Machine translation in the multilingual classroom: how, when and why do humanities students at a Dutch university use machine translation?

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How, when and why do humanities students at a Dutch university use machine translation?

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Machine Translation (MT), the process by which a computer engine such as Google Translate or Bing automatically translates a text from one language into another without any human involvement, is increasingly used in professional, institutional and everyday contexts for a wide range of purposes. While a growing number of studies has looked at professional translators and translation students, there is currently a lack of research on non-translator users and uses in multilingual contexts.

This paper presents a survey examining how, when and why students at Leiden University's Faculty of Humanities use MT. A questionnaire was used to determine which MT engines students use and for what purposes, and gauge their awareness of issues concerning privacy, academic integrity and plagiarism. The findings reveal a widespread adoption of Google Translate and indicate that students use MT predominantly to look up single words, as an alternative to a dictionary. Many seemed sceptical about the value of MT for educational purposes, and many assumed that the use of MT is not permitted by lecturers for graded assignments, especially in courses focusing on language skills.

The results demonstrate a clear need for more MT literacy. Students may not need practical training in *how* to use MT, but there is much room for improvement in terms of *when* and *why* they use it.

Keywords: machine translation, literacy, multilingual classroom, university students, transferable skills, plagiarism, ethics

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1. Introduction

Since the launch of Neural Machine Translation (NMT) in 2015 and subsequent claims about NMT achieving human parity (e.g., Hassan et al. 2018), both the professional and public interest in MT have taken flight. Many professional translators now incorporate MT in their workflow, even though many still resist the general overconfidence in MT's quality. For businesses, industries and governments, MT is an ideal way to handle the ever-increasing number of texts to translate: MT is fast, cheap and freely available. Naturally, concerns are being raised about the subsequent decrease in rates for professional translators who are asked to post-edit MT output rather than translate from scratch while the MT output is sometimes so problematic that re-doing the translation would be the best and fastest solution.

Yet, while many professional translators dislike MT and dislike being asked to do post-editing rather than translation, it is safe to assume that MT is here to stay. People may make fun of ridiculous mistakes in the output (Läubli and Orrego-Carmona 2017) and engage in back-and-forth translations as a source of entertainment (Gaspari 2006), but there is no denying that recent developments in machine learning and artificial intelligence have led to such considerable improvements in the quality of NMT output (Moorkens 2018) that it is deemed useful for a wide range of communicative purposes, including drafting and gisting (Bowker and Buitrago Ciro 2019). In many contexts, even professional ones, an overly literal or slightly awkward translation is good enough for our needs. We do not need a perfect or publishable translation, we just need a general idea of what the text says (Nurminen 2020).

As a result of the ever-increasing globalization and digitization of society, MT websites, plugins and mobile phone apps have become part and parcel of our everyday lives. We should not overlook the fact that for many people MT is the only available option to gain access to products, services and information in their own language. As Nurminen and Koponen (2020, 151) point out, it is important to remember that the ambition to improve MT is not only driven by science, the industry and government bodies; there is also an important humanitarian motivation: "[a]ccess to information can be seen as a human right necessary for participation in society and as a means of ensuring equality", and MT plays an essential role in providing multilingual access to information for refugees, migrants and people in crisis situations (O'Brien and Federici 2020).

Since MT allows us to gain access to multilingual information and to communicate directly in foreign languages we have little to no proficiency in, it should come as no surprise that the use of MT has also made its way into our educational systems. Yet we know surprisingly little about how students (or staff for that

matter) actually use MT: what they do with it, when and why they use it, and why they opt for MT rather than other solutions. Looking at Leiden University, it is striking that digital skills and information literacy are a key component of the curriculum – "Tools & Technology" is one of the eight Ambitions in the Learning@Leiden vision on teaching and learning ("About the vision", n.p.) – but there are no formal rules or guidelines that make clear whether and under which circumstances the use of MT is allowed. No reference is even made to MT, though big data and artificial intelligence are mentioned: "It is crucial that we respond to the changes in the professional field brought about by technological innovations such as big data, robotics and artificial intelligence" ("Application of technology", n.p.).

The Technology Ambition states that students need to be "trained to adapt to the technological innovations that will take place in their work" and argues that teaching should "reflect the way today's students experience technology" as these technological innovations are "changing higher education and the way that students participate in education" ("Application of technology", n.p.). Given the fact that it is actually far more likely that students are using MT than robotics or artificial intelligence, it is all the more worrying that so little attention has been paid to the role MT may very well be playing in the way all students – not only Translation or Humanities students – participate in higher education.

Of course, it is true that learning how to use MT is not a problem for most students: as pointed out by Bowker (2020), it is a simple matter of copy-pasting text into a browser and pressing a button. Yet it is telling that many students are hesitant to admit that they use MT. The status quo appears to be that lecturers present MT as detrimental to language learning (Bowker 2020) or consider it a form of academic misconduct relating to fraud (Mundt and Groves 2016), even though research has demonstrated the value of teaching students how they can use MT as a linguistic resource rather than a quick fix (e.g., Niño 2008, 2009; García 2010; García and Pena 2011). Very little attention has been paid to the use of MT as a pedagogical tool in foreign language learning, and studies often focus on post-editing output rather than employing MT as a resource to write directly in the foreign language (Lee 2019). An additional gap in existing scholarship concerns the fact that most studies involve advanced learners rather than beginners, while free online tools such as Google Translate specifically target people with little to no knowledge of the foreign language (García and Pena 2011).

While there is a growing body of research focusing on the use of MT by professional translators (e.g., Läubli and Orrego-Carmona 2017; Moorkens et al. 2018; Sánchez-Gijón et al. 2019) and translation students (e.g., Kenny and Doherty 2014; Gaspari et al. 2015; Rossi 2017; Moorkens 2018), there is only very limited attention to the use of MT by students who are not enrolled in a trans-

lation programme (cf. Bowker and Buitrago Ciro 2019; Bowker 2020) or professional users who are not involved in translation (cf. Nurminen 2020). There is a growing conviction in the Translation Studies community that we need to better understand what non-translation students and non-translator users (i.e., lay users) are doing with MT and raise awareness for the need to offer training not in MT *skills* but in MT *literacy* in university curricula, as part of more general training in information literacy and digital competence.

In the context of scholarly communication, Bowker and Buitrago Ciro (2019, 88) define MT literacy as the ability to:

- comprehend the basics of how machine translation systems process texts;
- understand how machine translation systems are or can be used (by oneself or by other scholars) to find, read, and/or produce scholarly publications;
- appreciate the wider implications associated with the use of machine translation;
- evaluate how (machine) translation-friendly a scholarly text is;
- create or modify a scholarly text so that it could be translated more easily by a machine translation system; and
- modify the output of a machine translation system to improve its accuracy and readability.

As summarized succinctly by O'Brien and Ehrensberger-Dow (2020, 145), "MT literacy means knowing how MT works, how it can be useful in a particular context, and what the implications are of using MT for specific communicative needs" They argue in favour of training and empowering non-traditional MT users, as MT literacy is becoming an essential part of more general digital literacy, and is playing an increasingly important role in contexts extending far beyond professional translation.

The survey presented in this paper is part of an ongoing teaching innovation project that focuses on developing a learning trajectory and an online toolkit for MT literacy aimed at students at Leiden University's Faculty of Humanities who are not specializing in translation. These students represent many different native languages and cultural backgrounds, as well as language proficiency levels. They frequently find themselves in multilingual classrooms, as courses are increasingly taught in English rather than Dutch but may be focused on developing proficiency in a third language, for example Dutch or Chinese students enrolled in the English-taught BA International Studies and choosing Japanese or Russian as their main language. The survey was used to determine how, when and why students use MT, with the aim of identifying areas in which their literacy could and should be further developed.

2. Study design

This section describes the materials and methods used for the online questionnaire. The questionnaire reported in this paper was conducted between 26 January and 28 February 2021 to determine students' experience with and knowledge of MT. Before conducting the study, the questionnaire was pre-tested and the feedback was implemented in the final version.

Questionnaires, as opposed to focus groups or interviews, were adopted as the data collection instrument, given the high number of students enrolled at the Faculty and the fact that conducting in-person interviews or focus groups was impossible due to the restrictions associated with the COVID-19 pandemic.

2.1 Respondents

In total, we received 293 usable responses from students enrolled at Humanities, Governance and Global Affairs, Law, Science, and Social and Behavioural Sciences. Given the project's focus on students in Humanities, and their overrepresentation in the data (283 respondents, 96.6%), this paper will zoom in specifically on their experiences, views and perspectives. The respondents were aged between 18 and 64 (average age 22.3), with 86.9% aged between 18 and 24, 12.4% between 25 and 34, 0.4% between 35 and 44 and 0.4% between 55 and 64. The majority of respondents were BA students (86.2%), followed by MA students (12%), PhD students (1.4%) and pre-master students (0.4%). Participation was voluntary. As a means of compensation, 10 vouchers of €7.50 were raffled among the respondents.

2.2 Questionnaire design

The questionnaire was designed in the two languages of instruction used at Leiden University, English and Dutch, using Qualtrics. Links and QR codes to the questionnaire were shared on university and faculty social media channels and online learning platforms with the help of student ambassadors and coordinators of studies involved in the different Humanities programmes. For the purposes of the analysis reported below, the English and Dutch versions of the questionnaire are considered equivalent and the data of both versions is therefore analysed together. To minimise equivalence problems, the questionnaire was designed and translated by the lead researcher and checked for inconsistency by the team (see Saldanha and O'Brien 2013).

The title of the questionnaires was followed by a brief description of the study's aim, data storage, respondents' rights and confidential use of data. The

questionnaire consisted of 19 questions, divided into three sections: (1) student profile (five questions), (2) use of free MT software (eleven questions), and (3) feedback on the questionnaire (three questions).

The main part of the questionnaire (Section 2) contained five-level Likert items, multiple choice questions and open-ended questions. The Likert scales were used to elicit a general idea of respondents' usage of MT software in their daily lives. The multiple choice questions focused on the usage of MT software.

The open-ended questions complemented the multiple choice questions by seeking specific answers to (1) the educational purposes for which MT was used, (2) the situations in which the respondent thought the usage of MT would be allowed, and (3) the situations in which the respondents thought the usage of MT would be prohibited.

In short, the questionnaire focused on the familiarity with and opinions on free MT software in general, and the respondents' experience with and opinions on its uses for educational purposes.

3. Results and discussion

The questionnaire yielded a considerable amount of data. In the analyses below, we will therefore zoom in on those results that are most relevant given our current focus on how, when and why Humanities students use MT in educational settings.

3.1 Familiarity with free MT software

The questionnaire asked students how familiar they were with a range of free online MT engines. Unsurprisingly, the great majority of respondents (96.8%) reported that they were very familiar or extremely familiar with Google Translate (see Table 1). Interestingly, students indicated not being at all familiar with Google Translate's main competitors, DeepL (82.3%) and Bing/Microsoft (72.8%); this is noteworthy given the fact that DeepL is generally considered the preferred option in academia and the industry (see Massey 2021). This finding shows that within the educational context, one step that can easily be undertaken by lecturers not opposed to the use of MT is to make students aware of alternatives to Google Translate, and invite students to run the same text through different engines and compare the output. The differences can be used not only to discuss linguistic and cultural differences, but also to raise awareness to issues concerning data mining, bias and the fact that Google Translate uses indirect translation, via English, for many language combinations.

What is also surprising is that most respondents reported that they were not very familiar with the use of MT software on social media, such as Facebook, Instagram, Twitter or LinkedIn. Given that the Netherlands has 11.77 million social network users ("Social media usage in the Netherlands – Statistics & Facts", n.p.), and the above-mentioned platforms are among the most widely used in the Netherlands, this finding may suggest that students do not use MT to follow or connect with people who post in other languages than Dutch and English. This may be a natural result of the dominance of English on social media in academia and in the Netherlands more generally, but it also suggests that students may not be exposed to genuinely multilingual and multicultural perspectives. Alternatively, students may not realize that they are reading MT, in which case lecturers may want to raise students' awareness of how mediation through MT affects our everyday communication.

Table 1. Familiarity with free machine translation software

	1. Not at all familiar	2. Slightly familiar	3. Moderately familiar	4. Very familiar	5. Extremely familiar
Facebook automatic translations	89 (31.4%)	75 (26.5%)	53 (18.7%)	55 (19.4%)	11 (3.9%)
Instagram automatic translations	60 (21.2%)	57 (20.1%)	81 (28.6%)	68 (24.0%)	17 (6.0%)
LinkedIn automatic translations	210 (74.2%)	36 (12.7%)	24 (8.5%)	11 (3.9%)	2 (0.7%)
Twitter automatic translations	159 (56.2%)	43 (15.2%)	34 (12.0%)	28 (9.9%)	19 (6.7%)
Google Translate	0 (0.0%)	1 (0.4%)	8 (2.8%)	58 (20.5%)	216 (76.3%)
Bing/Microsoft Translate	206 (72.8%)	50 (17.7%)	15 (5.3%)	9 (3.2%)	3 (1.1%)
DeepL	233 (82.3%)	16 (5.7%)	7 (2.5%)	9 (3.2%)	18 (6.4%)
Reverso	182 (64.3%)	15 (5.3%)	21 (7.4%)	34 (12.0%)	31 (11.0%)
Mobile Phone App	124 (43.8%)	40 (14.1%)	35 (12.4%)	47 (16.6%)	37 (13.1%)

When asked how often they used free online MT engines, 68.6% of the respondents answered that they used Google Translate regularly, either 'often' (46.3%) or 'on a daily basis' (22.3%). Table 2 shows that their frequency of usage

matches their familiarity with the different MT engines. Only a few respondents frequently ('often' or 'on a daily basis') used free MT software on social media, namely Facebook (6.4%), Instagram (9.5%), LinkedIn (1.1%) and Twitter (7.0%). There were hardly any respondents who frequently used Bing/Microsoft Translate (0.8%) or DeepL (6.3%). Other MT software such as Reverso (14.5%) and Mobile Phone Apps (20.9%) were used more often.

Table 2. Usage frequency of free machine translation software

	1. Never	2. Hardly ever	3. Every now and then	4. Often	5. On a daily basis
Facebook automatic translations	155 (54.8%)	73 (25.8%)	37 (13.1%)	15 (5.3%)	3 (1.1%)
Instagram automatic translations	117 (41.3%)	78 (27.6%)	61 (21.6%)	23 (8.1%)	4 (1.4%)
LinkedIn automatic translations	259 (91.5%)	17 (6.0%)	4 (1.4%)	1 (0.4%)	2 (0.7%)
Twitter automatic translations	202 (71.4%)	33 (11.7%)	28 (9.9%)	14 (4.9%)	6 (2.1%)
Google Translate	1 (0.4%)	10 (3.5%)	78 (27.6%)	131 (46.3%)	63 (22.3%)
Bing/Microsoft Translate	258 (91.2%)	18 (6.4%)	5 (1.8%)	1 (0.4%)	1 (0.4%)
DeepL	241 (85.2%)	17 (6.0%)	7 (2.5%)	12 (4.2%)	6 (2.1%)
Reverso	192 (67.8%)	17 (6.0%)	33 (11.7%)	35 (12.4%)	6 (2.1%)
Mobile Phone App	160 (56.5%)	22 (7.8%)	42 (14.8%)	39 (13.8%)	20 (7.1%)

3.2 Reasons for using MT software

The respondents were asked how often they used free MT programmes for (1) personal communication and social media, (2) educational purposes, and (3) work purposes (see Table 3). The results show that educational purposes are the most important reason for students to use MT (60.5%). A third of the respondents (30.4%) indicated that they never or hardly ever used MT for personal communication and social media, and another third used it only every now and then. For work purposes, a very large majority (75.3%) either never or hardly ever used MT.

These results reveal that students quite frequently use MT for educational purposes, despite the fact that they may believe that its use is frowned upon by lecturers. One important factor here is, of course, that the language used in educational settings, especially in academic papers, is generally more complex, abstract and formal than the language used on social media, and may therefore require the use of dictionaries, grammars and other resources more often. Additionally, most communication on social media, and in the students' work environment, is likely to be in Dutch or English, and may therefore not require translation.

Table 3. Purposes of using free machine translation software

	1. Never	2. Hardly ever	3. Every now and then	4. Often	5. On a daily basis
Personal communication and social media	16 (5.7%)	70 (24.7%)	108 (38.2%)	69 (24.4%)	20 (7.1%)
Your studies	5 (1.8%)	14 (4.9%)	80 (28.3%)	143 (50.5%)	41 (14.5%)
For work	179 (63.3%)	34 (12.0%)	39 (13.8%)	26 (9.2%)	5 (1.8%)

With regard to the usefulness of MT for different purposes, the respondents were also asked to list their reasons as to why they thought free MT websites are or are not useful for specific purposes in an open-ended question. Of the 283 respondents, 153 students reflected on their reasons why MT is or is not useful for personal communication and social media. The reasons they listed for considering MT useful for this purpose included: to translate single words (mentioned 49 times), for quick and easy use (mentioned 37 times), to understand the global meaning of posts and messages (mentioned 45 times) and for communication with foreign family and friends (mentioned 38 times). Reasons listed for why MT websites were not useful for personal communication and social media included: the software not being good enough (mentioned 13 times) and there being no need for translation (mentioned 8 times).

As for the usefulness of MT for educational purposes, 173 of the 283 respondents motivated their answer to this question. Reasons why students considered free MT websites useful for educational purposes included: to look up single words (mentioned 86 times), to understand the main idea behind academic texts (mentioned 40 times) and to improve their own produced content (mentioned 18 times). Reasons given as to why MT websites were not useful for educational purposes included MT not being good enough (mentioned 16 times) and there being

no need for translation (mentioned 3 times), the same reasons provided for personal communication

As for MT's usefulness in relation to work purposes, only 61 respondents considered MT to be useful for this purpose, including: to contact foreigners (mentioned 13 times), to translate single words (mentioned 9 times) and for gisting (mentioned 8 times). Reasons why these websites were not considered useful for work purposes included: no need for translation in the respondent's line of work (mentioned 18 times) and the respondent's language skills being sufficient for their work (mentioned 5 times).

3.3 Using MT for educational purposes

The results discussed in Section 3.2 show that the majority of students find MT useful for educational purposes. The survey also zoomed in more specifically on the use of MT in the educational setting, asking students what they had used MT for if they had used it for their studies. This open-ended question was answered by 271 of the 283 respondents (95.8%). In their responses, two main types of discourse emerged. Respondents reported *when* they had used MT for their studies, but also *how* they had used it (see Table 4).

The answers show that the participating students primarily used MT to read or understand articles (mentioned 103 times), to write papers or do homework (mentioned 78 times), and only sometimes to communicate in class or by email (mentioned 13 times). Regarding how these students used MT, over half of those surveyed reported that they used MT like a bilingual dictionary to translate single words, idioms or expressions (mentioned 157 times), followed by like a thesaurus to find synonyms (mentioned 25 times), and like a monolingual dictionary to understand the meaning of an unknown word or to check the spelling (mentioned 10 times). Importantly, the majority of students referred to the translation of single words or expressions, and some even took this opportunity to clarify that they rarely use MT to translate an entire text. For example, one respondent wrote: "To translate single words when writing papers: I hardly ever use MT for whole sentences because MT leaves a lot to be desired in that area" (Respondent 239).

The questionnaire then shifted the focus to the issue of admissibility and plagiarism. First, it asked students for which educational purposes they believed the use of MT was allowed. This open-ended question was answered by 268 of the 283 respondents (94.7%), who mentioned several different educational contexts in which MT can be used and how it should be used in this context (see Table 5).

According to these respondents, MT can be used to write papers, to study or to do homework (mentioned 65 times). One of the interesting observations that came up when discussing this topic was the matter of plagiarism. Some students

Table 4. When and how MT is used by Humanities students

***When* MT is used**	***How* MT is used**
To read or understand articles (mentioned 103 times). "To get an idea of the content of an article in a foreign language." (Respondent 234) "To be able to read a text faster." (Respondent 255)	*Like a bilingual dictionary to translate single words, idioms or expressions (mentioned 157 times).* "To search for an English word when I don't know it. I do not use MT for entire texts." (Respondent 276)
To write papers or do homework (mentioned 78 times). "To translate expressions from Dutch into English when I'm writing a paper and can't think of them." (Respondent 235)	*Like a thesaurus to find synonyms (mentioned 25 times).* "To find 'nice' synonyms for a paper." (Respondent 164)
To communicate in class or by email (mentioned 13 times). "To send emails to foreign universities." (Respondent 274) "To write emails to teachers (Japanese mainly but also Japanese, English and Dutch)." (Respondent 205)	*Like a monolingual dictionary to understand the meaning of an unknown word or to check the spelling (mentioned 10 times).* "To understand Korean words better (for example, Papago shows the Chinese characters of words and this helps to understand the word correctly)." (Respondent 271)

took the opportunity to tackle this topic and indicated that MT can be used when writing papers, but care should be taken so that authors of quotations used in papers are properly cited: "I think that machine translation may always be used, both for studying and for writing research. Of course, it would be plagiarism to quote a machine translation from another work" (Respondent 206).

When it comes to articles, whether full articles or excerpts, 62 of the respondents reported that these can be translated with MT for reading and understanding purposes. Other students argued that MT can be used in all contexts, with some exceptions for exams, especially language exams (mentioned 16 times). Interestingly, the results show that these students feel MT is a tool that can be used in any context and without restriction because it helps them to improve their understanding of a subject. As for the exception of exams, one student formulated this as follows:

> I think that you should always be allowed to use this to gain a better understanding of the materials, to better understand the subject matter of your studies; except when it is a course in which you should be learning a language, for example. You cannot use machine translation for a French exam; you can use it for a history exam if you have to read a French source, because the way you are being tested is very different. (Respondent 175)

Regarding how these students believed MT can or should be used, 64 of those surveyed reported that MT can be used to translate single words or sentences in opposition to full texts. These single words or sentences could have been written by the student or taken from reading materials. The second most common permitted use of MT is like a dictionary to check meanings and spelling (mentioned 50 times).

Table 5. In which contexts and how MT can be used

In which contexts can MT be used?	How can MT be used?
To write papers, to study or do homework (mentioned 65 times). "To understand a text or to write a paper. I think it is good as long as you are using a machine where you would otherwise use a dictionary." (Respondent 279)	*To translate single words or sentences in opposition to full texts (mentioned 64 times).* "Translating a few words or sentences; translating entire articles does not seem responsible to me." (Respondent 180)
For reading and understanding purposes (full) articles can be translated (mentioned 62 times). "To understand and process study materials when learning." (Respondent 274) "To read and understand what you are reading, and if you use machine translation in a paper you should of course still cite the source." (Respondent 263)	*Like a dictionary to check meanings and spelling (mentioned 50 times).* "As an alternative to a dictionary (look up a single word) for a foreign language that I do speak or am learning." (Respondent 215)
In all contexts, with some exceptions for exams and especially language exams (mentioned 16 times). "As long as it's not an exam, I don't think it matters if it increases your understanding of the text. In an essay it doesn't seem a problem to me either and even on a take-home exam it doesn't seem a problem as long as it is not a concept that you should have known/learned." (Respondent 185)	

After having established when and how MT was considered admissible in the educational context, the questionnaire asked students for which educational purposes they thought the use of MT would be considered fraud or plagiarism by lecturers. This open question was answered by 261 of the 283 students (92.2%). Amongst these 261 respondents, the most common view (101 responses, 39.70%) was that the use of MT is considered plagiarism when it is used to translate excerpts from sources and these translations are then presented in papers as the

original work of the student without any reference to the original author. As one respondent explains:

> If machine translation is used to cover up plagiarism, that is fraud. The use of machine translation, on the other hand, has nothing to do with plagiarism. Plagiarism is the copying of documents, thoughts and arguments of others and passing them off as one's own work. This means that it is language-independent whether something is plagiarism or not. Fraud is a broader concept.
>
> (Respondent 143)

Another common view, reported by 96 (36.78%) respondents, is that MT should not be used in exams or other graded assignments, particularly if the point of the exercise was to translate or to know that particular information in that language. Commenting on this issue, one of the respondents wrote: "When machine translation is used during tests and the answers are provided, like looking up a word when you should know it by heart" (Respondent 271).

A smaller number of those surveyed (34 respondents, 13.02%) suggested that translating whole sentences, paragraphs or texts that were written by the students themselves or by others using MT might be considered fraud. For instance, one of the respondents wrote: "I don't think it's okay if you translate entire sentences and copy paste into your papers? I would feel guilty if I did that" (Respondent 68). Since this and other respondents with similar answers did not provide more information to contextualize their answers, it is hard to explain why students seem to think that translating texts in general could be considered plagiarism.

One interesting outcome of the survey is the fact that it is unclear whether the act of translation itself is in some contexts already considered plagiarism/fraud, separate from the issue of giving reference to the original source or the method of translation (i.e., using MT or 'from scratch'). It may be that some of these respondents were in fact referring to the translation of excerpts of sources and the use of those translations without proper reference to the original author. However, they may have also been referring to any instance of using MT to translate more than a single, isolated word. If we compare the answers to this question with the answers to the previous open questions about how MT is used and can be used, we see that a large number of students use MT as a dictionary to translate single words. Thus, the results suggest that students appear to believe that MT is admissible when used for single words, but a form of fraud as soon as you use it for sentences or paragraphs. This clearly shows that many students may not be using MT to its full potential, and in fact, have a misguided understanding of how MT works and what it does.

4. Discussion and concluding remarks

This survey set out to understand the views and experiences of university students in the Netherlands regarding how, when and why they use MT with the purpose of identifying potential gaps in their literacy that should be addressed. Having identified a lack of research on non-translator users and uses of MT, as well as the need to further understand how non-translation students use MT for educational purposes in an increasingly multilingual and multicultural setting (see Section 1), this study zoomed in on the perspectives of Leiden University's Humanities students.

The findings of this study provide important insights regarding how Humanities students use MT that are of value to lecturers. However, more importantly perhaps than knowing how students use MT and which MT software students use, these findings shed some light on some of the areas that students need further information on, and develop more machine translation literacy in, namely in which contexts both inside and outside the classroom MT can be used and how it can be used. Since MT is widely used by students in multiple educational contexts, it is our recommendation that lecturers in the Humanities (as well as in other disciplines) include explicit information in their syllabus regarding when and how MT can and cannot be used with clear examples and reference to the course and programme's learning objectives. The results show that this information also needs to be made explicit for graded assignments, including exams.

The study also provides interesting information about how students believe MT can be used and when the use of MT might be considered plagiarism. The results show that students are unsure when the use of MT counts as fraud or plagiarism and they do not demonstrate any clear awareness of the ethical issues surrounding the use of MT, suggesting that students need more machine translation literacy in this respect. This issue could be addressed by including in the institutional guidelines on plagiarism a section on best practices when using MT. For example, guidelines should clarify that MT can be used to translate other people's work as long as the source is properly quoted even when paraphrased, and that an explicit reference to the use of MT should be included.

It was also telling that the participating students did not mention any concerns regarding the use of MT when translating confidential or sensitive information. They did not reflect on issues of data management and ownership, nor did they reflect on handling cultural references or bias, or discuss any other ethical issues, to name just a few of the potential problems of using MT.

Thus, one of the recommendations based on this study is to offer students explicit training in MT literacy. This training should ideally be offered to all first-year students alongside other literacies – digital literacy and information lit-

eracy – and other academic skills, such as academic writing. The results demonstrate a clear need to show students how MT can be used in more meaningful ways than as an alternative to a dictionary when translating single words.

Given that this study was restricted to students of Humanities, a natural progression of this work would be to conduct a similar study with students from other fields in order to ascertain how they use MT and which potential knowledge gaps need to be addressed. Lastly, this paper focused specifically on how, when and why Humanities students use MT. Since one of the main uses of MT by Humanities students is as an assistive tool in writing research papers, future studies could attempt to identify best practices on how to use MT for this purpose. Including such best practices in courses on how to conduct research and write academic papers would be of great educational value.

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