-Crespo 2017, 184). Researchers observed that university students primarily used MT to translate single words (Clifford, Merschel, Munné 2013; Correa 2014; Jolley, Maimone 2015), never or rarely using it to translate whole paragraphs (Jolley, Maimone 2015). Thus, the usage of MT was limited to functions that traditionally fall to a bilingual dictionary. Correa (2014, 4) explains this phenomenon

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[1] https://www.linguee.com/.

[2] DeepL: https://www.deepl.com. Google Translate: https://translate.google.com/.

by suggesting that MT was significantly easier to use than ODs: Firstly, instead of suggesting several options, MT makes a pre-selection; secondly, it conjugates the verb if a subject is provided.

Not much seems to have changed with NMT: its primary use has remained largely the same, for the reasons already mentioned by Correa (see also Lee 2020, 159). In their review of the literature, Jolley and Maimone (2022, 30) report that:

> In terms of segment length, research has found that students use MT most frequently to translate individual words or short phrases, compared to paragraph-length or longer segments.

The same researchers (Jolley, Maimone 2015) had previously found that around 65% of the university students they had surveyed used MT mostly to translate single words. And this proportion has not significantly changed with NMT. Wei (2021, 51) writes that 78% of students assume that GT "can help them translate single words accurately". Over half of the students surveyed by Dorst, Valdez and Bouman (2021, 10) use MT "like a bilingual dictionary to translate single words, idioms or expressions". Hellmich (2021, 8) also observed that half of the participants in her study feed too little text into the MT tools to be able to achieve a reliable translation. In another survey by Resende and Way (2021, 73), almost half of the respondents (47.3%) report using MT frequently or very frequently to translate single words. Ryu et al. (2022, 144) come to a similar conclusion: MT is primarily used as a dictionary to look up unknown words. Moreover, according to Niño (2020), the dictionary and collaborative dictionary features of MT are the most popular features for over 80% of independent language learners questioned. Valijärvi and Tarsoly (2019) point out a parallel trend in which the students participating in their action research project particularly appreciated that GT suggested several equivalents, thus functioning like a thesaurus. Dorst, Valdez and Bouman (2021) also mentioned that students were using MT to find synonyms for words. This use of MT as an alternative to bilingual dictionaries instead of a translation tool is not restricted to higher education: Bourdais and Guichon (2020) found that, in a secondary school setting, over 80% of pupils regularly or always use MT to check the meaning of individual words.

It is important to note that entering single words in MT systems fails to fully exploit MT's potential and increases the risk of getting an improper result, because of the way these systems work. One of the most basic principles of current MT systems is that they work most efficiently at sentence level (Pérez-Ortiz, Forcada, Sánchez-Martínez 2022, 153). There does appear to be some awareness of pitfalls when using MT, with some students for example considering that "dictionaries are more reliable than [machine] translators" (O'Neill 2019, 168) or understanding that they should check the MT output for accuracy

(Valljärvi, Tarsoly 2019, 66). However, the majority of secondary- and tertiary-level learners seem to be far from fully MT literate.

But what about language teachers and researchers in L2 language learning and teaching? As expected, many teachers also use MT for single word searches. Nugraha, Ratnawati and Surachmat (2019) equate GT with an "electronic dictionary" and promote its use as a fast and easy translator of both words and sentences. It is important to note that, for some language pairs including lesser-used languages, NMT systems are the only bilingual tool that exists. In the experimental setting created by Ryu et al. (2022), students were instructed to take particularly difficult words or phrases from a text and translate them using MT. Patterson (2022) explains how MT can be used to learn vocabulary and cites as one of several "specific pedagogical applications in the classroom" the action of "permitting students to use MT to translate single words or short phrases as a reading or writing aid". More disturbingly, Groves and Mundt (2021, 8) mention that no teacher in their study "opposed the use of MT as a substitute for a dictionary". However, they did not find it acceptable that students use MT to write whole texts. As the next section shows, most users – students, teachers, researchers and other professionals – misuse MT in the same way.

3 Metalinguistic Awareness of Mt Users: Data from DigLit Survey

3.1 DigLit Survey

The Digital Literacy in University Contexts is a four-year Swiss project jointly funded by swissuniversities and the four participating universities (Zurich University of Applied Sciences – ZHAW [leading house], University of Neuchâtel – UniNE, Bern University of Applied Sciences – BFH, and Zurich University of Teacher Education – PHZH).[3] It aims to develop MT literacy at Swiss universities and its first step in 2021 was to conduct a large-scale survey in German, French, Italian and English amongst all Swiss universities to gather data on people's use of and attitudes towards MT.

The survey received 6,504 responses from both staff (academic and support) and students of all disciplines. We asked more than 200 multiple-choice and open-ended questions (see Delorme Benites et al. 2021 for more details).

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[3] See our website for more information: `https://www.zhaw.ch/en/linguistics/digital-literacy-in-university-contexts-diglit/`.

3.2   Use of MT as a Dictionary and a Thesaurus

The use of MT as a dictionary depicted in the aforementioned studies coincides with one finding of the DigLit survey. As shown in Chart 1, most respondents (88%) indicated that they resort to MT to translate individual words or phrases. As this figure shows, this is not the only use of MT but it is the most prominent for a majority of users.
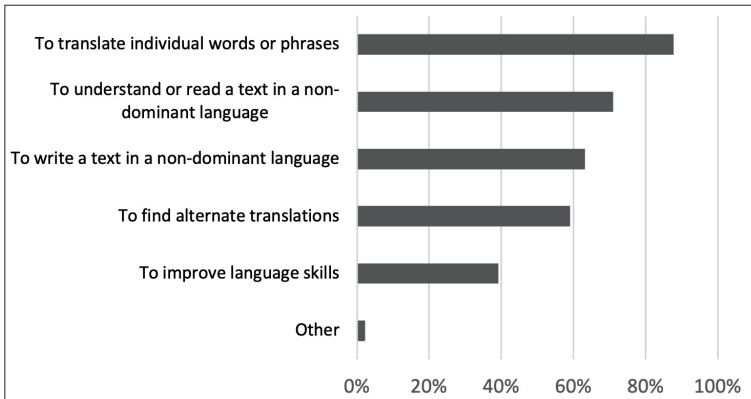

Chart 1   Self-reported purposes for using MT (n=3513) (DigLit survey)

Moreover, in our survey, two questions[4] elicited answers showing that Swiss users also employed MT as a thesaurus:

a.   Je peux chercher une expression dans un contexte (DeepL) ou obtenir une liste exhaustive de synonymes et d'expressions dans la langue cible (Leo, Google Translate) (BFH-1552).[5]

b.   Als Inspiration, Synonymsuche (ZHAW-851).[6]

c.   Kann helfen zu verstehen und Synonyme kennen zu lernen (ZHAW-919).[7]

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4   The first was 'I use MT for these reasons…' with several choices (free, fast, good quality, just for fun, easy, to improve my language output) and 'other'. When people wrote 'other', we asked them to elaborate. The thesaurus responses were found in these 'other' answers. The second question was 'How do you think MT will change the need to learn languages?' with several options given (we no longer need to learn other languages, learning languages is still needed but different competencies are necessary, MT will not change the need to learn languages significantly, I don't know) and 'other', with the thesaurus responses again stemming from the 'other' comments.

5   The initials represent the participant's university and the number denotes their place in the survey. We quote in the original language, without correcting spelling and other mistakes. Translation: "I can look up an idiom in context (DeepL) or obtain an exhaustive list of synonyms and idioms in the target language (Leo, Google Translate)". Leo is a well-known German collaborative dictionary, mostly used by German speakers and learners.

6   "To get inspired, to look for synonyms".

7   "Can help to understand, to learn synonyms".

These findings corroborate what has already been written about MT. As we suggested in section 2, they indicate that most MT users lack a proper understanding of the tool. As Bowker and Buitrago Ciro (2019) have suggested, while using MT is technically easy, a simple matter of copy and paste, employing this tool in an efficient and informed way requires some training. This involves understanding how the system works (e.g. the fact that it is mostly sentence based), assessing the output critically and knowing when to use and not to use the tool. Several researchers have also emphasized the need to raise metalinguistic awareness when dealing with MT (Garcia, Pena 2011; Valijarvi, Tarsoly 2019; Lee 2020; Tsai 2020; Ryu et al. 2022).

3.3 Metalinguistic Awareness in the DigLit Survey

The fact that MT systems are frequently used by non-translators as a mere bilingual dictionary raises questions about the underlying assumptions of these users regarding language and translation. More particularly, the question of the unit to be considered needs to be addressed. Dictionaries focus on word units, whereas MT systems perform best at sentence level, even slowly breaking the barriers of sentence (Zhang, Liu 2020). Professional (human) translators are trained to consider whole texts (Skopos theory, for example Reiss et al. 2015). Does the undifferentiated use of MT and ODs indicate an overall tendency to focus on word level? This question led us to conduct a corpus analysis of the answers given by all German and French[8] responses to ten open-ended questions related to the use and perception of MT systems **[tab. 1]**.

We subsequently compared the absolute frequency of occurrences for three levels of language units: word, text and sentence. For each category, synonyms and equivalents were added for both German and French during inter-annotator exchanges. Several rounds of coding allowed us to achieve a satisfying inter-annotator agreement. As a result, for example, the category 'word' includes designations such as synonym(s), lexis, terminology, term, lexical.

As shown in the chart, respondents often spontaneously mentioned words when elaborating on their use and opinion of MT, more frequently than sentences or texts **[chart 2]**. A more fine-grained analysis of specific questions shows a more differentiated picture. The respondents tended to write more about the text level when pondering

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8   The Italian and English were not included at that time because the data set was either very small (English) or not available yet (Italian). It would be interesting to see if these languages yielded different results.

whether or not to use MT **[chart 3]**, whereas they wrote about 'words' when reflecting on their actual active or passive use of MT **[chart 4]**.

Table 1   Open-ended questions about the use and perception of MT

| 1 | In which situation is it not OK to use MT? |
2	If someone discouraged you from using MT, for what reasons?
3	If someone encouraged you to use MT, for what reasons?
4	For what reasons do you use MT?
5	How do you make sure that the output is accurate?
6	What actions do you take to minimize risks linked to an incorrect output?
7	What modifications do you make to the text before using MT?
8	What modifications do you make to the text after using MT?
9	Describe a situation where you were not satisfied with MT
10	What makes you think that a text has been machine translated?
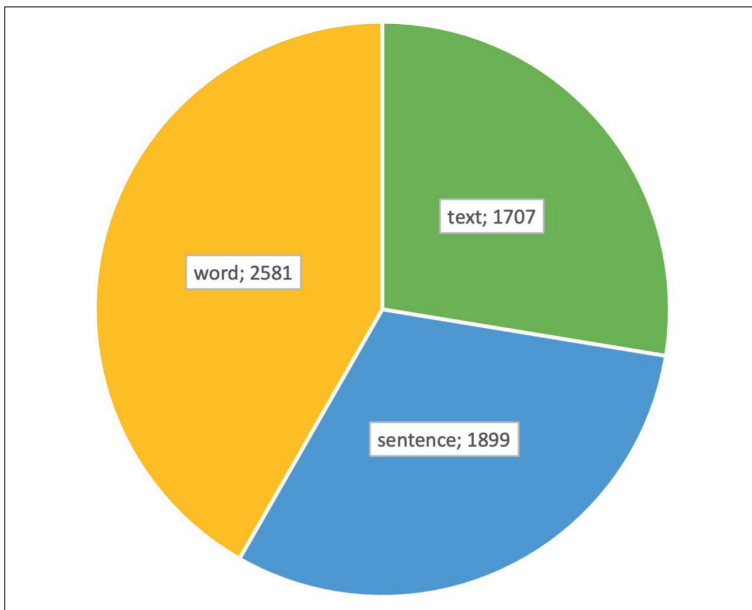
Chart 2   Units mentioned in all open-ended answers (n=9452) (DigLit survey)

Answers to the question "What actions do you take to minimize risks linked to an incorrect output?" **[chart 4]** seem to contradict this tendency, as the mentions of "text" are clearly more frequent than words or sentences. However, a closer look at the answers show that most respondents mentioned texts in a negative form, explaining that they do not translate entire texts as a measure to minimize risks:

d.   Je n'entre pas de phrases complète ou de texte complet. Je ne traduis que mot par mot (UniNE-91).[9]

e.   J'évite de traduire des paragraphes entiers et je vais toujours regarder les synonymes des mots proposés (UniNE-135).[10]

f.   Traduire seulement des mots pas connus et pas un texte entier (UniNE-262).[11]

g.   Traduction de mots ou petites phrases mais pas de textes entiers (UniNE-280).[12]

h.   Texte von mir anonymisieren, nur Teilsätze übersetzen lassen, nicht den ganzen Text (BFH-458).[13]

i.   Ich nutze MÜ nur unterstützend/bestätigend und nur teilweise, nie für ganze Texte. (BFH-568).[14]

j.   Ich lasse nie ganze Texte übersetzen sondern immer nur einzelne Sätze, bei denen ich mir nicht sicher bin. (ZHAW-929).[15]

These observations show that, while texts as a unit are indeed considered by most respondents before they decide (or not) to use MT, the actual work with the machine focuses heavily on single words as core units. On the one hand, this could be a direct consequence of the incursion of MT into the lives of many non-translators, who now have access to powerful translation solutions without having any conceptual tools to understand the translation process in its complexity. On the other hand, this is in line with the many observations that MT users do not differentiate between MT and ODs, pointing towards the need not only for MT literacy training but for a wider digital literacy (see section 4).

One potential reason for inserting only single words in MT is a lack of trust in MT abilities. Research has shown that respondents are very sceptical about translating whole paragraphs using MT.

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[9]   "I do not insert full sentences or a full text. I only translate word for word".

[10]   "I try not to translate whole paragraphs and I always look for synonyms of suggested words".

[11]   "Only translate unknown words and not a full text".

[12]   "Translation of words or short sentences but not full texts".

[13]   "Anonymise my texts, only translate bits of sentences, not a whole text".

[14]   "I use MT only to support/confirm and only partially, never for whole texts".

[15]   "I never translate the whole text, but only individual sentences that I'm not sure about".
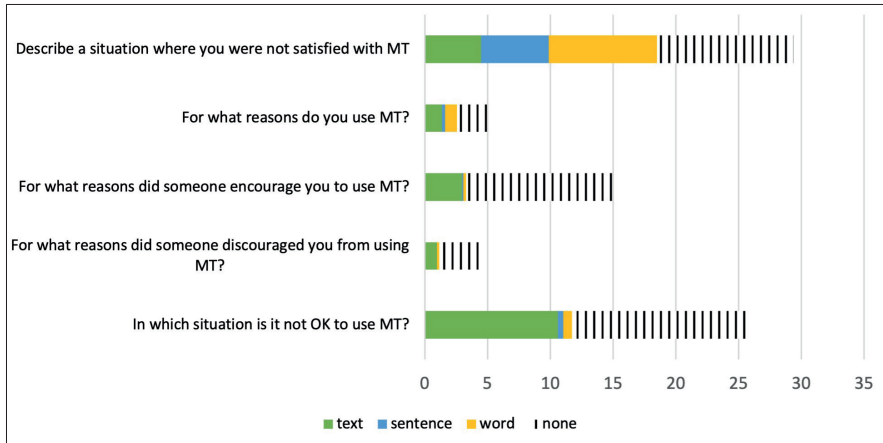
Chart 3   Units mentioned when reflecting on whether to use MT or not (DigLit survey)
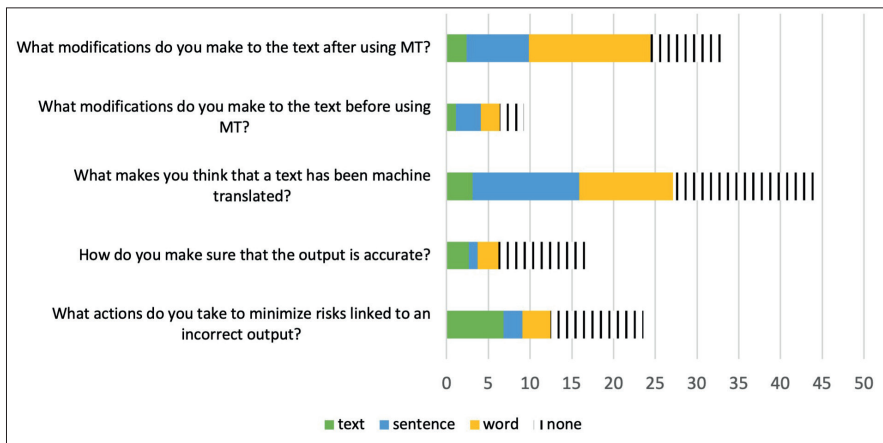

Chart 4   Units mentioned when reflecting on use of MT (DigLit survey)

In Wei (2021), only half of the students trust MT to translate paragraphs accurately. Groves and Mundt's (2021) subjects did not appear doubtful about employing MT as a dictionary, but voiced concerns when translating complete sentences or texts. In a comparison of ODs and online translators (OTs), O'Neill (2019, 173) found that

> [i]nterestingly, the top aspect mentioned as a negative for ODs, sentences, was also at the top of the list for OTs (12), even though OTs are arguably more suited for translating complete sentences.

This could indicate that students' scepticism stems from a lack of understanding of the difference between ODs and OTs, which Correa (2014) had already observed in 2014. Another reason could be linked to some teachers' attitude to MT (see section 2). Students may feel more morally entitled to use MT for single words than making more extensive use of it. Dorst, Valdez and Bouman (2021) conclude that as soon as entire sentences or paragraphs are translated, MT use is seen as "a form of fraud" (Dorst, Valdez, Bouman 2021, 13).

Finally, it seems that this could be linked to the learners' language level. Some studies mentioned in Jolley and Maimone (2022, 30) report that "low-proficiency learners tended to translate longer segments, such as entire sentences". As they become more independent, they resort to MT as an OD, looking up words that they do not know and thus relying less on MT.

4 The Jungle of Digital Tools

The confusion between the various bilingual tools mentioned in 3.3 as having been observed by Correa (2014) and Resende and Way (2021) also appeared in the DigLit survey. From the analysis of the respondents' open-end answers about which MT tools they know and use, we could infer that users tend to think that any digital bilingual tool is MT.

Chart 5 shows a wide variety of digital language resources, the majority being ODs (78% of all responses). Interestingly, 2% of the responses were neither ODs, nor online corpora or MT, being tools such as Grammarly, Wikipedia or MateCat. Resende and Way (2021, 72) also note that some of their respondents "confused MT systems with dictionaries and aligned corpora such as Linguee".

We saw in section 2 that one of the reasons users turn to MT instead of an OD to look up words is its simplicity and its outward univocality:[16]

> Contrairement aux dictionnaires, les traducteurs offrent une réponse unique. Il n'est pas nécessaire d'identifier la nature du mot ou le contexte pour choisir la traduction appropriée. Cette apparente simplicité est rassurante pour les élèves. (Bourdais, Guichon 2020, 15)[17]

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[16] Clearly, many users are not aware that with DeepL, a right click on each word elicits a list of possible replacements.

[17] "Unlike dictionaries, translators show only one possible answer. It is not necessary to identify the nature of the word or the context to choose the appropriate translation. This apparent simplicity is reassuring for students."
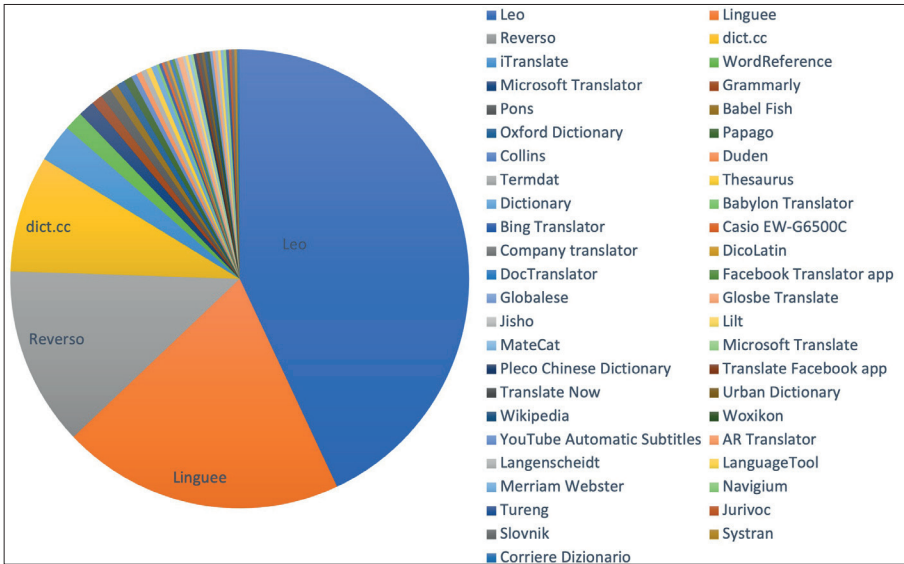
Chart 5 Tools mentioned as MT (DigLit survey)

This explains why students favour MT: they believe it yields a straightforward answer fitting the context. But the idea of finding a word in context is also pertinent to other tools, mostly bilingual parallel corpora like Linguee, which in the DigLit survey is often mistaken for either an MT system or an OD. The following responses were recorded to the questions "I use MT for these reasons" (k, l, m) and under 'other' in answer to the question "Which MT system do you use?" (n).

k. J'utilise un dictionnaire de la langue seconde ou le site Linguee qui permet de voir des mots ou expression en contexte (UniNE-51).[18]

l. Linguee propose des exemples de phrase avec les mots intégrés. ça me permet d'être sûre de comment utiliser le mot dans une phrase (UniNE-64).[19]

m. Certains traducteurs de mots comme linguee.fr et content.reverso.net donnent des exemples de phrases qui permettent d'être plus précis quant au bon mot à utiliser (UniNE-253).[20]

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[18] "I use a L2 dictionary or the Linguee website which allows to see words or idioms in context."

[19] "Linguee suggests examples of sentences with integrated words. This allows one to be sure of how to use the word in a sentence."

[20] "Some word translators like linguee.fr and content.reverso.net give examples of sentences that allow one to be more precise when looking for the right word to use."

> n. Linguee: Benutze ich für die Übersetzung von Wörtern und wenn ich wissen muss, in welchem Kontext das Wort gebraucht wird. (ZHAW-3005).[21]

Linguee and Reverso Context, both online bilingual parallel corpora, are considered to be *traducteurs de mots* (word translators) because that is how they are used, just as MT and ODs.

However, these findings put what we wrote earlier into perspective. If students say they mainly use MT to look up single words and the system they use is Linguee, then their labelling of the tool is incorrect but their use is appropriate. Hellmich (2021) also shows in great detail how imaginative and savvy some students are when using MT to help them write in the L2. Nevertheless, our analysis of MT users' metalinguistic awareness points to word-level use of all tools, including MT, and thus calls for more training for both students and teachers.

Last but certainly not least, the presentation of MT and other bilingual tools for language learning can be misleading. For example, the layout of MT tools available on smartphones complicates the differentiation between OTs and ODs. GT, for example, looks like a dictionary when used in the app. This must not be forgotten, especially given that young MT users often use the app version (Bin Dahmash 2020). Other tools like Reverso[22] offer a range of tools (MT on the landing page, bilingual parallel corpus on the 'Context' tab and ODs when one clicks on the three dots). Linguee presents itself as an "English Dictionary and Translation Search with 1,000,000,000 example sentences from human translators".[23]

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21   "Linguee: I use it to translate words and when I don't know in which context the word is used."

22   https://www.reverso.net/traduction-texte.

23   https://www.linguee.com/.

5 Conclusion: Towards a Global Literacy of Digital Tools for Language Learning

The data gathered on the use of MT in the DigLit survey and in various research settings confirms that much still needs to be done to train users, both students and teachers. MT literacy (Bowker, Buitrago Ciro 2019; Bowker 2020) is a good start. Knowing how MT systems work should allow users to understand why using MT as an OD is not appropriate. However, our data also shows that this is not enough. Learners should also be trained to know, recognise and use critically and efficiently the various tools at their disposal. Most of them are faced with a jungle of tools which they cannot differentiate and which they use indiscriminately. It is imperative that language teachers start training their students in the use of these resources so that learners can fully benefit from the variety of free tools available. Such instruction should primarily focus on the smartphone versions of the tools, as it seems that most students – generation Z, at least – are using these devices more than their laptops or computers to learn (Poláková, Klímová 2019).

Further, the recent release of the transformer-based text generation system ChatGPT to the broad audience amidst enormous media attention has suddenly multiplied the potential uses of artificial intelligence tenfold, not only to translate words or texts but also to generate texts and content. Nevertheless, no attention has yet been paid to how such tools are used or how to ensure that humans are still in the communication loop. The insights acquired around MT literacy (or lack thereof) will therefore be extremely valuable to ensure an informed, safe and constructive use of AI for communication purposes.

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