

# Using DeepL translator in learning English as an applied foreign language – An empirical pilot study

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## ABSTRACT

With the advent of new emerging technologies, machine translation, especially natural machine translation (NMT) and its tools, is being increasingly applied in second language (L2) acquisition. The aim of this study is to investigate the usefulness of machine translation, specifically DeepL Translator, in the second language acquisition process, since it has a great potential to transform foreign language education. The present empirical pilot study describes an experiment dealing with the use of neural machine translation in the process of formal writing (i.e., writing a summary) in a foreign language. Altogether 16 university students learning English as an applied foreign language with C1 level of English proficiency participated in the experiment. The results show differences between pre-test and post-test, and a significant improvement in students' language skills due to the use of DeepL Translator. The questionnaire survey, among other things, reveals positive perceptions of this tool and awareness of improved language skills by the research participants. The findings indicate that purposefully guided working with a NMT tool can contribute to the perceived usefulness of its use in learning English as an applied foreign language.

## 1. Introduction

Technology is an integral part of education, including foreign language (FL) learning, and various technological tools offer new possibilities for learners to practice and enhance their language [1]. Thanks to the development of artificial intelligence, big data and neuroscience machine translation has developed into a new form – neural machine translation (NMT) [2], which helps its users to exchange ideas with other Internet users without the need to share a common language. This NMT has great potential for FL learning and teaching [3,4]. It can be used for the development of all language skills (speaking, reading, listening and writing) [1]. However, it is mostly exploited for second language (L2) writing [4]. This finding is supported by several empirical studies which focus on the use of NMT, predominantly of Google Translate (GT), on the development of students' writing tasks. For example, Chen [5] in his study with 16 Taiwanese university students of translation studies from Mandarin into English and vice versa used GT for the development of effective L2 writing. The results of his study indicate that students used GT for writing both the paragraph and whole-text translation. Furthermore, Chung and Ahn [6] conducted a study with 91 Korean university graduates who had to write an essay first without the GT and then with its help. The findings of this study reveal that students improved in L2 accuracy when using the GT, but they still made mistakes in syntactic structures and lexical items. As the results of the study by Kol et al. [7] also show students can enrich their L2 writing with more words when using the GT. Lee [8] expands that NMT used for revisions also positively affects the students' writing

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strategies. Generally, research shows that the GT texts are of higher quality than students' self-written texts [9] since the GT texts have a more enriched content with more advanced vocabulary and fewer spelling and grammatical errors than the self-written texts [10].

Although, recent studies mainly used GT, at present the most efficient and reliable NMT tool seems to be the DeepL translator tool [11,12]. Birdsell [11] emphasizes that students should be taught how to effectively use this tool in L2 writing tasks with respect to their critical thinking skills, such as analysing and evaluating their own writing. Research also shows that more advanced FL learners benefit from the use of NMT most because they are able to critically reflect on the output of NMT generated texts more than beginners or lower-intermediate learners [3,8].

Overall, the findings confirm the positive attitudes of both students and teachers towards the use of NMT tools [5,10,13–15], as well as its positive impact on students' achieving results [8,13,16,17]. However, such learning process might be successful provided that both teachers and students are guided and trained in using the NMT tools [3,18].

The investigation of NMT in formal writing is important as it can provide insight into the potential benefits and limitations of NMT tools for improving the quality of formal writing in different contexts. Understanding the usefulness of NMT tools in formal writing can help language learners and educators make decision about whether to use these tools in the process of language learning. Regarding this, the present study aims to investigate two interrelated areas of research, i.e., the usefulness of DeepL Translator in improving the quality of formal writing, particularly in academic context, and an analysis of learners' attitudes towards using DeepL Translator as learning tool, shown in Fig. 1. Therefore, the research questions were formed as follows:

**RQ1.** To what extent can working with neural machine translation help learners to improve their formal writing?

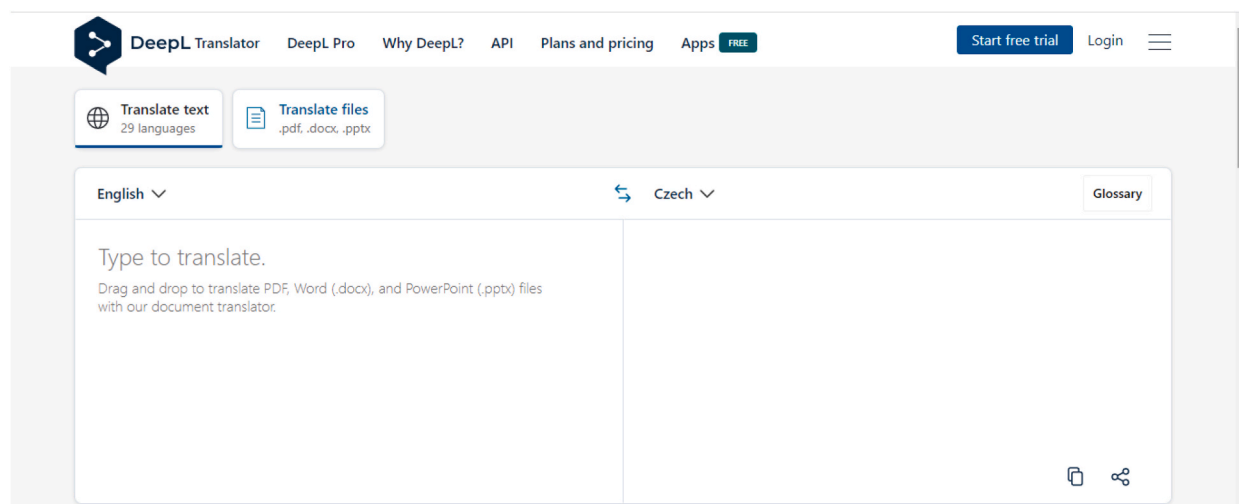
**RQ2.** What attitudes do students have towards using DeepL Translator as a learning tool?

## 2. Methodology

The current study includes a convenient research sample of students of bachelor degree programmes from the Faculty of Informatics and Managements, University Hradec Králové, Czech Republic. These students study English as an applied foreign language since they major in computer science or economics. All students were subjected to the Cambridge English Unlimited Placement Test which is designed to help teachers find students' English proficiency level. The test contains 120 multiple-choice questions, 20 at each level from Starter to Advanced. Students were asked to choose the best answer for each question and to stop when the questions become too difficult. However, they could spend no more than 40 min on the test. Students were at C1 level of English proficiency according to the Common European Framework of Reference (CEFR) [19]. Altogether, there were 16 students in the research group. Their ages ranged from 20 to 22 with the proportion of six females and ten males. The research period lasted 10 weeks.

At the beginning of the research, the students were instructed on how to write a summary, which was a research material. Content, structure of the text, formal style, grammar, and use of vocabulary when writing a summary were covered. Students were then asked to read an article on the top technology trends [20] and write a 150-word summary. This summary was used as a pre-test and students were not allowed to use any dictionaries or machine translation applications. When the summaries were corrected by the teachers, the research participants could have a look at the mistakes they had made when writing the summaries so they could avoid them later.

In the following weeks, the students read short texts [21,22], at the beginning of the lessons, and were asked to summarise them in no more than 7 sentences. Writing the summary, including reading, took approximately 30 min. The task was to write a summary of the text in their native language, then to summarise the text in English without using a dictionary or machine translation, and finally to write the summary using DeepL Translator. The research participants could then compare both the summary written in their own



**Fig. 1.** An illustration of the machine translation application called DeepL Translator.

words and the summary written using *DeepL Translator*. They had an opportunity to become aware of the errors they had made in the text written in their own words.

At the end of the treatment, the students were again asked to write a 150-word summary, without using any machine translation, which was used as a post-test. By making the analysis of the summaries and comparing the results of the pre-test and post-test, it was possible to find whether the students' formal writing and vocabulary improved due to the use of machine translation. Furthermore, an open-ended questionnaire, provided in appendix, was used to understand the students' perception of the use of *DeepL Translator* in the process of language learning.

In addition, the GDPR (EU General Data Protection Regulation) was strictly followed, as no personal data about the respondents were collected. The research was approved by the Ethics Committee of the University of Hradec Kralove no. February 2021. All students expressed their agreement with the research at the beginning of the experiment.

### 2.1. Analysis of the summaries

During the analysis of the summaries, text content, text structure, grammar (morphology, syntax, spelling), and use of vocabulary were assessed. The students could get a maximum of 5 points for each area, i.e., 20 points for the whole summary. When analysing the summaries, the clarity and comprehensibility of the ideas, the graphic structure, and the logical connection of ideas were assessed. The use of linguistic structures, the use of syntactic constructions, the occurrence of grammatical and spelling errors, and the use of vocabulary were also evaluated. This method of assessment was inspired by the guidelines and criteria for the assessment of the written form of the internal part of the maturita exam from a foreign language in Slovakia [23]. The criteria for the summary assessment are described in Table 1.

## 3. Results

The following Table 2 shows the major types of errors made by the research participants when writing the summary. It also shows and compares the results of the summaries written before and after the machine translation treatment. The most problematic area in writing summaries appeared to be grammar, specifically spelling where 21 errors were made. The second biggest problem (19) was writing contractions, although students were advised to use a formal style when writing summaries and, therefore, not to use any contracted forms of words. The third most common mistake was omission of the words (17) followed by the incorrect use of punctuation (15). The correct use of prepositions can also be considered an issue, accounting for up to 11 errors. The same percentage of errors (10) was seen in the use of redundant words, text coherence, and improper use of pronouns. Other lexical errors and the use of incorrect verb forms also reached number 9. The research participants also made mistakes in word order (8) and in the use of determiners (7). Three students expressed their own opinion, which is inappropriate when writing a summary. However, comparing the pre-test and post-test results, it can be concluded that students' formal writing improved by more than half after the machine translation treatment.

Regarding the questionnaire survey, the results showed that the research participants were mostly familiar with the machine translation applications, such as Google Translator (100%), DeepL (62%) and others (50%). Google Translator is the most commonly used application (87.5%) among students, followed by DeepL (25%). According to the research participants, the main differences between these two applications are that DeepL is more accurate (69%) than the Google Translate, and it also provides different synonyms when translating (31%). Among other differences, it was also mentioned that DeepL offers more verb forms, and translates complex texts more comprehensibly. Students also reported that up to 50% of them rarely use machine translation, 12.5% use applications a few times a month, 12.5% a few times a week, 12.5% once a week, and 12.5% need to use the translation applications every day. Furthermore, the results show that students normally use machine translation when searching for new words and phrases (44%), looking up the meaning of the words (31%), studying (31%), or writing a bachelor thesis (12.5%). The findings of the survey also reveal that up to 69% of students use machine translation to translate words, 56% translate sentences, and 25% of students use them to translate whole paragraphs. The most sought-after language is English (88%). The same percentage of students consider DeepL easy to comprehend. 100% of students agree that DeepL does not translate word by word. All research participants (100%) find the application useful because it enables them to learn new vocabulary (50%), provides feedback (19%), helps to understand the meaning of the words (13%), as well as it helps to improve their language skills (13%). The biggest benefits of using the machine translation include learning new vocabulary and phrases (50%), fast and accurate translation (38%), and easy access (13%).

Conversely, the downsides of using the machine translation application might include not relying on one's own knowledge and laziness (32%). However, up to 50% of students are not aware of any disadvantages of using machine translation. The research

**Table 1**  
Criteria for the summary assessment.

Text content	Text structure	Grammar	Vocabulary
Expressing ideas from the text. The content of the work corresponds to the assignment.	Graphic structure. Characteristics of the genre required.	Linguistic structures. The difficulty of the syntactic constructions used.	Range of vocabulary. Appropriateness of vocabulary.
Clarity and comprehensibility of the text	Logical connection of ideas.	Grammatical and spelling errors.	Missing words and redundant words

**Table 2**  
The major types of errors.

Error types	Pre-test summaries	Post-test summaries	Difference in results
<b>Grammatical (morphological, syntactical and spelling) errors</b>			
Prepositions	11	5	6
Determiners	7	3	4
Word order	8	5	3
Verb forms	9	4	5
Punctuation	15	7	8
Spelling	21	10	11
<b>Lexical errors</b>			
Missing words	17	5	12
Redundant words	10	5	5
Others	9	3	6
<b>Stylistics errors</b>			
Text coherence	10	4	6
Improper usage of pronouns	10	0	10
Contractions	19	9	10
Expressing own ideas	3	0	3
<b>Total</b>	<b>149</b>	<b>60</b>	<b>89</b>

participants stated that using machine translation did not reduce interest in learning English (56%), but it could sometimes cause low motivation to learn (19%). 94% of students agree that using DeepL helped them to improve their language skills. 63% of research participants reported an increase of vocabulary as a result of using the DeepL Translator. The same percentage of students stated that machine translation makes learning easier and they would definitely prefer machine translation before using a dictionary (100%). The research participants described DeepL as user-friendly and helpful in providing feedback on grammar (63%) and use of vocabulary (44%). 100% of the research participants stated that they would use the DeepL Translator in the future.

Considering the information collected from the analysis of the summaries, it can be concluded that DeepL helped students to a high extent since it helped them to improve their formal writing skills by more than 50%. This improvement was also perceived by the research participants, who reported that using machine translation had helped them to enhance their vocabulary and other language skills. Even though the students' formal writing was improved and positive attitudes towards DeepL Translator as learning tool was expressed, it is recommended to replicate this research with a larger research sample and compare it with a control group in order to ensure validity of the research.

#### 4. Discussion

The findings of this experimental study reveal that the DeepL tool seems to be an effective learning tool for the development of formal writing skills because students' writing skills were significantly improved as the results of the post-test indicate. This is in line with other research studies dealing with this topic, e.g., O'Neill [18] whose students, trained in using the NMT tool, reached better results than students who were not trained in using this tool. The same is true for the study by Tsai [10] whose students were also better at L2 writing performance when using the GT than in their self-written essays.

Furthermore, the results of this study also disclose the types of mistakes students made in their summaries. The most common were mistakes in spelling, using contractions, omissions of words, and mistakes in punctuation, which was also partly confirmed in other experimental studies dealing with the common mistakes in L2 writing, such as Zamborová and Klimova [24] or Lee and Seneff [25]. However, in comparison with the present study, in both of these studies the most common mistake was the use of articles, which is very typical of the non-native students' FL performance. The reason is that these languages do not use articles. However, students in the present study were using the NMT for writing summaries and the NMT tool helped avoid making this mistake, i.e., where to write articles. In this respect, DeepL proved to be very beneficial and contributed to the improvement of this language phenomenon.

This technology is here to stay. Therefore, the teachers of foreign languages should look for its added value in foreign language teaching and learning. DeepL in this case is suitable support for writing summaries since students can enhance their vocabulary, learn the right collocations [11], as well as avoid making mistakes in the use of definite, indefinite and zero articles, to fix the correct word order, as well as to make their summaries more coherent [8]. Furthermore, this tool makes the writing process more effective and faster and because summaries represent a short piece of the text, it provides its users with almost native like language [26]. However, the process of writing summaries is a complex issue and teachers of foreign languages play an important role in it. They act as facilitators and consistently attempt to reduce students' mistakes in developing their writing skills beyond the use of NMT by developing their additional exercises on the language phenomena that hinder students' proficiency in L2 acquisition, as well as providing them with meaningful constant feedback [27].

The findings of the questionnaire survey indicate that students like using NMT in learning English as an applied foreign language because they can see the perceived benefits of this tool, such as acquiring new L2 vocabulary and phrases and receiving fast and accurate translations, which is also true for several studies [10,13,15,28]. For example, Liu et al. [15] claim that NMT is especially beneficial gaining lexical knowledge and knowledge to ensure translation efficiency, but not in bicultural knowledge.

In addition, according to Clifford et al. [29], students report that they benefit from the use of online translators and assume that

these tools should be allowed in language courses, which is in line with this study. Thanks to the feedback on the written language provided by NMT, students can achieve a higher level of language proficiency but, on the other hand, there is a real danger that this technology may lead to a loss of motivation to learn and use languages in a sophisticated way [30]. This claim was rejected in this study. It should be noted, however, that students were purposefully trained to use the DeepL tool, which might assist in reducing students' anxiety in its use, as well as make their FL learning more efficient in the sense that they could see its usefulness for the development of their language proficiency and also critically reflect on its data [15]. As Birdsell [11] states, students should be made aware of the effective use of NMT in order not only to enhance their writing skills, but also to develop their lifelong language and critical thinking skills. Deng and Yu [14] suggest that the implementation of NMT into FL classes should follow four steps: introduction, demonstration, task assignment, and reflection, which in fact was conducted in the present study.

## 5. Conclusion

Based on the results of this empirical pilot study, it can be concluded that the use of NMT technology in the FL learning process is beneficial. The use of technology helps students to improve their linguistic competence, which they themselves are aware of. This fact makes them willing and motivated to use technology in their learning process in the future. As shown in this and previous research, the use of NMT tools in FL learning offers rich opportunities for learners to improve their language skills, as well as to teachers to innovate their teaching methods. NMT, therefore, has the potential to become a productive pedagogical tool integrated into the FL learning environment. The findings of this study can be used by educators and researchers to develop effective strategies for teaching formal writing skills to students, particularly those who are non-native speakers of the language.

Furthermore, it is important to note that this study has a few limitations, including the lack of control group, the failure to use inferential statistics, and the use of a relatively small research sample. Nevertheless, despite the limited number of research participants, this empirical pilot study, thanks to its mixed method design, provides conclusive findings about the usefulness of NMT tools for learning English as an applied foreign language and sets directions for further research in applied linguistics whose empirical research is still being neglected in this respect.

## Production notes

### *Author contribution statement*

Petra Polakova; Blanka Klimova: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

### *Data availability statement*

The data that has been used is confidential.

### *Additional information*

No additional information is available for this paper.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix

Questionnaire on the use of machine translation in foreign language learning

The list of the questions presented to the participants of the research:

1. What machine translation tools do you know? (For example, Google Translate ...)
2. What machine translation tools do you use?
3. Please describe the differences between the machine translation tool you normally use and the DeepL Translator.
4. How often do you use machine translation?
5. In what situations do you use machine translation (e.g. learning new words, finding a word ...)?

6. Do you usually translate words, sentences, or paragraphs?
7. What language do you normally search for in machine translation?
8. Is the language utilized in machine learning easy to comprehend? If not, why?
9. Does machine translation translate word by word?
10. Does machine translation help you with translation?
11. How important is machine translation in your English studies? Please explain.
12. What are the benefits of using machine translation for you?
13. What are the drawbacks of using machine translation for you?
14. Does machine translation reduce your interest in learning English? Why?
15. Can machine translation help you to learn English?
16. Did deepL help you to acquire new vocabulary?
17. Do you think that machine translation makes learning easier?
18. Is it easier for you to use a dictionary or machine translation when you study English or just look for the right word? Please explain.
19. Please describe your experience using deepL to learn how to write a summary in English.
20. Will you use deepL in the future or not? Please explain why.

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