Research Article

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On the uses of machine translation for education purposes: Attitudes and perceptions of Lithuanian teachers

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Abstract: Technology in the context of education is a subject of debate, from a very positive experience that promotes learning to a very negative one that prohibits the use of various smart devices, tools, programmes, and platforms in the classroom. The problem is how to find a balance between the two positions and how to encourage teachers to introduce possibilities of technologies to benefit the general education process. The topic of machine translation in educational contexts has gained the attention of the research community only recently. Previous studies not only point to the benefits that the technology may bring to the classroom, especially in foreign language learning, but also report mixed views of educators. This study, which is based on the findings from a survey of Lithuanian secondary school teachers, seeks to explore the current status of the inclusion of machine translation in the educational process from teachers' perspective to envisage the teacher's role as a facilitator or a mediator in developing children's machine translation literacy. The conclusions that can be drawn imply that machine translation is rarely considered to be a useful technology by teachers, and its benefits are either unknown or underestimated. Therefore, the need for machine translation literacy instruction emerges.

Keywords: machine translation, teachers, children, secondary education, machine translation literacy, Lithuania

1 Introduction

The inclusion of technologies in education is a widely debated topic among scholars these days. Some of them analyse the impact of the Internet on children from an early age (Livingstone et al. 2015, Dias et al. 2016, Brito et al. 2017, Chaudron et al. 2018), while others examine the impact of technology on children in an educational context (Carrier 2018, Reza 2020, Liubinienė and Kasperavičienė 2019), and the impact of smart classrooms, various tools, and study platforms that promote a smart environment in education (e.g., Google Classroom (Perrotta et al. 2020); EDUKA class (Kondratavičienė 2019, Klizienė et al. 2021)). On the other hand, some scholars express concern that smart technology and automation may lead to a more machine-driven education (Selwyn 2019) and thus encourage teachers to prohibit the use of smartphones in educational settings (Pangrazio and Sefton-Green 2022).

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Machine translation is gaining acknowledgement among various society members. In a multitude of cases, the use of, and sometimes overreliance on, machine translation even by government officials is reported in the mass media. The previous research has shown that machine translation is used by various society members for multiple purposes, including personal communication, work, research, and studies. Machine translation in the pedagogical context has recently attracted more attention in the research community. There is a growing body of research on how machine translation can be used to help learners read and write more effectively and/or learn more (Sefton-Green et al. 2016, Carrier 2018, Reza 2020). Using machine translation when studying a foreign language can help write more fluently, communicate more effectively, and make fewer mistakes (Fredholm 2019, Lee 2020). However, language teachers often find the use of machine translation in an educational context problematic. Although many children begin using machine translation for homework or other related tasks from an early age (Liubinienė et al. 2022), their teachers seem to have mixed opinions about it (Lee 2021). Some studies even report the teachers' strong disapproval "with punitive aspects associated with the use of such technologies" (Merschel and Munné 2022).

There are not many studies analysing children's attitudes towards machine translation. Although public opinion on the quality of machine translation is diverse (Vieira et al. 2020, Kasperė et al. 2021), children tend to use machine translation, and sometimes even consider its quality to be comparable to human translation (Pérez Macías et al. 2020). Academic debate often raises the question of whether students can learn to communicate more effectively, and improve their reading and writing skills through machine translation (Garcia and Pena 2011, Jiménez-Crespo 2017, Tsai 2019). Some researchers suggest that children experience both positive and negative consequences when experimenting with machine translation (Lee 2021). Despite the willingness of children to try machine translation, their teachers, especially foreign language teachers, are reluctant to encourage the use of machine translation in classrooms or at home for various tasks, and believe that machine translation may cause more problems than benefits.

In the given context, it may appear that the topic of machine translation instruction has only recently achieved attention from the researcher community. Although there is evidence that machine translation may benefit learning, teachers are reluctant to use it in the classroom, while children use this, like any other, technology extensively. Therefore, this study seeks to explore the current status of the inclusion of machine translation in the educational process from teachers' perspective to envisage teacher's role as a facilitator and a mediator in developing children's machine translation literacy and find out how, if at all, schoolchildren in Lithuania are introduced to the opportunities provided by machine translation. This study contributes to the understudied topic of the uses of and attitudes towards machine translation for the educational purposes, by focusing specifically on the teachers' perceptions in the Lithuanian context. The study is expected to contribute to our understanding of the barriers to machine translation instruction at school and, consequently, literacy of the broader public. The benefits of machine translation use have been mainly discussed in the scientific literature on foreign language learning. It remains unclear if machine translation could be perceived as a useful technology in other subjects. Our study attempts finding out the tendencies of machine translation use in a wider educational context, including the teachers of many other subjects taught at secondary school.

2 Literature review

In a recent scientific debate whether the use of machine translation should be prohibited, allowed, recommended, or taught in classroom settings, it has been acknowledged that more effort needs to be exerted to provide learners with the awareness that machine translation tools could be used critically, analytically, and ethically for learning purposes (Briggs 2018, Ducar and Schocket 2018). The major findings relate to the uses, attitudes, and perceptions of students and teachers in higher education. A systematic literature review by Deng and Yu (2022) on the use of machine translation for learning purposes has revealed that machine translation is mainly used by undergraduate and graduate university students, and that mixed opinions, both positive and negative, were observed among teachers and students learners. The benefits of machine translation usage in the educational context have been mainly discussed in terms of foreign language learning. However, there is a

lack of evidence and empirical data from secondary school learners and teachers. In subjects other than languages, machine translation uses, perceptions, or possible benefits have not been studied.

2.1 Machine translation for language learning in higher education

Numerous scientific literature sources report the views and attitudes towards machine translation by university-level learners and/or teachers. Integration of machine translation into teaching and learning environments has been analysed by Benda (2013), Case (2015), Groves and Mundt (2015), Fredholm (2019, 2021), and Lee (2020) among others. In terms of the subjects and skills that might benefit from the use of machine translation in higher education, research studies have been focused mainly on language learning. The studies employing various research approaches have reported mixed views of both learners and teachers towards learning languages.

In an empirical study, Ata and Debreli (2021) explored the survey data of 462 Turkish learners and 34 instructors. The results of their study demonstrated that the majority of learners used machine translation for language learning, mainly to translate words or phrases. In this study, the instructors had more positive views about the quality of machine translation outputs than learners (Ata and Debreli 2021).

In a small-scale experimental study of university students' writing assignments conducted using machine translation, Groves and Mundt (2015) found that machine translation, namely, *Google Translate*, could not significantly assist students in producing error-free essays when translating from Malay and Chinese to English. However, the authors note that students are increasingly using machine translation for homework as technology becomes more accurate in terms of grammatical and lexical translation (Groves and Mundt 2015).

Lee and Briggs (2021) analysed Korean university students' (n = 58) corrections in the writing assignments and found a significant decrease of errors when they used machine translation as a help tool for English as a foreign language. The study concluded that effective integration of machine translation for learning purposes was a prerequisite.

In another study employing a mixed-method approach based on the data obtained from surveys, questionnaires, screen recording, as well as human and automatic evaluations, it has been shown that machine translation can improve lexical proficiency in Chinese writing (Yang et al. 2023). Students' positive perceptions towards machine translation and keen interest in learning to use the technology in responsible and efficient ways were also reported (Yang et al. 2023).

In a netnographic study based on a thematic analysis of students' forum posts in the United Kingdom, mixed views towards machine translation were observed among students (Organ 2023). On the one end, students acknowledge the technology's drawbacks, and on the other end, they also acknowledge the benefits, including the possibility to obtain more linguistic information, practice pronunciation, and use machine translation for successful assignment completion. The study showed that students rely on each other, learn from their mistakes, and share experiences with peers when using machine translation, but are reluctant to talk about it with their teachers (Organ 2023).

University teachers' attitudes towards the use of machine translation for language learning purposes have also been assessed. Case (2015) has analysed the data obtained from a questionnaire distributed to language teachers in a Swedish university. The findings mainly indicate that language teachers consider the use of machine translation in the classroom as somewhat cheating (Case 2015).

Therefore, it may be assumed that teachers do not pay enough attention to the integration of machine translation into the foreign language learning process, and first, it is crucial to introduce teachers to how machine translation could be implemented in the process (Urlaub and Dessein 2022, Lee and Briggs 2021). The results also demonstrate discrepant views between learners and teachers regarding the use of machine translation in foreign language learning (Ata and Debreli 2021). Despite teachers' unfavourable or mixed opinions about machine translation, students are willingly using the tool for various purposes, either openly or secretly.

2.2 Machine translation in secondary education

The views of learners and teachers towards technologies at a primary and secondary level have received scarce attention in the scientific literature. Generally, some studies focusing on the purposiveness of technology use by young children have demonstrated that even at a young age technologies may be beneficial for the development of various skills; however, teachers have been observed to lack awareness of how to employ the technologies. In a study on the perceptions of 300 preschool teachers in Romania towards the use of technologies for education purposes at an early age, Rad et al. (2023) have found that teachers were less confident using digital tools for didactic purposes with young kids even though they were positive about technologies for their own personal purposes.

In a study of young learners and teachers, Stapleton and Kin (2019), who examined the quality of machine translation, specifically *Google Translate*, aimed to determine whether the quality of the translation was sufficient for primary-level learners (n = 6) to write texts in their native Chinese language and then translate them using *Google Translate*. The authors also investigated teachers' (n = 12) reactions after being told that learners had completed assignments using machine translation. Teachers agreed that it was becoming increasingly difficult to prevent students from using machine translation while accomplishing assignments, and they were generally not against the use of the tool, yet vigilant towards the extent of technology exploitation for learning purposes (Stapleton and Kin 2019).

In a longitudinal study of upper secondary school students in Sweden, Fredholm (2019) has examined the vocabulary development of students learning Spanish as a foreign language. The study results reported that students demonstrated a short-term effect of a more diversified vocabulary when machine translation was used compared with the control group, which used a paper dictionary for the writing assignment. At the same time, students were not found to have kept the more varied vocabulary over a longer time (Fredholm 2019). On the other hand, the conclusion in Fredholm's (2021) study published as a doctoral dissertation focuses on strengthening the learners' technological skills for foreign language learning purposes (Fredholm 2021).

In a qualitative study of ten Lithuanian families having 12- to 17-year-old children on their perceptions and awareness of machine translation, Liubinienė et al. (2022) have reported children's opinion that their teachers are generally against machine translation in the classroom, which hinders the children's awareness of what and how the technology could be used responsibly, safely, and ethically. The findings of this and other aforementioned studies imply that the views of secondary education teachers and students are mixed and no clear guidance as to the use of the technology in the classroom exists, but it is possibly desired by all.

Summing up, many users who know little about machine translation use the tools, but may not always be aware of the benefits and drawbacks of the technology. Developing machine translation literacy is a way to train them to better understand the strengths and weaknesses of these tools. Machine translation literacy (a term introduced by Bowker and Buitrago 2019) is less about knowing how to use technology, but more about deciding whether, when, and why to use that technology and how to interact with it. In this way, more emphasis is placed on assessing the suitability of a text for machine translation, or evaluating the benefits and drawbacks of machine translation compared with other translation (Bowker 2021). The most fundamental machine translation literacy course should be based on four main components: understanding a data-driven and general approach to machine translation; its transparent use; ability to understand risks involved; and application of basic pre- and post-editing (Bowker 2021). Developing machine translation literacy skills in both educators and children of all ages may help to meet the challenges that nowadays so many teachers and their students face.

3 Methods and materials

3.1 Data collection and analysis

To determine the teachers' attitudes towards the use of machine translation in a classroom setting, we designed a survey, consisting of mainly closed questions with some options provided and a possibility to

elaborate on the "other" option. There were 13 close-ended questions and 1 open-ended question asking the respondents to share any views they had towards the topic or any questions within the questionnaire. The survey was open for 5 months and was advertised through Facebook groups and a University website. The quantitative data collected for the purposes of this article are presented using descriptive statistics and were analysed with IBM SPSS Statistics 27 package. The Spearman and Pearson correlation tests were employed to detect if there were any statistically significant correlations between the variables. The p value lower than 0.05 was considered to be statistically significant.

3.2 Participants

Unlike in other studies that excluded primary/elementary school teachers, working with children younger than 11 years (Merschel and Munné 2022), our survey targeted teachers of the primary and secondary education, and among those in the latter, teachers of all subjects were invited to fill in the survey online. The teachers of primary education were targeted and included in the sample since no previous studies have been found to report data on the uses and/or attitudes towards machine translation among primary school teachers teaching children until the fourth grade (7–11 years). The rationale to include these teachers in our sample lies primarily in two reasons. First, technologies are nowadays so pervasive that even small kids are subjected to them from a very early age, which makes them more prone to try out something new. Second, in the age of artificial intelligence and technologies, digital competence education starts earlier. For example, the Lithuanian primary education programme for 2024 mentions that the digital competence is to be developed across all subjects in the curriculum along with an integrated or separate class of information technologies developing skills of computational thinking, use of modern technologies in creative and responsible ways, digital content creation, etc. In relation to this and the fact that machine translation is a technology for all (rather than for professionals only), we assumed that including primary school teachers was relevant to grasp any emerging tendencies.

In total, we managed to receive 134 completed surveys. The majority of the teachers (n = 70) were from the five largest cities (overall comprising approximately 1.17 million of the country's population) and/or suburbs of the country (Figure 1). One-third of the respondents (n = 44) were from smaller towns (with fewer than 50,000 residents), and around 12% (n = 16) were from villages. The respondents who completed the surveys were teachers of fifth to eighth graders (n = 75) and ninth to twelfth graders (n = 72) (Figure 2). Primary school teachers comprised 30% (n = 39) of the sample size, while there were also a few of those who were involved in teaching adults (n = 6; 4.4%). The survey contained a question on the age of the teachers: the majority of the respondents were within the age range of 50–59 (36%, n = 48) and 40–49 years (36%, n = 41), followed by those aged 60–69 (14%, n = 19) and 30–39 years (13%, n = 18) (Figure 3). The smallest number of respondents were in

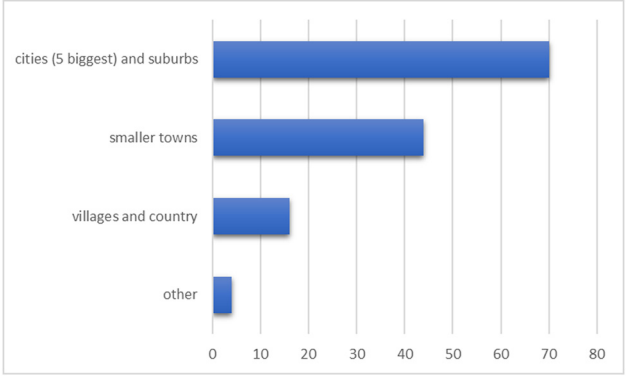

Figure 1: Distribution of the respondents by localities.

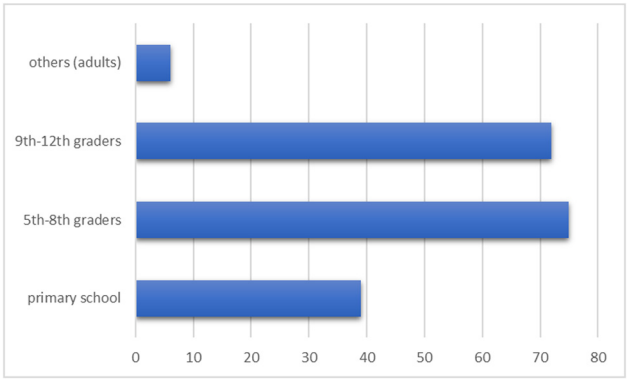

Figure 2: Distribution of the respondents by grades taught.

the age group of 29 years and younger (6%, n = 8). In our sample, there were no respondents aged 70 years and older. The respondents indicated foreign languages being their major subject taught at schools (44%, n = 59, of whom 52 were teachers of English). Other teachers (n = 75) indicated teaching Lithuanian (6%, n = 8), IT, and mathematics (15%, n = 20) (Figure 4).

4 Results

To find the respondents' attitudes towards machine translation, we prepared a question whether they use it themselves generally for their own various purposes. The majority of the respondents (87%, n = 116) indicated using machine translation for personal purposes (entertainment, travel, online shopping, etc.), and only 11% (n = 16) indicated not using it. When asked in what language directions they used machine translation, 78% (n = 84) indicated using it from a foreign language to a native one, 66% (n = 84) indicated using it from a native language to a foreign one, and almost half of the respondents (49%, n = 62) used it from one foreign language to another foreign language. When using machine translation for personal purposes, 4% of the respondents (n = 5) were very much satisfied with machine translation, 48% of the respondents (n = 62) were satisfied, 37% (n = 48) were neither satisfied nor dissatisfied, and 8% (n = 7) were not satisfied (Figure 5). There were no respondents to indicate that they were completely dissatisfied with machine translation. The respondents were given an option to comment on their answers, and some pointed out that sometimes they had no other option but to use machine translation even though were not satisfied with the quality. Besides, a statistically significant correlation was observed between the teachers' satisfaction with machine translation when they

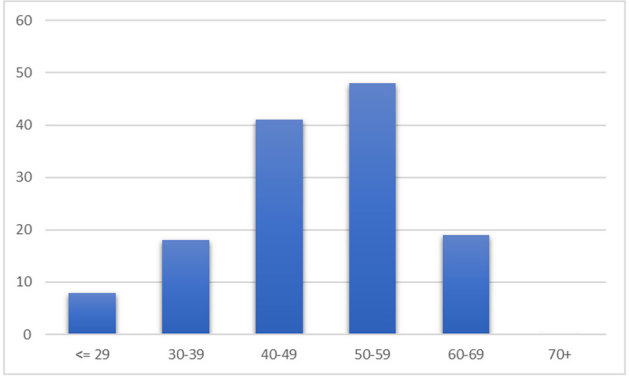

Figure 3: Distribution of the respondents by age.

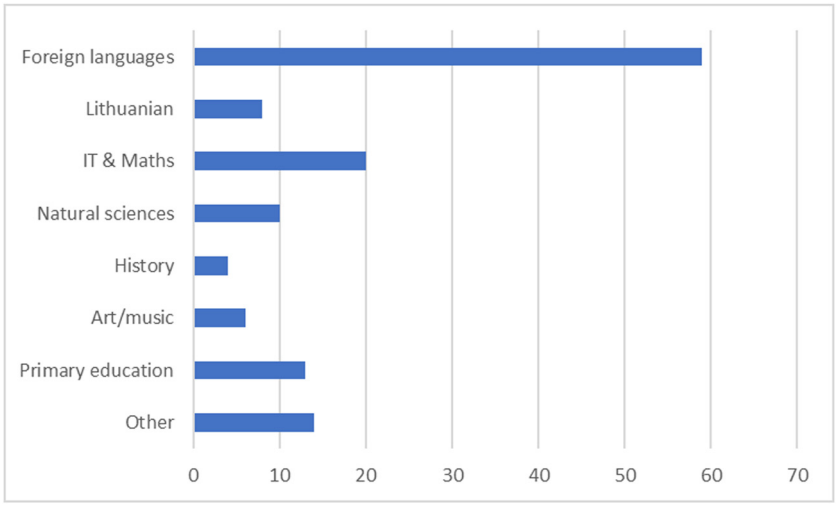

Figure 4: Distribution of the respondents by subjects taught.

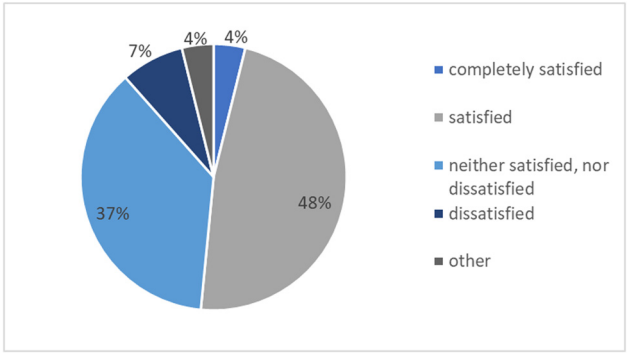

Figure 5: Satisfaction scores of the respondents with the quality of machine translation.

used it for private needs and their age (r_s = 0.286, p = 0.001). The younger the respondents, the more satisfied they were with machine translation.

All these data imply that the teachers are not against machine translation as ordinary end-users and possibly see its benefits. The majority use machine translation, and only a small proportion of them are dissatisfied with the quality.

When it comes to using machine translation for teaching purposes, the standpoint seems to be different: 6% (n = 8) use it often, 31% (n = 40) use it, but sometimes, 35% (n = 45) use it rarely, and 28% (n = 37) never use machine translation in classes of the subject they teach. Of those respondents who use machine translation in their classes, 11% (n = 12) allow and advise their students to use machine translation at any time and for any purpose, 56% (n = 62) allow and advise their students to use it only for some particular tasks, and 24% (n = 26) allow and advise their students to use it for homework tasks (Figure 6). Some respondents elaborated and explained that they recommended their students to use machine translation only for understanding more complicated sentences and usually only for additional tasks, and advised their students to use machine translation responsibly and not overly rely on the output, or for individual uses. Other respondents openly stated using machine translation to get ready for the classes themselves or to prepare tasks for students. Instead of machine translation tools, the teachers indicated recommending their students to use professional dictionaries that give precise meanings of words/phrases, possible usage examples and pronunciations (Oxford, Cambridge dictionaries, etc.). One respondent explained using machine translation with Ukrainian refugee students who attended schools together with Lithuanian schoolchildren. All these answers imply that

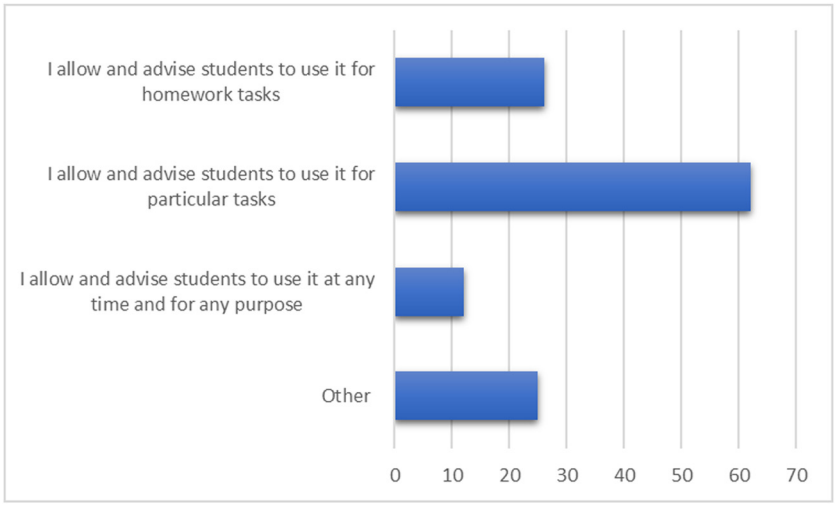

Figure 6: Ways teachers employ to integrate machine translation in classes.

teachers see the merits of machine translation in their job, but the majority think that its use should be restricted to some particular tasks or completely banned.

Among the reasons for not using machine translation in their classes, the respondents thought that it was not a valuable or useful tool in their subject class (48%, n = 36; Figure 7). Others mentioned lack of trust (24%, n = 18), lack of knowledge how to integrate machine translation into subject classes even if they wanted to (5%, n = 4), and lack of support from colleagues and/or students if they tried to integrate machine translation into subject classes (3%, n = 2). Some did not know why they did not use it and have never thought about it (15%, n = 11). In the option where they could give more elaborate answers, the teachers provided various other opinions. For example, some teachers of languages did not recommend using machine translation for lower-level language learners, as it could interfere with the acquisition of basic language structures, which can be taught in other, more flexible, ways, or that machine translation tools do not generally motivate learning and using a (foreign) language, or that their students know English very well, for which reason they do not need machine translation.

The respondents were asked to specify the particular machine translation tools they used. The majority indicated using *Google Translate* (91%, n = 116). Other tools selected as options were as follows: *eTranslation*

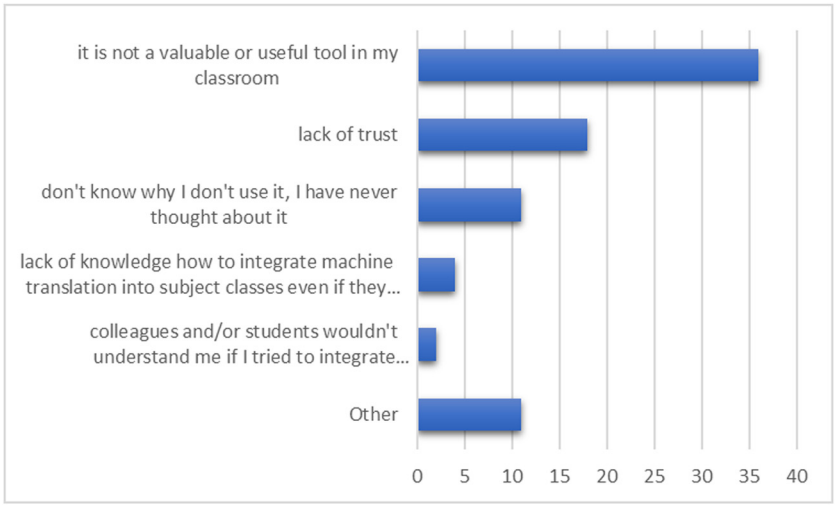

Figure 7: The reasons given by the respondents for not using machine translation in teaching.

(10%, *n* = 13), *DeepL* (9%, *n* = 11), *Apple Translate* (6%, *n* = 8), *Tilde* (5%, *n* = 7), *Bing Microsoft Translator* (3%, *n* = 4), *Yandex* (1%, *n* = 1), etc. Among other things mentioned were dictionaries, *Linguee* and *Google Lens*.

Figure 8 demonstrates patterns of machine translation use in subject classes by teachers across different age groups. The proportion of those who use machine translation often (12.5%) or never (12.5%) use it in their subject classes is equal in the group of the youngest teachers (≤29), whereas the greatest difference between those who often (5.3%) vs never (36.8%) integrate machine translation in their lessons is observed in the group of elderly teachers (60–69 years). Still, the majority of answers to this question fall into the categories 'rarely' and 'sometimes,' which indicates that the general habit of use is neither frequent nor neglected at all. It might also depend on the wider context, considering the subject and the general need for the inclusion of the foreign sources into the teaching process. The greatest number of respondents who rarely (50%) use machine translation in subject classes is among the youngest group of teachers (≤29), which may indicate that this group has acquired good skills in a foreign language and does not need to rely on machine translation. Among those who sometimes use machine translation for their subject classes, the greatest numbers are found in the age group of 30–39 (38.9%), followed by 40–49 (31.7%) and 60–69 (31.6%). Altogether the results reveal that the age of the teachers is an important variable to consider when analysing the habits of machine translation use in subject classes.

Another variable, the place of residence, as shown in Figure 9, adds more insights into the different preferences of machine translation use for subject classes among teachers. Residents of large cities have an equal distribution of machine translation usage in the categories 'never' (34.3%) and 'rarely' (34.3%), which makes in total 68.6% and shows that they belong to the category of less frequent users of machine translation for the subject classes compared to smaller towns ('never' – 20.9%; 'rarely' – 30.2%), and villages and country ('never' – 25%; 'rarely' – 31.3%). However, generally, this difference is not statistically important and does not indicate any emerging tendencies. The Pearson chi-square test was used to perform comparison between categories (value 8.392, df 9, $p = 0.495$). The explanation for this finding may emerge out of a few circumstances. On the one hand, our sample is not equally representative of the respondents from urban and rural localities. On the other hand, technology is ubiquitous, and so is machine translation, hence the insignificant differences

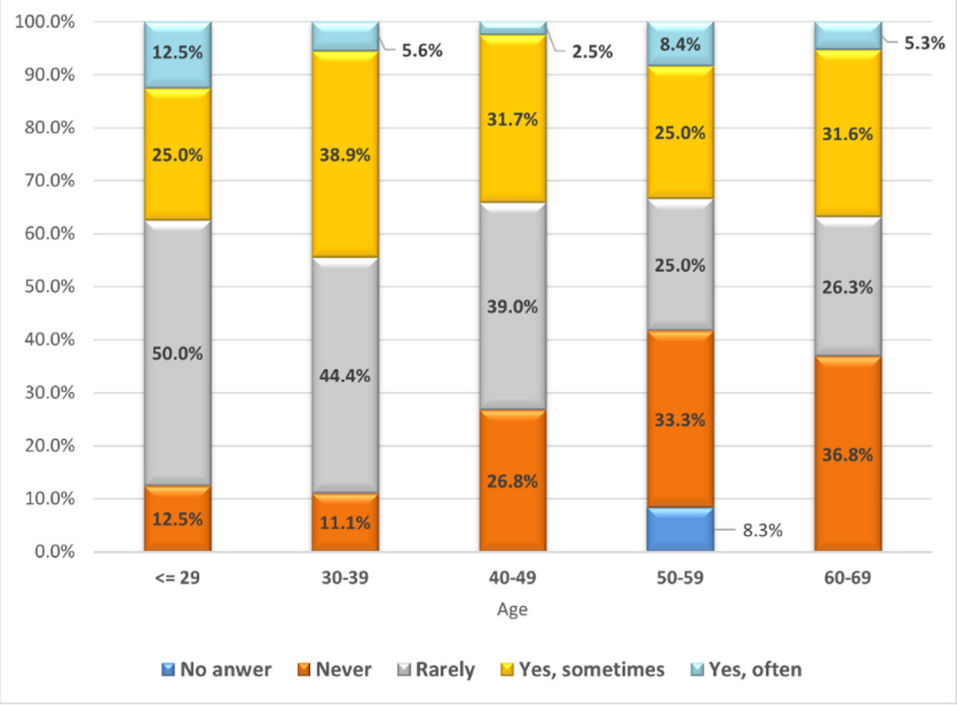

Figure 8: Patterns of machine translation use in subject classes by teachers of different age groups.

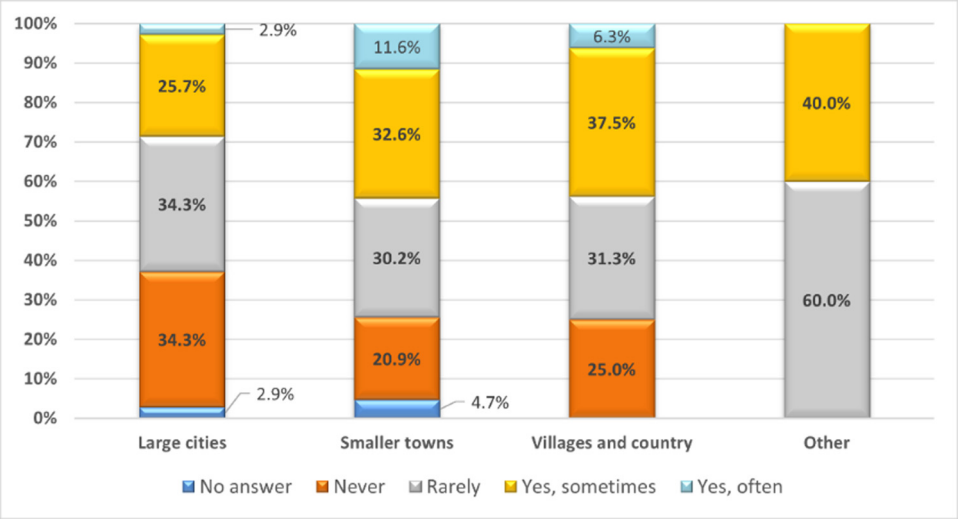

Figure 9: Patterns of machine translation use by teachers from different localities.

in the use of machine translation between urban and rural localities. Finding out whether distinct and divergent tendencies exist for cities and country localities would require a more representative sample.

Figure 10 shows that in fact the highest rate of frequent machine translation use is in the highest grades, and the lowest is in primary school grades. This is an expected result; however, a combined rate for frequent and occasional use of machine translation is higher for the fifth to eighth grades (65.2%) than for the highest grades, i.e., ninth to twelfth grades (61.1%). This may be possibly explained by an assumption that in the fifth to eighth grades, learners are still not so much aware of the possibilities that machine translation can open up to their educational process, and the need to use these tools might still be insufficient.

On the other hand, it is also obvious that a combined rate for the 'never' and 'rarely' answers (51.3%) is the highest in the lowest grades, i.e., primary school, and lowest in fifth to eighth grades (34.8%) followed by ninth to twelfth grades (38.9%). This is also very natural as in primary grades a lot of time is devoted to fundamental skills of reading, writing, counting, etc. Development of skills in various technologies as well as a second

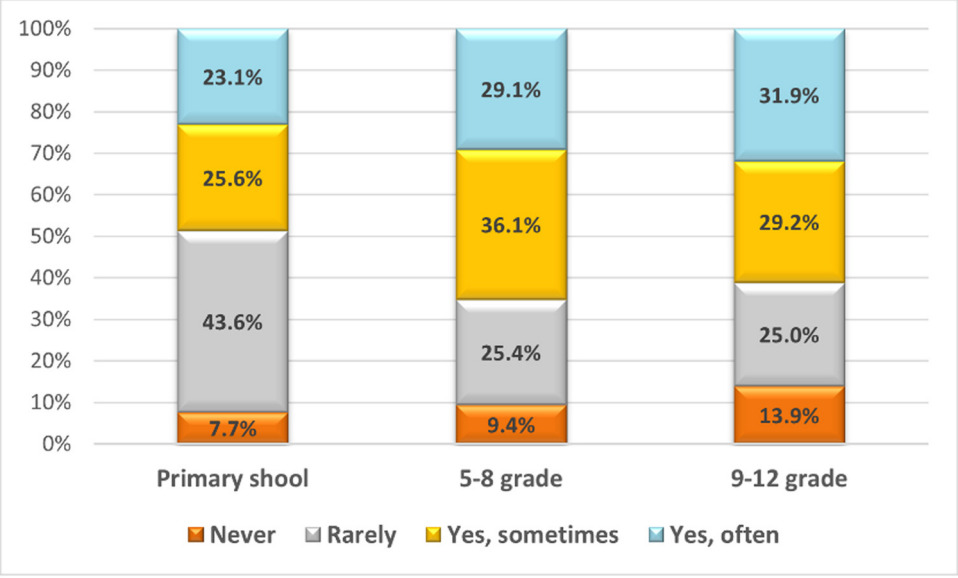

Figure 10: Patterns of machine translation use by different grades of school.

foreign language learning, which might possibly benefit more from machine translation, start in the second grade.

The study reveals that respondents teaching different subjects have different preferences for including machine translation in their subject classes (Figure 11). Among the most frequent users of machine translation are those teaching natural sciences (20%), and art and music (16.7%). One reason for such a choice might be Ukrainian refugee students who have been attending schools together with Lithuanian schoolchildren since the war in Ukraine, as indicated by one respondent. Among those who 'sometimes' use machine translation in their subject classes, music (66.7%), natural sciences (40%), IT and mathematics (30%), history (25%), Lithuanian language (25%), and foreign languages (20%) dominate.

Integration of machine translation tools into the studies of foreign languages has been one of the most debated issues so far, ranging from a clear position of the teacher forbidding learners to use machine translation in the educational process to a more liberal acceptance of such usage. Our data show that 34.5% of the respondents never use machine translation, 40% use it rarely, 20% use it sometimes, and only 3.7% do it often. A combined rate for the 'never' and 'rarely' answers – 74.5% – indicates the tendency that teachers are reluctant to integrate machine translation into their classes of foreign languages. The study also revealed a statistically significant correlation between the teachers' satisfaction with machine translation when they used it for private needs and their use of machine translation in subject classes (r_s = 0.179, p = 0.047). The more the respondents were satisfied with machine translation when they used it for private needs, the more they tended to use machine translation in the classroom.

In the open-ended question where the respondents were invited to express any other ideas or insights about machine translation, some respondents were willing to elaborate. Approximately one-third of those who filled in the questionnaire provided more feedback on the topic. Of them, two-thirds (about 70%) expressed a negative opinion. Although some acknowledged that machine translation is constantly improving, the respondents did not see it as very useful for education, especially in language teaching, e.g.,

> Machine translation can only be used if the language is unfamiliar and you need to understand what is being said. Often, a machine translator will only take the first meaning of a word, which may not necessarily be the one needed.

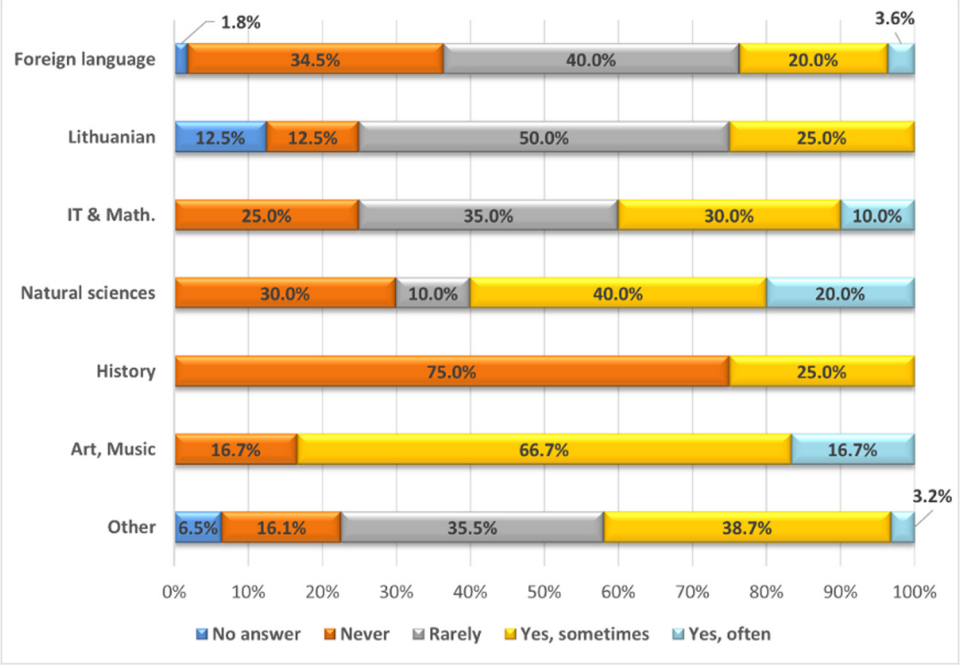

Figure 11: Patterns of machine translation use by teachers of different subjects.

> Machine translation can help to understand a text in a language we do not speak, to make sense of long texts and documents that we do not understand. However, attempts to integrate machine translation into language classes often result in the misuse of this tool for even simple tasks.

> Machine translation programmes help to get a general picture of the text, giving possible initial meanings of words. However, I do not recommend them for foreign language classes because of their narrow presentation of primary meanings and limited contextual reliability.

Some teachers noted the drawbacks of machine translation tools being inaccurate and unreliable, e.g.,

> The translation of sentences is often inaccurate, with very simple or unfamiliar words.
> Translation is mostly literal, inaccurate in terms of sentence structure, and problematic in terms of interpreting visual aids
> Many mistakes. Register problems.
> Does not translate correctly.
> Often the meaning of a single word is not consistent if taken out of context.
> Very poor translation. Often incomprehensible.
> You always need to correct the translation result.

The teachers of languages are aware of the shortcomings of machine translation in particular language pairs, e.g.

> Translation into or from Russian is very imprecise, sometimes illogical.
> The English-Lithuanian, Lithuanian-English translations are as expected, with some curious translations from other languages.

Some respondents also indicated that they thought machine translation non-suitable, or even demotivating, in language learning, e.g.

> Suitable for clarifying brief information, not suitable for learning
> Does not encourage motivation to learn foreign languages.

Only a small proportion of the respondents were positive about machine translation, e.g.

> Recently, the quality of translations has been quite good. There are corrections, but not many.
> It translates well.
> It improves very quickly
> With adjustments to the final product, it is possible to get a good result.
> The quality of machine translation has improved considerably in recent years.
> I find it useful for myself, too, and then I just need to edit the text. But the initial help is considerable.

Some respondents clearly see the potential of machine translation, although mostly for personal, rather than professional, i.e., teaching, purposes, e.g.

> I find it useful when potential project partners write a message in their own language. I think it is useful in certain situations, but it still needs to be improved.
> Needed in life. In lessons so far, depends on the subject.
> A handy thing, but rarely used so far.
> I know the language, so I don't need translation programs.

Overall, the use of machine translation tools by teachers is still a debatable issue. Approximately two-thirds (about 70%) of the respondents still bear a negative approach towards machine translation tools which might imply that they consider machine translation less of an opportunity, but possibly more of a threat.

5 Discussion

Our study reveals that the majority of teachers are familiar and do use machine translation themselves for personal purposes. This means that it would not be difficult for them to introduce the main tools as well as pros and cons of machine translation to their pupils at school. Still, the reluctance to work on this may be related to their own beliefs or negative attitudes towards integration of machine translation tools into the classes. As our data show, almost half of the teachers believe that machine translation tools are not useful in their classes. Still, others indicate the lack of trust as well as the lack of knowledge on how to integrate machine translation into subject classes even if they wanted to. Such results may lead to a consideration whether children are possibly more competent in the field of technologies and machine translation possibilities in particular than their teachers. The previous studies with children (Liubinienė et al. 2022) have revealed that children are eager to try out machine translation. However, they mostly discover machine translation possibilities from their parents or peers, or even on their own, which may result in inaccurate pattern of usage.

From the perspective of the competences of teachers, one of ten respondents indicated not using machine translation tools themselves, and even more respondents could not find the answer as to why they did not use and never thought about using machine translation tools. The results of our study are in line with those obtained in a Romanian study with 300 young children educators who have been found to lack confidence in using the technologies with kids (Rad et al. 2023). So, generally, we can assume that some teachers feel the lack of support from colleagues or administration, as well as the lack of encouragement to develop machine translation literacy in themselves and later on the need to disseminate their knowledge to their pupils via integration of machine translation into subject classes.

As freely available machine translation tools are comparatively a recent technological development, the quality of output is not always satisfactory, especially in the case of low-resource languages such as Lithuanian. Thus, it is quite understandable that language teachers consider the use of machine translation in studies of foreign languages to be problematic. Our study findings are in line with those obtained by Lee (2021) who claims that teachers still have conflicting opinions about integration of machine translation tools into the educational process. On the other hand, according to other studies (Fredholm 2019, Lee 2020, Yang et al. 2023), the use of machine translation for teaching or learning a foreign language provides advantages such as extension of vocabulary, a more fluent writing, more effective communication, and fewer mistakes. Our study reveals that the more satisfied the teachers are with the output of machine translation for their private needs, the more trust they have gained in new technologies and the more willing they are to integrate machine translation tools into the teaching process. This tendency once again demonstrates that it is essential first to develop machine translation literacy among teachers, and, as Urlaub and Dessein (2022) note, to introduce them to how to implement machine translation into the foreign language learning process.

It is embedded in the teacher's profession that they must systematically update their own skills and competences. In the age of artificial intelligence when it is important for teachers to be ahead of their own students, especially in the use of various technologies, non-formal education programmes, especially those that are supported by governmental decisions, could be helpful. Higher education institutions, teachers' associations, and various training establishments from the private sector put on the market huge amounts of training courses, both onsite and online. The COVID period-inspired remote learning possibilities could be a great option for teachers to renew their teaching methods, including the techniques to integrate machine translation for education purposes. On the other hand, it is also important for teachers to share good practices among themselves through in-school initiatives. Urlaub and Dessein (2022) suggest that a broader and more public awareness of the pros and cons of machine translation would benefit the educators and the entire educational community. In line with this, our study maintains that teachers are key players in this process being at the front of the educational community. Urlaub and Dessein (2022) also advocate for the 'development of MT-based pedagogical tools.' In terms of the pedagogical implications, our study also draws attention to the fact that machine translation might also be of benefit in educational levels other than university, which is in line with Ducar and Schocket's (2018) allegation that learners at all levels – elementary, secondary, and higher education – need to be taught responsible ways of machine translation use for learning purposes. It may not take long until such tools are offered and adopted in schools and by teachers to a broader extent. Therefore,

finding the ways how to incorporate machine translation in the classroom may benefit not only educators and students but also the broad public.

6 Final implications and future research directions

The conclusions that can be drawn from this study mainly demonstrate that machine translation is rarely seen as a useful technology for teaching purposes, and its benefits are either unknown or generally underestimated. Teachers are less eager to improvise by employing machine translation tools for didactic purposes and are not always aware of the ways machine translation could be integrated into classroom settings, except in very minor cases, especially related to language learning. Children often get to know technologies and tools, including machine translation, from environments other than school, which may result in their superficial awareness of how such tools may be used efficiently and safely.

There is an emerging need for machine translation literacy instruction. However, since this is a relatively new challenge, there is no one right way to help users develop machine translation literacy. In each situation, the content must be tailored to the specific needs of the target audience. One way to develop machine translation literacy for teachers is through the 'train the teacher' principle. Machine translation literacy could be included in teacher training programs, digital and information literacy courses, language courses, workshops, etc. Universities and other higher education institutions, especially those implementing translation study programmes, could offer courses, micromodules, seminars, webinars, or hands-on sessions on machine translation for language learning. The benefits of such a practice can be obvious, as machine translation is presented in a positive light, rather than as a taboo or shameful practice. Thus, machine translation can be understood as an aid for language learning. However, there are also some risks, as machine translation may face resistance from language teachers who fear that using machine translation may go against the objectives of language learning. Teachers should, therefore, at least discuss, rather than ignore or prohibit, the use of machine translation with their students, by, for example, trying out a machine translation post-editing task that may demonstrate how good the technology is in a particular language pair. Teachers should first understand if using machine translation brings benefits for learning purposes. In case machine translation is adopted as a useful tool of learning by the teacher, various strategies employing the technology could be adopted:

- In a translation task when students are asked to render the meanings in a foreign language, they might also be asked to use machine translation for comparison purposes, which could help them learn synonyms or new lexical items or check the grammatical structures they use against those suggested by a machine translation tool.
- Students may be given the possibility to use machine translation as a dictionary (readily available on a computer and/or smartphone).
- Students may be allowed to use machine translation for comprehension purposes, especially in classes of history, geography, or other subjects where new knowledge could be mined from a variety of sources rather than only textbooks in one's native language.

Our findings might have also revealed a newly emerging tendency that teachers of natural sciences, music and arts, IT, and mathematics employ machine translation in their classes for specific purposes, e.g. to help Ukrainian refugee students who are being integrated into the schools together with Lithuanian schoolchildren. Yet, this assumption is only tentative and should be further researched.

In conclusion, developing machine translation literacy skills for both educators and children of all ages can help overcome the challenges that so many teachers and their students face today. Currently, major scientific findings relate to machine translation uses for older students, many times those studying at universities; however, we believe that machine translation literacy is relevant for all members of society. Therefore, in technology- and AI-competent society, instruction and education on the ethical and responsible uses of all technologies, including machine translation, should start as early as possible.

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References

Ata, Murat and Emre Debreli. 2021. "Machine translation in the language classroom: Turkish EFL learners' and instructors' perceptions and use." *IAFOR Journal of Education* 9(4), 103–22. doi: 10.22492/ije.9.4.06.

Benda, Jonathan. 2013. "Google Translate in the EFL classroom: Taboo or teaching tool?" *Writing & Pedagogy* 5, 317–32. doi: 10.1558/wap.v5i2.317.

Briggs, Neil. 2018. "Neural machine translation tools in the language learning classroom: Students' use, perceptions, and analyses." *JALT CALL Journal* 14(1), 2–24. doi: 10.29140/jaltcall.v14n1.221.

Brito, Rita, Rita Francisco, Patricia Dias, and Stephane Chaudron. 2017. "Family dynamics in digital homes: The role played by parental mediation in young children's digital practices around 14 European countries." *Contemporary Family* 39(4), 271–80. doi: 10.1007/s10591-017-9431-0.

Bowker, Lynne and Jairo Ciro Buitrago. 2019. *Machine translation and global research*. Bingley: Emerald.

Bowker, Lynne. 2021. "Machine translation use outside the language industries: A comparison of five delivery formats for machine translation literacy instruction." *Translation and Interpreting Technology Online*, 25–36. doi: 10.1080/08963568.2020.1794739.

Carrier, Michael. 2018. "English for the underserved: Closing the digital divide." *Training, Language and Culture* 2(4), 9–25. doi: 10.29366/2018tlc.2.4.1.

Case, Megan. 2015. "Machine translation and the disruption of foreign language learning activities." *eLearning Papers* 45, 4–16.

Chaudron, Stephane, Di Gioia Rosanna, and Gemo Monica. 2018. Young children (0–8) and digital technology, a qualitative study across Europe; EUR 29070. doi: 10.2760/294383.

Deng, Xinjie and Zhonggen Yu. 2022. "Systematic review of machine-translation-assisted language learning for sustainable education." *Sustainability* 14, 7598. doi: 10.3390/su14137598.

Dias, Patricia, Rita Brito, Wanes Ribbens, Linda Daniela, Zanda Rubene, Michael Dreier, Monica Gemo, Rosanna Di Gioia, and Stephane Chaudron. 2016. "The role of parents in the engagement of young children with digital technologies: Exploring tensions between rights of access and protection, from 'Gatekeepers' to 'Scaffolders'." *Global Studies of Childhood* 6(4), 414–27. doi: 10.1177/2043610616676024.

Ducar, Cynthia and Deborah Houk Schocket. 2018. "Machine translation and the L2 classroom: Pedagogical solutions for making peace with Google translate." *Foreign Language Annals* 51, 779–95. doi: 10.1111/flan.12366.

Fredholm, Kent. 2019. "Effects of Google translate on lexical diversity: vocabulary development among learners of Spanish as a foreign language." *Revista Nebrija* 13(26), 98–117. doi: 10.26378/rnlael1326300.

Fredholm, Kent. 2021. *Genvägar, omvägar och irrvägar – Gymnasieelevers användning av maskinöversättning under uppsatsskrivande på spanska*. PhD thesis. Karlstads universitet/Uppsala universitet.

Garcia, Ignacio and Maria Pena. 2011. "Machine translation-assisted language learning: Writing for beginners." *Computer Assisted Language Learning* 24(5), 471–87. doi: 10.1080/09588221.2011.582687.

Groves, Michael and Klaus Mundt. 2015. "Friend or foe? Google Translate in language for academic purposes." *English for Specific Purposes* 37, 112–21. doi: 10.1016/j.esp.2014.09.001.

Jiménez-Crespo, Miguel. 2017. "The role of translation technologies in Spanish language learning." *Journal of Spanish Language Teaching* 4, 181–93. doi: 10.1080/23247797.2017.1408949.

Kasperė, Ramunė, Jolita Horbačauskienė, Jurgita Motiejūnienė, Vilmantė Liubinienė, Irena Patašienė, and Martynas Patašius. 2021. "Towards sustainable use of machine translation: Usability and perceived quality from the end-user perspective." *Sustainability* 13(23), 13430. doi: 10.3390/su132313430.

Klizienė, Irina, Gražina Taujanskienė, Aldona Augustinienė, Berita Simonaitienė, and Gintautas Cibulskas. 2021. "The impact of the virtual learning platform EDUKA on the academic performance of primary school children." *Sustainability* 13(4), 2268. doi: 10.3390/su13042268.

Kondratavičienė, Renata. 2019. "Development of values of primary school pupils by using information communication technologies." *Pedagogika* 133(1), 202–16. doi: 10.15823/p.2019.133.11.

Lee, Sangmin Michelle and Neil Briggs. 2021. "Effects of using machine translation to mediate the revision process of Korean university students' academic writing." *ReCALL* 33(1), 18–33. doi: 10.1017/S0958344020000191.

Lee, Sangmin Michelle. 2020. "The impact of using machine translation on EFL students' writing." *Computer Assisted Language Learning* 33(3), 157–75. doi: 10.1080/09588221.2018.1553186.

Lee, Sangmin Michelle. 2021. "The effectiveness of machine translation in foreign language education: a systematic review and meta-analysis." *Computer Assisted Language Learning* 36(1–2), 103–25. doi: 10.1080/09588221.2021.1901745.

Liubinienė, Vilmantė, Donata Lisaitė, and Jurgita Motiejūnienė. 2022. "A snapshot of children's attitudes toward machine translation." *Information* 13(7), 1–14. doi: 10.3390/info13070317.

Liubinienė, Vilmantė and Ramunė Kasperavičienė 2019. "Children's empowerment through digital technologies in the context of smart pedagogy: case study." In *Didactics of smart pedagogy: Smart pedagogy for technology enhanced learning*, edited by Linda Daniela, p. 253–65. Cham: Springer.

Livingstone, Sonia, Giovanna Mascheroni, Michael Dreier, Stephane Chaudron, and Kaat Lagae. 2015. *How parents of young children manage digital devices at home: The role of income, education and parental style*. London: EU Kids Online, LSE. http://eprints.lse.ac.uk/63378. [accessed 20 March 2023].

Merschel, Lisa and Joan Munné. 2022. "Perceptions and practices of machine translation among 6th–12th grade world language teachers." *L2 Journal* 14(1), 60–76. doi: 10.5070/L214154165.

Organ, Alison. 2023. "Attitudes to the use of Google Translate for L2 production: analysis of chatroom discussions among UK secondary school students." *The Language Learning Journal* 51(3), 1–16. doi: 10.1080/09571736.2021.2023896.

Pangrazio, Lucy and Julian Sefton-Green, eds. 2022. *Learning to Live with Datafication*. London: Routledge.

Pérez Macías, Lorena, María del Mar Sánchez Ramos, and Celia Rico. 2020. "Study on the usefulness of machine translation in the migratory context: Analysis of translators' perceptions." *Open Linguistics* 6(1), 68–76. doi: 10.1515/opli-2020-0004.

Perrotta, Carlo, Kalervo Gulson, Ben Williamson, and Kevin Witzenberger. 2020. "Automation, APIs and the distributed labour of platform pedagogies in Google Classroom." *Critical Studies in Education* 62(1), 97–113. doi: 10.1080/17508487.2020.1855597.

Rad, Dana, Anca Egerău, Alina Roman, Tiberiu Dughi, Gabriela Kelemen, Evelina Balaș, Adela Redeș, Maria-Doina Schipor, Otilia Clipa, Liliana Mâță, Roxana Maier, Gavril Rad, Remus Runcan, and Csaba Kiss. 2023. "On the technology acceptance behavior of Romanian preschool teachers." *Behavioral Sciences* 13, 133. doi: 10.3390/bs13020133.

Reza, Fawzia. 2020. "COVID-19 and disparities in education: collective responsibility can address inequities." *Knowledge Cultures* 8, 68–75. doi: 10.22381/KC83202010.

Sefton-Green, Julian, Jackie Marsh, Ola Erstad, and Rosie Flewitt. 2016. *Establishing a research agenda for the digital literacy practices of young children: a white paper for COST action IS1410*. doi: 10.13140/RG.2.2.10896.30720.

Selwyn, Neil 2019. *Should robots replace teachers? AI and the future of education*. Cambridge: Polity Press.

Stapleton, Paul and Becky Leung Ka Kin. 2019. "Assessing the accuracy and teachers' impressions of Google Translate: A study of primary L2 writers in Hong Kong." *English for Specific Purposes* 56, 18–34. doi: 10.1016/j.esp.2019.07.001.

Tsai, Shu-Chiao. 2019. "Using Google translate in EFL drafts: A preliminary investigation." *Computer Assisted Language Learning* 32(5–6), 510–26. doi: 10.1080/09588221.2018.1527361.

Urlaub, Per and Eva Dessein. 2022. "From disrupted classrooms to human-machine collaboration? The pocket calculator, GoogleTranslate, and the future of language education." *L2 Journal* 14(1), 45–59. doi: 10.5070/L214151790.

Vieira, Lucas Nunes, Minaco O'Hagan, and Carol O'Sullivan. 2020. "Understanding the societal impacts of machine translation: A critical review of the literature on medical and legal use cases." *Information, Communication & Society* 11, 1515–32. doi: 10.1080/1369118X.2020.1776370.

Yang, Yanxia, Xiangqing Wei, Ping Li, and Xuesong Zhai. 2023. "Assessing the effectiveness of machine translation in the Chinese EFL writing context: A replication of Lee (2020)." *ReCALL* 14(1), 211–24. doi: 10.1017/S0958344023000022.