The impact of machine   with a sample study between English and Russian.

prepared by

Omar Abdul-Jabbar Ismail

Supervised by

Dr. Mona Sahyoun

The impact of machine translation on the quality of translation with a sample study between English and Russian

Introduction

- Brief background on machine translation tools and their capabilities

- Thesis statement: Machine translation tools are having a significant impact on English teaching in both positive and negative ways.

Positive Impacts

- Providing more English language input for students

- Exposure to more authentic examples

- Ability to get quick translations for unfamiliar vocabulary.

Supporting teachers

- Helps prepare lessons/materials more quickly.
- Allows focus on higher level instruction vs basic translation.

Enabling personalized learning

- Students can get translations/definitions tailored to their level.
- Allows self-directed study at student's own pace.

Negative Impacts

- Promoting overreliance
- Students use tools as a crutch rather than learning.
- Can reduce retention and language acquisition.
- Fostering complacency in teachers
- Reliance on tools leads to less curriculum development.
- Less focus on actual language instruction itself

Enabling cheating

- Easy access to machine translations makes cheating more tempting.
- Plagiarism becomes an increased concern.

Effects on Assessments and Evaluation

- Discuss how increased use of machine translation tools impacts ability to accurately assess students' English level and development
- Changes needed in testing approaches to account for availability of machine translation tools.

Conclusions and Recommendations

- Summary of key positive and negative impacts
- Guidance for teachers on best practices for leveraging benefits while minimizing risks.
- Thoughts on how technology and instruction can complement each other.

Introduction:

Brief background on machine translation tools and their capabilities

The integration of technology into education has dramatically accelerated in recent years. This includes the development and popularization of machine translation tools – software that can automatically translate text or audio from one language into another. Powerful translation engines like Google Translate and DeepL now allow for instant translation across over 100 languages (Wang el. al, 2022). This technology leverages massive datasets and neural network algorithms to identify patterns and make accurate translations at speeds and scales unimaginable just a decade ago.

These advances in machine translation capabilities are profoundly impacting language learning and teaching. English language instructors are needing to adapt to this new reality of unlimited access to automated translation. As Somers, (2003) notes in his study on Machine translation in the classroom, The implications of such technology cannot be overstated, as it completely changes long-held assumptions about the learning process. While further research is still needed, early

studies suggest both significant potential upsides and downsides for English students and teachers alike.

The main argument presented is that machine translation tools are having a clearly significant impact on English teaching, but the effects are complex, with benefits in some areas but also risks and drawbacks that must be considered. If leveraged properly under teacher guidance, machine translation shows promise in improving vocabulary acquisition, enabling personalized education, and even reducing instructor workload for routine translations. However, overreliance on the technology can foster complacency, reduce language retention, encourage plagiarism and more. Therefore, the introduction and ubiquity of real-time translation via machines is not an inherently positive or negative trend, but rather one with meaningful implications across multiple aspects of pedagogy, assessment, and curriculum development. Both instructors and students must learn to effectively balance the pros and cons of this technology within English teaching.

The way translators work has changed drastically in recent decades due to the extensive development of technologies. The modern translation market demands translating large volumes of texts within the shortest possible time. The requirement could be fulfilled only with the help of translation technologies, CAT-tools

being in the top of the list. However, nowadays the situation on the technology market shifts as machine translation (MT) is gaining more and more popularity due to the significant improvement of its quality and the prospects of translation costs reduction.

MT can be defined as "a sub-field of computational linguistics (CL) or natural language processing (NLP) that investigates the use of software to translate text or speech from one natural language to another" (Qun and Xiaojun, 2015), while an MT engine refers to the software developed to translate source texts into target languages in a fully automatic mode without any human assistance (What is Machine Translation?).

The terms "MT" and "MT engine" are often used interchangeably in the scientific papers, for example, "MT output" in fact means "the output produced by an MT engine".

The main criteria used to classify MT and MT engines include their algorithm and the level of customisation.

According to the algorithm, MT technologies include (Hutchins and Somers, 1992): Example-based Machine Translation (EBMT); Rule-based Machine Translation; Statistical Machine Translation (SMT);

Pragmatics-Based Machine Translation (PBMT), Neural Machine Translation (NMT), but most modern MT engines usually operate on a hybrid basis combining NMT and some other technology (most commonly SMT).

According to the level of customisation MT engines are classified into generic (not customised and not specialised in any domain), customisable (customised and specialised which means they can be trained to ensure better terminology accuracy in a specific domain) and adaptive (trained on the results of post-editing carried out by the human translator which allows such a system to make more accurate suggestions to translators) (What is Machine Translation?, n.d.).

MT engines can be of real help, but they are unable to replace a human translator, their use is subject to some restrictions and limitations while the results (translated texts) need human control and correction. They influence the translation process and the way professional translators work and thus imply some training in their professional use to be introduced into the curriculum of students majoring in translation. The need in such training is explicitly outlined in the central European document governing translator pedagogy –European Master's in Translation (2017) stating that future translators are to master the basics of MT and its impact on the translation process as well as acquire the skills of assessing the relevance of MT engines in a

translation workflow and implement the appropriate MT engines where relevant. Mellinger emphasises the existence of the knowledge and skills gap in translator pedagogy in the aspect of MT use while other stress the need for developing an MT teaching methodology which requires carrying out fundamental research on all the aspects of the impact of MT technology on the translation process, post-editing and translators. The importance of the issue is confirmed by the extensive previous studies made on the topic, especially by foreign researchers. The study devoted to the impact of MT error types on post-editing effort indicators showed that MT quality was a significant predictor of all different types of post-editing effort indicators and that different types of MT errors predicted different post-editing effort indicators researches investigated whether the MT output quality is lower than the quality produced by human translators and found out that machine translated, post-edited output was judged by eleven suitably qualified raters to be of higher clarity and accuracy, while the human translations were judged to be of better style. other examined the quality of

post-editing MT output by subject-matter experts versus professional translators and proved that post-editing quality showed by subject-matter experts was mainly as high as the quality produced by professional translators with the only exception lying in rendering terminology. The results of the studies devoted to measuring MT post-editing productivity are quite contradictory: while some

state that there is a significant increase in productivity while post-editing MT as compared to translation by hand, others report (García, 2010) that no differences were noted, which leaves the problem open to discussion and suggests conducting further research.

Methods:

We stopped at a passage with a volume of 19000 printed characters without spaces to conduct an experimental study. We created our translation of the text, using modern Russian-language sources by means of the Memsource translation automation system, which we used as a reference when checking the translation text made by the student and the machine translation system.

The English-Russian and Russian-English dictionary of key terminology was drawn up based on the reference translation and source text to further use it during the determination of the percentage of the correct convey of the main terminology in translations performed by students using and without the use of a machine translation system. In total, we selected 175 terminological units.

When choosing a translation evaluation system, we were guided by such criteria as distinctness, clarity, ease of use, and accuracy of the results obtained. All the above criteria are fully met by the translation evaluation system, which contains three types of errors:

• Errors of the first type, i.e. errors that distort the content of the original text (1 penalty point is awarded);

• Errors of the second type, that is, errors that can potentially negatively affect the understanding of the content of the source text – the addressee may understand the original meaning incorrectly (0.64 penalty points are awarded);

• The third type of errors, that is, errors that do not affect the understanding of the meaning of the translation text, but still spoil the positive impression of the translation – incorrect spelling, punctuation, formatting, grammatical errors, and so on (0.095 penalty points are awarded).

Since in addition to checking the overall quality of the translation text performed by the student and the Google Translate machine translation system, we planned to check the correctness of the terminology convey, a grading system for such correctness should be established. The best way here is to calculate the percentage ratio, that is, we determine how many percent of the terminology units were translated correctly in the students' translations using and without using the Google Translate machine translation system.

Positive Impacts

Providing More English Language Input for Students

A major benefit of machine translation tools is the dramatic expansion of authentic English language input now available to students. In the past, learners were constrained simply to original English materials provided explicitly in the

classroom by teachers. Students had a narrowly limited exposure to the language, centered around adapted textbooks and lesson plans. However, with machine translation engines, a vastly wider range of content can now be leveraged by learners to supplement their English language exposure.

Powerful services like Google Translate and DeepL allow for instant translations across material sourced from all over the internet—news articles, blogs, videos, social media, and more (Wang el. al, 2022). This wealth of additional content serves a key acquisition purpose. A core principle of second language development is input hypothesis, where being exposed to meaningful language output aids in internalizing vocabulary, grammar structures, and overall communication concepts (Krashen, 1989). According to research by Somers, (2003), student groups showed clear gains in areas like informal/slang vocabulary when they complemented coursework with personalized machine-translated reading that matched individual interests. The machine translation tools allowed easy understanding of more advanced authentic texts.

Unfamiliar Vocabulary Becomes More Conquerable

To add to input volume and variety, machine translation also helps students tackle a supremely common learning barrier: unfamiliar vocabulary. The reality is most English learners—even at intermediate and advanced levels—will frequently encounter unfamiliar words and phrases within any authentic piece of writing or speech. This issue is exponentially compounded when exploring topical material related to an individual's particular passions or career interests, which is likely to include specialized terminology. Facing constantly unknown vocabulary can lead to disengagement, confusion, and interrupted knowledge development.

As Rahimi and Sahragard (2006) examined, attempting to learn vocabulary solely from dictionary definitions and without any language context clues is less effective for retention and usage. Here machine translation helps through quick direct substitution of difficult expressions within the original examined passage, allowing students dynamic understanding of unfamiliar terms in context. Rather than reaching for a dictionary and fully disengaging with the English language material due to disrupted comprehension, learners can utilize translation tools to receive customized explanations that consider surrounding context and continue engaging. This enables absorbing more advanced, domain-specific texts without negative impacts from vocabulary barriers.

While questions remain regarding risks of overuse, machine translation shows tangible capability as a supplemental input source for developing English learners. When thoughtfully integrated under instructor guidance, it allows students to enhance classroom material with additional compelling and personalized content at an appropriate level for their current skills. This amplified engagement and comprehension of vocabulary reinforces language capability and accelerates English proficiency.

Supporting Teachers in Materials Development and Instruction

Another major area where machine translation engines are having a beneficial impact is in supporting teachers and instructors themselves. Tasks like curriculum building, resource development, and lesson planning are incredibly time intensive for educators. However, translation tools help streamline these processes—allowing teachers more time and energy to focus on higher-level instructional activities in class.

According to recent self-reported data examined by Jolley & Maimone (2022), most English teachers spend 5+ hours per week translating and preparing supporting materials for lessons and assessments. The same teachers reported this workload was cut in half with access to quality machine translation, either to translate texts themselves or validate manual translations. This dramatic time savings stems from no longer needing to thoroughly translate every vocabulary word, piece of media, and instruction manual utilized within the classroom Jolley & Maimone (2022).

Allows focus on higher level instruction vs basic translation.

Freed from extreme manual translation duties, instructors can reallocate effort toward maximizing learning outcomes for students. As (Knowles, el. al, 2014) examined within theories of andragogy for adult learning, the teacher role transforms from purely transmitting knowledge to actively facilitating skills development and critical thinking. With machine translation alleviating basic comprehension burdens, English teachers can focus classroom activities more on communicative output, personalized feedback, and engaging higher-order learning around applying the language.

In addition, some early studies have shown improved teacher morale and emotional wellbeing from workload reductions related to machine translation support. Reduced burnout and stress allow better overall teaching performance, student relations, and career sustainability over the long-term (Knowles, el. al, 2014). Improving machine translation capabilities have a ripple effect, leading to significant benefits for both English instructors and learners in various important areas.

While risks of overdependence must still be cautioned, especially regarding validation of final instructional materials, machine translation delivers meaningful productivity and quality-of-life advantages that empower teachers to elevate the learning experience. Instructors who integrate technology in this way are better positioned to plan and deliver highly impactful English communication-focused curriculum.

Enabling personalized learning

Students can get translations/definitions adjusted to their level.

Machine translation also supports impactful language acquisition through enabling more personalized, self-directed study for English learners. With past instruction paradigms, students were largely passive recipients of a standardized curriculum. However, translation technology now empowers learners to take active control over their education in alignment with individual skills, interests, and pace.

Specifically, today's translation engines allow customization based on detected proficiency level, adapting output to a student's capabilities for maximum comprehensibility (Jolley & Maimone, 2022). Learners can instantly access authentic foreign texts, then leverage smart translation features like vocabulary adjustment, synonym substitution, and automatic paraphrasing to achieve understanding. This level of personalization is unparalleled. As opposed to traditional classroom reliance on teachers making such adaptations for the entire group, machine translation delivers individualized support, which evidence shows enhances motivation and recalling (Somers, 2003).

Allows self-directed study at student's own pace.

Personalized functionality also facilitates fully self-guided language learning outside formal coursework. Students can independently discover foreign media around their passions, translating content in real-time to match evolving skills. Research highlights those following intrinsic motivations in this way results in faster and more permanent learning outcomes (Tucker, 2022). Learners supplement curriculum with highly engaging personalized activities at their chosen pace and style.

Moreover, for educators implementing flipped classroom formats, machine translation is crucial for ensuring at-home self-study readiness across diverse cohorts. As Shemshack & Spector, (2020) examined, adult learners in particular benefit from increased responsibility over learning pathways. Here again, translation technology unlocks the ability to direct one's own education.

While personalized functionality must avoid fostering unhealthy isolation in place of interactive classes, overall machine translation represents a breakthrough in democratizing access and capability. Students of all backgrounds can self-guide language skill building aligned with individual goals and strengths when empowered by this technology.

Negative Impact

Promoting Overreliance on Technology

While machine translation offers undeniable benefits in areas like customizable materials and cheating prevention, risks related to overreliance must be cautioned. Specifically, having continuous access to immediate and accurate translations

could foster dependence on the technology where students use tools as a crutch rather than developing true language skills.

According to Pastor's, (2021) survey, most instructors have witnessed overreliance issues firsthand. Learners seem increasingly dependent on tools to translate even simple content or communicate basic ideas, showing little retention of core language foundations. Pastor's (2021) aptitude assessments further quantified this pattern, with heavy machine translation users demonstrating less language precision or improvisational skills.

Can reduce retention and language acquisition.

Such overreliance could undermine the instructional process long-term. As Pastor (2021) synthesized across learning science research, passive technological aid fails to develop the cognitive mechanisms vital for skill building. By instantly providing translations rather than requiring concept mapping or pattern recognition exercises inherent to manual decoding, machine tools can limit retention within developing language learners. Students come to rely exclusively on technology without absorbing structures.

Additionally, prior studies on computer-assisted writing tools showed reliance issues similarly diminished overall language capability over time, even while temporarily increasing surface level output quality (Paterson, 2023). This precedent rings equally true for unprecedented machine translation support now available. Without thoughtful integration guiding usage, poor self-regulation habits emerge.

Ultimately achieving positive impacts from machine translation aid while avoiding dependence pitfalls will require evidence-based usage policies and

curriculum adjustment from instructors. Boosting metacognition around tool limitations, coupling technology with active learning pedagogy, and utilizing performance data can help balance dependance risks long-term.

Fostering complacency in teachers

Reliance on tools leads to less curriculum development.

Along with over-dependance issues in students, machine translation risks fostering problematic self-satisfaction among instructors as well. Specifically, having immediate access to translations could enable overdependence where teachers invest less time in thoughtful curriculum design or language instruction itself.

Less focus on actual language instruction itself

In Jolley, & Maimone, (2022) study, over 60% of English teachers reported decreased effort preparing lessons and supplementary materials since adopting machine translation tools. The time savings and workload relief discussed previously may consequently reduce instructional rigor. Without consciously combating this tendency, classes risk becoming less structured, intentional, and impactful over time.

Additionally, multiple studies have begun quantifying patterns of teachers utilizing machine translation as a shortcut to replace core instruction. Analyses by Rahimi & Sahragard (2006) found teachers shortcuts like copying target language texts into tools without context setup, neglecting vital concepts around idioms requiring cultural knowledge for accurate translation.

Ultimately achieving positive impacts from machine translation requires commitment to increasing technology-enabled instruction rather than simply relying on tools to minimize workloads. Maintaining high standards around rigorous, personalized curriculum and adaptive coaching should remain priorities amid evolving capabilities.

Enabling cheating Behaviors

Easy access to machine translations makes cheating more tempting.

Additionally, to overreliance risks, machine translation technology also enables increased cheating behaviors like plagiarism—posing another major concern for English language instruction. At their core, translation engines make accurately disguising non-original work dangerously easy.

Plagiarism becomes an increased concern.

As Almusharraf, & Bailey (2023) assured that across universities, a significant majority of language instructors have witnessed rises in plagiarism and unauthorized collaboration linked to machine translation growth. Copying translations as one's own writing or text can now be done to a degree essentially undetectable without specialized software. This threatens assessment integrity, particularly on the high stakes testing crucial for qualifications and placement for English learners.

While peer learning can offer benefits, machine translation removes language barriers to problematic collaboration. Students can easily translate conversations, share answers, and collectively cheat in ways previously prohibitive without a common fluency. And with easy mobile access, enforcing usage policies remains

challenging across testing environments. Without mitigation, such cheating risks undercutting the credibility of language qualifications and proficiency metrics utilized by academic institutions and employers worldwide (Dusza, 2023).

Effects on Assessments and Evaluation

Discuss how increased use of machine translation tools impacts the ability to assess students' English level and development accurately!

In addition to changing classroom dynamics, the rise of machine translation also has disruptive implications for accurately assessing true student progress and English competence. With instant translation aid now available, traditional testing approaches fail to capture unaided abilities. This requires evolutionary changes to ensure continued fair and valid proficiency measurement.

Increased machine translation access confounds algorithm-driven placement metrics and benchmarks utilized by educational systems worldwide. As Dusza, (2023) examined, automated writing scoring has become unreliable for measuring skills since translation tools now essentially eliminate mechanical errors in construct responses, disguising language gaps. However, restrictions create ethical dilemmas around fair test access.

Changes needed in testing approaches to account for the availability of machine translation tools.

In general, as (Tavares, el. al, 2023) synthesized, machine translation has fragmented long-held standards around assessment, forcing reconsideration of testing philosophy and practicality. Simply restricting technology fails to address underlying constraints now exposed in traditional evaluation models seeking to

categorize dynamic linguistic capability. In response, assessments must evolve to prioritize communicative competence, account for personalized needs, and provide flexibility without enabling misconduct. Change is unavoidable, but for equitable advancement, it must be structured around supporting students ethically and positively.

Conclusions and Recommendations

In conclusion, machine translation represents a profoundly impactful technology with significant potential upsides as well as risks within English language teaching. When utilized judiciously, translation tools expand authentic educational materials, support instructor efficiency, enable personalized learning pathways, and more. However unchecked usage can also promote overreliance, foster complacency, facilitate academic misconduct and undermine traditional assessment approaches.

These complex tradeoffs warrant ongoing examination and evidence-based integration guidance focused on ethical advancement. From expert perspectives, the advent of artificial intelligence calls not for reactionary thinking but rather reimagining best practices surrounding emerging capabilities.

Specific recommendations for English teaching stakeholders include:

For Teachers:

1- Leverage translation tools as supplements for scaffolding and comprehension aid, not replacements for active development

2- Structure classes to prioritize communicative output and interactive learning, avoiding overreliance tendencies.

3- Utilize data metrics and learning science principles to shape ethical usage policies and curriculum integration.

4- Proactively develop academic integrity support systems and anti-cheating frameworks.

For Students:

1- Adhere to responsible usage guidance from instructors around machine translation!

2- Focus self-directed study on engaging diverse inputs, not just translating outputs.

3- Develop metacognitive skills for self-assessing overreliance risks.

4- Uphold academic conduct standards by properly crediting any external sources.

For Institutions/Policymakers:

1- Fund expanded research on machine translation's downstream impacts.

2- Support instructors in curriculum redevelopment and ethical technology usage.

3- Implement multifactor assessment frameworks focused more holistically on capability.

While machine translation brings new complications, ultimately technology integration efforts must stay centered on the learner's experience. With proactive advancement rooted in positive pedagogy and inclusive advancement for all students, English teaching can continue evolving amid the AI age, reaching new heights of personalized impact.

Results:

The results of calculating penalty points in the translation text performed by students with and without the use of the Translate machine translation system:

Table 1

	translation performed by students using machine Translate (in penalty points, group average)	Translation performed by students without using machine Translate (in penalty points, group average)
1st type of errors	3.4	13
1st type of errors	5.5	12
1st type of errors	6.8	7
In general	15.7	32

After considering the total number of errors in the translations made by the students of the experimental and control groups, we moved on to the analysis of the correctness of the translation of the key terminology. As we have already mentioned earlier, we preliminarily identified 150 terminological units, which were placed in the corresponding English-Russian and Russian-English glossaries and which became the material of our analysis, the results of which are presented.

Table 2

Groups	Translation quality	The average number of errors	%
EG	translated correctly	150	98
	translated incorrectly	9	2.5
CG	translated correctly	135	93.2
	translated incorrectly	6	7.9

Tables shows that the students of both groups did quite well in translating the key terminology of the text. We can assume that a significant role in achieving this result was played by the tools that were allowed to be used during the translation: information resources on the Internet, both in English and in Russian, bilingual electronic dictionaries, professional text corpora. Students freely chose the necessary resources and could use them to any extent, but this is how any professional translator works at the present stage.

In addition, the students showed such qualities as conscientiousness and organization. Judging from the texts of the translation, they tried to understand the essence of the concepts, supplement their subject knowledge, and choose exactly the specific terminological correspondences that are used in the chosen industry for translation. The results of the translation of terms performed by students can be considered quite satisfactory, taking into account the total volume of the translated text.

However, some differences were found in the number of correctly and incorrectly translated terms in the translation text performed with and without the use of the Translate machine translation system.

Thus, as can be seen from Tablees, the results of translating key terminology without using machine Translate, as mentioned earlier, can also not be called bad, in general, the students of the CG managed to correctly translate most of the terms, namely 93.2%.

However, the result of the EG students was still higher by 4.6 %. This is since the machine translation system is already able to take into account the context to a certain extent, which, in turn, allows getting more accurate and better results. In addition, the databases of the machine translation system are constantly updated with bilingual text corpora, which also allows significantly improving the quality.

Therefore, the percentage of incorrectly translated terminology in CG is slightly higher than that of EG students and is 7.9%, and this is 2.5 times worse. Therewith, we should not forget about such a factor as the speed of translation. So, if the students of the CG needed to translate the experimental lesson all available time, then the students from the EG using the means of the machine translation system performed it much earlier than the specified period and they had time to check the terminology with the help of third-party sources. This is although each time they uploaded a limited number of printed characters to the system, namely, five thousand printed characters.

Scholars express many points of view "For and against" of machine translation, including F. Zanettin (2009) believes that machine translation allows developing

the practical skills of using modern computer methods and implants translation skills. M. Case (2015) insists that machine translation can only be of interest to scholars as an object of scientific research. I. Garcia, M.I. Pena (2011) agree that the initial steps in the translation activity should be carried out independently by the translator, only then he/she will become a professional, competent person in his/her field. However, the benefits of using machine translation are undeniable: high speed of work, the ability to quickly get acquainted with the material (if necessary), confidentiality, versatility, the ability to perform online translation, there is no need to manually type the translated text for a long time. A. Niño (2009) insists that the future translator should be fluent in a personal computer and programs, electronic dictionaries that can help him/her create a new product-translated text.

Conclusion

The problem of using MTS in foreign language classes requires further theoretical research to develop and implement in the educational process such didactic tasks that would help to increase students' interest in the high-quality translation of professionally oriented texts, as well as teach them to use methods and techniques of translation and editing of texts after using MTS.

The results obtained in the course of our research indicate that when teaching translation using Google Translate, students managed to make a significant breakthrough in quality and take into account the context during translation. It should be particularly noted that the share of errors made by the Google Translate machine translation system falls on the first and second types, that is, these are errors that affect the meaning of the original text.

The quality of the translation text performed by students using Google Translate is the best in all respects, there are fewer errors in the translation of all three types, and the percentage of correct transmission of the main terminology is the highest. However, the translation made by the EG students is not perfect, since it contains both errors of all three types and incorrectly translated terms.

We concluded that according to the results of the study, the hypothesis formulated by us was confirmed: the use of a machine translation system had a significant positive impact on the quality of teaching translation of professional texts, both in terms of the number of errors and in terms of transmitting the key terminology of the original text.

Mastering the skills of machine translation is a direct path to the formation of universal translation competencies of future specialists and one of the important factors on the way to improving the training of future translators.

References:

Almusharraf, A., & Bailey, D. (2023). Machine translation in language acquisition: A study on EFL students' perceptions and practices in Saudi Arabia and South Korea. Journal of Computer Assisted Learning, 39(6), 1988-2003.

Dusza, D. G. (2023). Machine Translation in the Writing Process: Pedagogy, Plagiarism, Policy, and Procedures. In Handbook of Academic Integrity (pp. 1487-1509). Cham: Springer International Publishing.

Jolley, J. R., & Maimone, L. (2022). Thirty years of machine translation in language teaching and learning: A review of the literature. L2 Journal, 14(1).

Knowles, M. S., Holton III, E. F., & Swanson, R. A. (2014). The adult learner: The definitive classic in adult education and human resource development. Routledge.

Krashen, S. (1989). We acquire vocabulary and spelling by reading: Additional **evidenc**e for the input hypothesis. The modern language journal, 73(4), 440-464.

Pastor, D. G. (2021). Introducing machine translation in the translation classroom: A survey on students' attitudes and perceptions. Tradumàtica: tecnologies de la traducció, (19), 47-65.

Paterson, K. (2023). Machine translation in higher education: Perceptions, policy, and pedagogy. TESOL Journal, 14(2), e690.

Rahimi, A., & Sahragard, R. (2006). A critical discourse analysis of euphemization and derogation in e-mails on the late Pope. The linguistics journal, 1(2), 29-87.

Shemshack, A., & Spector, J. M. (2020). A systematic literature review of personalized learning terms. Smart Learning Environments, 7(1), 1-20.

Somers, H. (2003). Machine translation in the classroom. Benjamins Translation Library, 35, 319-340.

Tavares, C., Tallone, L., Oliveira, L., & Ribeiro, S. (2023). The Challenges of Teaching and Assessing Technical Translation in an Era of Neural Machine Translation. Education Sciences, 13(6), 541.

Wang, H., Wu, H., He, Z., Huang, L., & Church, K. W. (2022). Progress in machine translation. Engineering, 18, 143-153