Article

The Impact of Generative AI on the Role of Translators and Its Implications for Translation Education

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Abstract: This paper explores the profound impact of generative artificial intelligence (AI) on the translation industry and analyzes its implications for the changing role of translators and translation education. With advancements in AI technologies such as Neural Machine Translation (NMT) and GPT models, there has been significant progress in improving the efficiency and accuracy of translations. However, the responsibilities of translators have shifted from traditional manual translation to new tasks, including post-editing, quality assurance, and data management in AI-assisted translation. The paper also discusses potential threats posed by AI, including job displacement, deskilling, biases in AI output, and issues of accountability. Based on these findings, the necessity for curriculum reform in translation education is emphasized, highlighting the importance of AI literacy, technical skills, and balance with traditional linguistic competencies. Furthermore, recommendations for future research and policy in translation education are provided to ensure that translators maintain their core values and effectively adapt to technological changes in the AI era.

Keywords: generative AI; translation industry; translator role; post-editing; translation education; ethical issues; AI bias; technical literacy

1. Introduction

1.1. Overview of Generative AI and Its Advancements

The advent of generative artificial intelligence (AI) has revolutionized numerous fields, and the realm of language translation is no exception. Unlike earlier iterations of machine translation, which relied heavily on rule-based systems or statistical models, generative AI uses advanced neural networks to produce coherent, contextually relevant translations. These systems, epitomized by tools like OpenAI's GPT models, are not merely translating words but are generating language in a way that mimics human-like understanding. By learning from vast datasets of human language, generative AI can predict and generate text with high levels of accuracy and fluency, adapting to various contexts and nuances of meaning.

Generative AI's ability to perform complex tasks such as translating idiomatic expressions, cultural references, and even understanding the tone or intention of a sentence represents a leap forward in machine translation. What used to be a mechanical, word-for-word replacement process has evolved into a more sophisticated system that approaches human-level quality. These advances, while promising, also bring profound implications for the role of professional translators.

1.2. The Evolving Role of Translators in the Digital Age

The role of translators has undergone a significant transformation over the past few decades. With the rise of machine translation technologies, human translators no longer serve solely as manual processors of language but are increasingly seen as language consultants, quality controllers, and post-editors. The integration of AI into the translation

process has shifted the focus from producing translations to refining and enhancing machine-generated content.

In the digital age, translators are expected to possess not only linguistic expertise but also technical skills, such as the ability to work with AI-driven tools. This new paradigm requires translators to collaborate with machines, ensuring that the outputs generated by AI meet the necessary standards of accuracy, style, and cultural appropriateness. As generative AI continues to evolve, the line between human and machine translation is becoming increasingly blurred, necessitating a reassessment of the traditional role of translators in professional settings.

1.3. Purpose of the Study and Research Questions

This paper seeks to explore the impact of generative AI on the role of professional translators and its broader implications for translation education. As AI technologies become more sophisticated, the demand for skilled translators who can work alongside these systems is growing. The central questions guiding this study are: How has generative AI redefined the responsibilities and skills of translators? What challenges and opportunities does AI present for the profession? And how should translation education evolve to equip future translators with the skills they need in this AI-driven landscape?

Through an examination of the current trends in AI translation, the shifting responsibilities of translators, and the potential for integrating AI into translation education, this paper aims to provide insights into the future of the translation profession in an increasingly AI-driven world [1-4].

2. Generative AI and Translation: A New Paradigm

2.1. Definition and Characteristics of Generative AI in Language Processing

Generative AI refers to artificial intelligence systems that can create new content, such as text, images, or sound, by learning patterns from large datasets. In the realm of language processing, generative AI has advanced rapidly, leveraging deep learning algorithms and neural networks to model human language more naturally and accurately than previous methods. Unlike rule-based systems or statistical machine translation (SMT), generative AI does not rely solely on pre-programmed linguistic rules or probability calculations. Instead, it processes language data through vast neural networks that simulate the structure of the human brain, enabling the AI to learn and predict language patterns.

A key feature of generative AI in language processing is its capacity for context-awareness and creativity. By analyzing large corpora of text, these systems can generate meaningful sentences, maintain coherence over long texts, and even mimic specific writing styles or tones. This ability to produce text that goes beyond simple translation and taps into broader communicative elements—such as intent, tone, and cultural nuances—sets generative AI apart from traditional approaches to machine translation. Tools like OpenAI's GPT models have shown impressive proficiency in generating text that is fluid and contextually appropriate, suggesting that AI can now contribute to language processing tasks in more sophisticated ways than ever before [5].

2.2. Key Advancements in AI Translation Tools (e.g., Neural Machine Translation, GPT Models)

The development of Neural Machine Translation (NMT) marked a significant leap in AI translation technology. NMT utilizes deep learning models that process entire sentences or paragraphs at once, rather than translating word by word or phrase by phrase. This holistic approach allows NMT systems to grasp the broader context of a text, reducing the likelihood of mistranslations, especially in cases involving idiomatic expressions or complex sentence structures. The Transformer model, introduced by Vaswani et al. in 2017, has been a cornerstone of NMT, as it improved upon previous models by allowing

for better handling of long-range dependencies in language. Major platforms like Google Translate and Microsoft Translator now rely heavily on NMT systems to deliver more accurate and contextually relevant translations.

Generative AI models such as GPT-3 and GPT-4, developed by OpenAI, represent another major breakthrough. These models not only translate text but also generate language that resembles human-like creativity. GPT models are pre-trained on vast amounts of internet data, enabling them to generate text that is coherent, context-aware, and linguistically diverse. They are capable of handling complex tasks such as summarizing texts, creating dialogue, and, most importantly, translating between languages while maintaining nuances. Unlike earlier machine translation tools, which struggled with ambiguity and context, GPT models can produce translations that account for the subtleties of language, from humor to cultural references. This capability makes them highly valuable for a wide range of language tasks, including creative writing, localization, and beyond.

2.3. Comparison of Traditional Machine Translation and Generative AI

Traditional machine translation systems, such as Rule-Based Machine Translation (RBMT) and Statistical Machine Translation (SMT), operated on fundamentally different principles than generative AI. RBMT relied on predefined sets of linguistic rules, making it inflexible and often incapable of handling linguistic variations. SMT, which emerged later, improved upon RBMT by using statistical methods to determine the most likely translations based on large bilingual corpora. While SMT offered better accuracy, especially for frequently used phrases, it still struggled with capturing context and meaning beyond sentence-level translations. Both systems often produced clunky, literal translations that required extensive human intervention to be usable.

Generative AI, in contrast, transcends these limitations by using deep neural networks to model language in a more dynamic and context-sensitive way. The key difference between traditional machine translation and generative AI lies in the latter's ability to process entire texts holistically, considering broader meaning and context. While older models were limited by their dependence on rules or statistical probabilities, generative AI systems, particularly NMT and models like GPT, generate translations that are more fluent, natural, and closer to how humans communicate. This evolution has led to fewer errors in complex text structures and a greater ability to handle idiomatic expressions, humor, and tone, making AI-assisted translations much more reliable for real-world applications [6,7].

3. The Changing Role of Translators

3.1. Historical Perspective: From Human Translators to AI-Assisted Translation

The role of human translators has evolved dramatically over the centuries. Traditionally, translation was a purely manual process, requiring deep linguistic knowledge and cultural sensitivity to accurately convert a text from one language to another. For centuries, translators played a critical role in diplomacy, religion, literature, and science, ensuring that ideas and knowledge could cross linguistic and cultural barriers. Mastering multiple languages and understanding the subtle nuances of meaning, tone, and context were essential skills that set professional translators apart. In this period, translation was seen as an intellectual and creative endeavor, requiring both linguistic expertise and a deep understanding of the source and target cultures.

With the advent of computers in the mid-20th century, machine translation became a subject of academic interest. Early translation programs, such as the Georgetown-IBM experiment in 1954, were rudimentary and focused on translating limited vocabulary in technical domains like military or scientific texts. These early systems relied on basic rule-based methods, wherein linguistic rules were programmed into the machine. Though innovative, these early translation systems produced literal, often awkward translations,

underscoring the complexity of human language and the limitations of the available technology. Human translators remained indispensable, particularly for complex or creative texts, and AI-assisted translation was seen as complementary rather than a replacement for human expertise.

The late 20th and early 21st centuries saw the rise of more sophisticated machine translation technologies, particularly Statistical Machine Translation (SMT) and later Neural Machine Translation (NMT). These developments marked a turning point in the profession. Instead of replacing human translators, machine translation tools like Google Translate became valuable aids, helping translators work faster and more efficiently. With AI now capable of producing higher-quality translations, the role of human translators began to shift from sole producers of translation to editors and quality controllers of machine-generated content. Translators today often find themselves post-editing machine translations, refining the output to ensure that it meets the desired standards of accuracy, fluency, and cultural appropriateness.

3.2. *New Tasks and Responsibilities for Translators (e.g., Post-Editing, Quality Assurance)*

As generative AI and machine translation (MT) technologies continue to improve, the tasks assigned to human translators have undergone a significant shift. One of the primary new responsibilities is **post-editing**, a process where human translators revise and refine the output generated by AI systems. Unlike traditional translation, where the human translator would work from scratch, post-editing involves taking an AI-generated draft and making necessary adjustments to ensure that the final product is accurate, fluent, and contextually appropriate. Post-editing requires a combination of linguistic expertise and technical proficiency, as translators must be adept at identifying errors introduced by the AI, such as mistranslations, cultural insensitivity, or stylistic issues.

Another important role emerging for translators is **quality assurance**. AI-generated translations, though increasingly sophisticated, still require human oversight to meet professional standards. Translators are tasked with ensuring that the translations adhere to the client's specifications, whether those are related to tone, style, or terminology. This process often involves reviewing machine outputs for consistency, checking for factual accuracy, and ensuring that the translated text aligns with the intent of the source material. As AI systems continue to evolve, the human element remains crucial in maintaining the quality of translations, particularly for complex or highly sensitive materials, such as legal, medical, or literary texts.

Additionally, human translators are now increasingly responsible for **data management and training AI systems**. Many AI translation tools rely on large databases of bilingual text to improve their algorithms. Translators are often asked to curate and clean these datasets, ensuring that the language data fed into AI systems is accurate and representative. In some cases, translators work directly with developers to train AI models, using their expertise to help fine-tune the system's ability to handle specific linguistic or cultural nuances. These new tasks reflect a broader shift in the profession, where translators are becoming more integrated into the AI development process and taking on roles that go beyond traditional translation work [8-10].

3.3. *The Shift from Translation as a Manual Task to a Collaborative Role with AI*

The rise of AI in translation has fundamentally altered the nature of the translator's job, transforming it from a purely manual task into a more collaborative process between human expertise and machine intelligence. In the past, translators were responsible for the entire translation process, from comprehending the source material to producing an accurate and fluent translation. This work required an immense amount of cognitive effort, as translators had to juggle linguistic equivalency, cultural nuances, and stylistic elements to ensure a seamless translation. With the introduction of AI tools, however, much of the

labor-intensive part of translation—such as sentence-by-sentence replacement—can now be done by machines, freeing up human translators to focus on higher-order tasks.

This collaboration between AI and human translators has created a new paradigm in the profession, where the translator's role is increasingly one of **supervision, creativity, and strategic decision-making**. Rather than generating translations from scratch, translators work in tandem with AI to refine and improve machine-generated content. In this capacity, translators act as editors who ensure that AI outputs meet the required linguistic and cultural standards. This shift has redefined the profession, placing greater emphasis on the translator's ability to manage and enhance AI outputs rather than merely produce translations. It has also broadened the scope of the translator's responsibilities, requiring them to develop new skills in working with AI tools, such as post-editing techniques, understanding how AI systems generate language, and identifying specific areas where machine-generated translations fall short.

The collaboration between human translators and AI tools is not just about efficiency; it also enables human translators to bring more creativity and nuanced judgment to the translation process. While AI can handle repetitive, formulaic translations, human translators are needed to manage complex texts, deal with ambiguity, and provide the contextual knowledge that machines still lack. As a result, translators are moving from a back-end role to a more strategic position, where their linguistic expertise is crucial in shaping and refining the output of AI systems. This evolution underscores the importance of human intervention in maintaining the quality and cultural relevance of translations, even in an AI-dominated world.

4. Implications for Translation Education

4.1. Need for Curriculum Reform in Translation Programs

As generative AI and machine translation tools reshape the translation industry, there is an urgent need for curriculum reform in translation education. Traditional translation programs, which often focus on manual translation techniques, no longer fully prepare students for the challenges and opportunities of an AI-driven marketplace. In the past, translation training revolved around linguistic competence, cultural fluency, and subject matter expertise. While these remain essential, they are no longer sufficient in a world where translators must navigate increasingly sophisticated AI tools. Translation education must evolve to incorporate AI literacy, the ability to work with machine-generated outputs, and a deeper understanding of the technologies underpinning modern translation tools.

To meet the demands of the future workforce, translation programs must integrate courses that teach students how to collaborate effectively with AI tools, such as neural machine translation (NMT) systems and generative models like GPT. This includes developing new curricula that emphasize **post-editing machine-generated translations**, managing AI workflows, and ensuring the ethical use of AI in translation. Additionally, translation educators should focus on helping students develop critical thinking skills, enabling them to evaluate and refine machine outputs to ensure accuracy and cultural appropriateness. Ultimately, reforming translation education is about preparing students not only to use AI tools but also to think critically about their limitations and potential pitfalls.

4.2. Key Skills Translators Need in the AI Era (e.g., AI Literacy, Post-Editing, Data Management)

The rise of AI in translation has introduced new skill sets that are essential for future translators. **AI literacy** is perhaps the most crucial of these skills, as translators will increasingly need to understand how AI systems generate translations, the limitations of these systems, and how to interact with them effectively. This includes knowing how to interpret machine-generated translations, identify common errors, and understand the

processes that AI models use to analyze and produce language. Translators who are proficient in AI technologies will be better equipped to work as post-editors, ensuring that the outputs meet professional standards.

Post-editing has emerged as a key responsibility in AI-assisted translation workflows. Translators must learn how to efficiently review, edit, and refine AI-generated texts to ensure accuracy, fluency, and cultural relevance. This requires both linguistic expertise and a solid understanding of how AI systems function, as well as the ability to spot where the machine output falls short in terms of meaning or nuance. Another critical skill is **data management**, as many AI systems rely on large datasets to improve their translation accuracy. Translators may be involved in curating and cleaning data for machine translation models, a task that requires attention to detail, technical proficiency, and a strong grasp of language-specific and cultural considerations. The ability to manage, prepare, and analyze linguistic data will be an invaluable skill for translators navigating the AI era.

4.3. Incorporating AI Tools and Technology in Translation Training

For translation programs to remain relevant, they must actively incorporate AI tools and technologies into the training process. Hands-on experience with cutting-edge translation software, such as neural machine translation systems, post-editing tools, and AI-driven CAT (Computer-Assisted Translation) tools, will be critical in preparing students for real-world challenges. Training programs should include modules on how to use popular AI translation platforms like Google Translate, DeepL, and other industry-specific tools, while also encouraging students to critically assess the strengths and limitations of these technologies.

Moreover, translation students should be exposed to the **technical aspects** of AI systems, including an understanding of the underlying algorithms that power machine translation. By providing students with both practical and theoretical knowledge of AI, translation programs can produce graduates who are not only adept at using AI tools but who also have the skills to help develop or refine these systems. This integration of AI into the curriculum ensures that translators will be able to adapt to an industry that is increasingly reliant on technology, while also contributing to the ongoing improvement of AI translation models through their expertise in language and cultural nuance [11].

4.4. The Balance Between Traditional Linguistic Skills and Technical Proficiency

While AI literacy and technical proficiency are increasingly important, traditional linguistic skills remain at the heart of what makes a translator effective. **Cultural fluency, language mastery,** and **the ability to interpret context and nuance** are areas where AI still lags behind human translators, and these competencies will remain essential even in an AI-dominated industry. The key challenge for translation education is finding the right balance between maintaining a strong foundation in linguistic theory and cultural knowledge, while also equipping students with the technical skills to work alongside AI systems.

Translation programs must ensure that students do not lose sight of the human elements of translation, such as creativity, problem-solving, and the ability to adapt translations to specific contexts or audiences. Translators are uniquely positioned to understand the subtleties of tone, humor, idiomatic expressions, and other language features that AI often struggles with. As such, translation education should emphasize the importance of these skills, while also recognizing the need for technical proficiency in working with AI systems. The future of translation lies in the collaboration between human creativity and machine efficiency, and educational programs must reflect this hybrid approach.

5. Challenges and Ethical Considerations

5.1. Potential Threats of AI to the Profession (e.g., Job Displacement, Deskilling)

As generative AI continues to develop, its increasing capabilities have raised concerns about its potential impact on the translation profession. One of the most significant threats posed by AI is **job displacement**. With AI systems now able to generate high-quality translations at a fraction of the time and cost, some companies and organizations may opt to rely on AI for their translation needs rather than hiring human translators. This could lead to a reduction in demand for professional translators, particularly for more routine or straightforward translation tasks. For freelancers and translators working in areas with low pay or limited specialization, this shift could mean fewer job opportunities and increased competition with AI-generated solutions.

Another concern is the potential for **deskilling** within the profession. As AI tools take over the more mechanical aspects of translation, such as converting individual sentences or handling large volumes of text, translators may find themselves doing less hands-on translation work and more post-editing or quality control. While these tasks still require a high degree of linguistic expertise, they often involve less creative or intellectual engagement compared to traditional translation. Over time, there is a risk that translators may become overly reliant on AI tools, losing their ability to perform complex or nuanced translations independently. This shift could diminish the richness of human expertise in the field, reducing the translator's role to that of an editor rather than a creator of meaning [12].

5.2. Ethical Issues: Quality Control, Bias in AI Translations, and Accountability

The use of AI in translation also introduces significant ethical concerns, particularly around the issues of **quality control** and **bias**. Although generative AI systems like neural machine translation models are capable of producing impressive results, they are not infallible. AI-generated translations can still suffer from errors, inaccuracies, or inappropriate phrasing, particularly when dealing with idiomatic expressions, culturally sensitive materials, or domain-specific language. In some cases, these errors may go unnoticed, resulting in flawed or misleading translations. The over-reliance on AI without proper oversight can lead to serious consequences, especially in legal, medical, or political translations, where accuracy is critical.

Bias is another major issue that has gained attention in AI translations. AI systems learn from large datasets of human language, and these datasets often reflect the biases present in society, such as gender, racial, or cultural biases. As a result, AI-generated translations may perpetuate stereotypes or skew meanings based on the data they have been trained on. For example, certain words or phrases may be translated in a way that reinforces gender norms or cultural prejudices, which can be particularly problematic in sensitive contexts. Ensuring that AI-generated translations are free from such biases is a complex challenge that requires human intervention and a deeper understanding of the ethical implications of AI use.

The question of **accountability** also arises when errors occur in AI-generated translations. If an AI system produces a flawed or biased translation, who is responsible for the outcome? The human translator tasked with post-editing? The developer who designed the AI system? Or the organization that deployed the tool? These questions are difficult to answer, as AI systems operate in a collaborative framework where both human and machine contribute to the final output. Establishing clear guidelines and accountability structures will be essential in ensuring that AI is used responsibly and ethically in the translation process [13].

5.3. Strategies to Ensure Ethical Use of AI in Translation

To mitigate the potential threats and ethical challenges associated with AI in translation, several strategies can be implemented to promote its **responsible and ethical use**.

First, the industry needs to establish **standards and guidelines** for the use of AI tools, particularly in high-stakes or sensitive contexts. These guidelines should outline best practices for integrating AI into the translation workflow, including clear protocols for quality control and post-editing. By ensuring that human translators play a key role in overseeing AI-generated outputs, the risk of errors and biases can be minimized, while maintaining a high standard of accuracy and cultural sensitivity.

Training and education are also crucial in ensuring that translators are equipped to navigate the ethical challenges posed by AI. Translation programs should incorporate training on the ethical implications of AI, teaching students how to identify and address bias in machine translations, and how to maintain accountability in an AI-assisted translation process. Additionally, professional development opportunities should be made available to current translators to help them stay up to date with evolving AI technologies and the ethical considerations that come with them.

Finally, fostering **transparency** in AI systems is essential. Developers of AI translation tools should prioritize the creation of models that are interpretable and transparent, allowing users to understand how decisions are made by the system. This would enable translators and organizations to make more informed decisions about when and how to use AI tools, and to intervene when necessary. By encouraging collaboration between developers, translators, and other stakeholders, the industry can work toward creating AI systems that are both powerful and ethical, ensuring that AI enhances rather than undermines the quality and integrity of the translation profession.

6. Conclusion and Future Directions

6.1. Summary of Findings

The rise of generative AI has brought both profound changes and new opportunities to the field of translation. While AI technologies, such as Neural Machine Translation (NMT) and models like GPT, have dramatically improved the speed and accuracy of translations, they have also redefined the role of human translators. Instead of being displaced, translators are taking on new responsibilities, particularly in post-editing, quality assurance, and managing the complexities of AI-generated outputs. The collaboration between AI and human translators has created a hybrid model where technology handles repetitive tasks, and human expertise ensures linguistic, cultural, and contextual accuracy. This shift has also highlighted the need for reforms in translation education, where new skills—such as AI literacy, data management, and the ability to work with AI systems—are becoming increasingly important.

However, the integration of AI in translation has raised several challenges. Ethical issues, such as maintaining quality control, mitigating bias in AI outputs, and ensuring accountability, have become central concerns. Translators must now not only produce translations but also act as custodians of ethical AI use, balancing the efficiency provided by machines with the critical judgment and creativity that only humans can bring. These findings suggest that AI will continue to shape the translation profession, but its role should be framed as complementary to, rather than a replacement for, human translators.

6.2. Long-Term Impact of AI on Translation as a Profession

In the long term, AI will likely have a transformative impact on the translation profession, reshaping both the market and the skill set required for translators. As AI technology continues to evolve, routine and repetitive translation tasks will become increasingly automated, potentially leading to a contraction in demand for entry-level or standardized translation work. However, this also opens up new opportunities for specialization. High-level tasks that require deep cultural understanding, creative adaptation, or nuanced decision-making will still demand human expertise, positioning translators in roles that require more strategic thinking and higher-level decision-making.

The profession may also see a rise in hybrid roles, where translators act as both language experts and AI managers. This shift will require translators to master technical skills and acquire a deep understanding of how AI systems function, enabling them to control and optimize machine outputs. As a result, translation will likely become more interdisciplinary, with professionals needing expertise not only in language but also in technology, ethics, and data analysis. In the future, human translators may become indispensable not for their ability to directly translate text, but for their capacity to supervise, refine, and ethically manage AI-driven translation processes.

6.3. Recommendations for Future Research and Policy in Translation Education

To ensure that translators are well-equipped for the future, significant reforms in **translation education** are essential. Academic programs should prioritize the integration of AI literacy and technical skills into the curriculum, teaching students not only traditional linguistic competencies but also how to work with and manage AI translation tools. Courses in post-editing, data management, and bias detection should become standard components of translator training, allowing future professionals to effectively oversee AI systems and intervene where necessary to uphold quality and ethical standards.

Future research should focus on developing best practices for **post-editing and AI collaboration**, exploring how human translators can best complement AI systems to optimize efficiency without sacrificing quality. There is also a need for further investigation into the **ethical implications of AI in translation**, particularly in areas such as bias mitigation and accountability. Policymakers and professional organizations must work together to create guidelines and standards that ensure AI is used responsibly in the industry, safeguarding both the quality of translations and the integrity of the profession.

Finally, **longitudinal studies** on the long-term effects of AI integration in translation should be conducted to better understand how the profession evolves and to ensure that translators can adapt to new roles without being marginalized. By addressing these challenges and opportunities through research and education, the translation profession can thrive in the AI era, evolving in ways that preserve its core values of linguistic precision and cultural sensitivity while embracing technological advancements.

References

1. Sang Joon Lee & Kyungbin Kwon.(2024).A systematic review of AI education in K-12 classrooms from 2018 to 2023: Topics, strategies, and learning outcomes. *Computers and Education: Artificial Intelligence*. doi:10.1016/J.CAEAI.2024.100211.
2. Yong-Jik Lee, Robert O. Davis & Jeeheon Ryu.(2024).Korean in-Service Teachers' Perceptions of Implementing Artificial Intelligence (AI) Education for Teaching in Schools and Their AI Teacher Training Programs. *International Journal of Information and Education Technology*(2). doi:10.18178/IJIET.2024.14.2.2042.
3. Chunfang Zhou & Wei Zhang.(2024).Computational Thinking (CT) towards Creative Action: Developing a Project-Based Instructional Taxonomy (PBIT) in AI Education. *Education Sciences*(2). doi:10.3390/EDUCSCI14020134.
4. Eunsun Choi,Jinsu Kim & Namje Park.(2023).A Case Study of SW · AI Education for Multicultural Students in Jeju, Korea: Changes in Perception of SW · AI. *Applied Sciences*(17). doi:10.3390/APP13179844.
5. Fan Yang, Kangxi Li & Ruilin Li.(2024).AI in Language Education: Enhancing Learners' Speaking Awareness through AI-Supported Training. *International Journal of Information and Education Technology*(6). doi:10.18178/IJIET.2024.14.6.2108.
6. Jia Yanfang & Sun Sanjun.(2023).Man or machine? Comparing the difficulty of human translation versus neural machine translation post-editing. *Perspectives*(5). doi:10.1080/0907676X.2022.2129028.
7. Lina Wei & Chantana Viriyavejakul.(2022).AI Education drives the development and change of education management. *Communication & Education Review*(6). doi:10.37420/J.CER.2022.049.
8. WANG Wei & ZHOU Weihong.(2023).Assessment of the Translation and Post-editing of Machine Translation (MT) with Special Reference to Chinese-English Translation. *Cross-Cultural Communication*(4). doi:10.3968/13178.
9. Yang Yanxia,Liu Runze,Qian Xingmin & Ni Jiayue.(2023).Performance and perception: machine translation post-editing in Chinese-English news translation by novice translators. *Humanities and Social Sciences Communications*(1). doi:10.1057/S41599-023-02285-7.
10. Sánchez Ramos María del Mar.(2022).Public service interpreting and translation training: a path towards digital adaptation to machine translation and post-editing. *The Interpreter and Translator Trainer*(3). doi:10.1080/1750399X.2022.2092829.

11. Latorraca Rossella.(2024).Exploring genre-based EN◇IT specialised translation training and its effects on self-efficacy. *The Interpreter and Translator Trainer*(1). doi:10.1080/1750399X.2024.2307157.

12. Lina Wei & Chantana Viriyavejakul.(2022).AI Education drives the development and change of education management. *Communication & Education Review*(6). doi:10.37420/J.CER.2022.049.

13. Jang Yeonju,Choi Seongyune & Kim Hyeoncheol.(2022).Author Correction: Development and validation of an instrument to measure undergraduate students' attitudes toward the ethics of artificial intelligence (AT-EAI) and analysis of its difference by gender and experience of AI education. *Education and Information Technologies*(9). doi:10.1007/S10639-022-11164-8.