Analysis of the Impact of Machine Translation Technologies on MTI (Master of Translation and Interpreting) Cultivation from the Perspective of Technological Progress

Zhijie Wu[1]

[1] *Wuhan Textile University, Wuhan, Hubei, China*

ABSTRACT

In the last few decades, the introduction of technology into the translation industry has revolutionized the traditional translation ways, which in turn has a reflective effect on the training mode of MTI (Master of Translation and Interpreting). With the aid of machine translation or AI-backed translation technologies, the speed and quality of translation has been much improved. For these reasons, the AI-backed translation technologies can't be ignored or omitted from the MTI training system. In this paper, the evolution of translation technologies will be illustrated and analyzed, and then research of translation technology teaching will be explored, thereafter, what and how to integrate translation technology into MTI cultivation system will be discussed.

Keywords: *Machine translation, Computer-assisted translation, Machine translation post-editing, Interactive machine translation, MTI training mode.*

1. INTRODUCTION: EVOLUTION OF MACHINE TRANSLATION AND ITS IMPACT ON TRANSLATION TALENTS TRAINING

Translation technology can be traced back to 7th January 1954, when the Georgetown-IBM experiment(the collaboration of IBM and Georgetown University), the best-known demonstration of machine translation technology in Russian-English translation practice, sparked a great deal of public interest in machine translation. Although this debut of machine translation was restricted to only 250 Russian words and six programmed grammar rules, it provided possibilities and prospects to later research and application of machine translation technologies. 1970s witnessed the development of speech recognition technologies that paved the way for voice-to-text technologies. Then electronic dictionaries emerged in the next decade, which was a very important example of the applications and

research tasks in Natural Language Processing(NLP), the very beginning trial of artificial intelligence in giving machine or computers the ability to understand text and spoken words in much the same way human beings can. Also during this time, corpus linguistics developed at an ever accelerating rate, giving rise to the emergence of Statistical Machine Translation(SMT) developed by IBM researchers, which was trained with parallel linguistic data. SMT was regarded as a machine translation approach that used large volumes of bilingual data to find the most suitable or probable translation for a given language input. This phase of development gave rise to terms like terminology database, translation memories and other similar developments in later computer-assisted translation research and applications. The 1990s was the prime time for the development and application of computer-assisted translation or computer-aided human translation (CAT tools in short), which has much improved the quality and efficiency of translation work, yet contextual errors were seemed to be an impassable obstacle for most

CAT tools, that is, a machine can't be programmed to fully understand the context of how a certain word or phrases is being used so that human manual correction or editing are necessary to ensure the contextual appropriateness and accuracy. In early 2000s, cloud-based Translation Management System(TMS), a system designed to manage the localization and translation of language assets, appeared in the market. Under TMS, much of the translation is done automatically with the use of machine learning of AI, then revised or edited by native speakers for context manually. Ever since its debut, google translate has been progressing with the technological advances like neural machine translation, rewriting-based paradigms, on-device processing and etc, which has made great leaps in translation accuracy and efficiency. Whatever the stage, machine translation technologies have undergone changes from rule-based to example-based, and then to word-based, phrase-based, syntax-based model till the emergence of Neural Machine Translation(NMT), the use of neural network models to learn a statistical model for machine translation.

The leaps and bounds in artificial intelligence and machine translation technologies have provided both challenges and opportunities for MTI interdisciplinary talents cultivation (Xin Xiong, Yixuan Wang, 2019), which requires both teaching staff and students to update their professional knowledge and skills, to complete their academic system with interdisciplinary knowledge, for this part, this paper will discuss it in details later.

2. MAJOR MACHINE TRANSLATION TECHNOLOGIES AND THEIR PROS AND CONS

With the advancement in Internet technology, artificial intelligence, translation modes have undergone great changes: computer-assisted technology, machine translation, machine translation post-editing and interactive machine-translation technology, and the following part will be the detailed elaboration of them.

2.1 Computer-assisted Technology(CAT)

Before any form of machine translation technology emerged, manual translation dominated, where any translation work is done by human translators. Manual translation has been through years and is still used today for some specific tasks. However, with the expansion of international communication in every field, translation volume has grown at an unexpected rate, for this, manual translation or human translator can't catch up with the changes. For another, the popularization of internet has an extra credit for the beginning of CAT tools, which include Trados, memo Q, Dejavu, Wodfast and etc. These tools encouraged the research and development on tools like "quality assurance", "translation memory", "terminology management". CAT tools has loads of competitive advantages over manual translation on efficiency, scale, cost, consistency in terminology, accuracy and etc. However, less flexibility in contextual choices, time and energy-consuming in personnel training and many others reasons combined promoted further research and development of machine translation.

2.2 Machine Translation(MT)

Machine translation is the translation process performed by a computer, without any help from a human. As the name indicates, the benefits of this translation mode are quite obvious: faster, more efficient, cost-effective. Owing to its huge supremacy in handling speed and language storage, machine translation is a good choice when strong personality in translation is not required (like technical documentation). On the other hand, the downsides are apparent as well: 1) the guaranteed efficiency and fluency doesn't equal to effectiveness and accuracy; 2) the same wording within one text can be dealt with properly with different translation, but machine can't actually fulfill the translation of creative texts, where human efforts will have to be intervened, and this may to some extent cost extra labor and energy; 3) the quality of translated texts can't be guaranteed, i.e., poor translation can be embarrassing or even disastrous for some serious and rigid source text. In this case, a combination of machine translation and human post-editing method is to be explored and employed in translation practice.

2.3 Machine Translation Post-editing(MEPE)

Machine translation post-editing is a combination of machine translation's speed and efficiency with human translator's accuracy and quality, which is different from pure human revision. The process usually goes like this: machine translation uses software to translate the source language into target language, then human translators review and edit the translated text to

ensure the contextual accuracy, the consistency in voice, tone, and choice of language. MTPE usually takes two forms: full post-editing and light post-editing. The former gives full and thorough review and revision of machine translated text on tones, voice, style, consistency and etc., while the latter usually scans the document for any obvious or glaring errors (spelling mistakes, incorrect words, inappropriate repetition, ungrammatical sentences and etc.) "For a large number of translation projects of large quantities, post -translation editing is an ideal choice "(Wang Junsong, 2023)" and "it has become a new format of translation" (Li Mei, 2021: 93). Like any translation model, machine translation post-editing is not an exception when disadvantages are talked about. Since the quality of machine translation cannot be guaranteed, editing and modifying the mixed-quality of machine translation will spend more time and energy. In addition, due to the sole dependence on machine translation, whatever and however edited by human translator, the translated text can't avoid the "tone and voice of machine (O'Brien, 2014). "As translation technology has continued to advance with new outputs like neural and adaptive machine translation, the relative effectiveness of MTPE has decreased" (Drew Evans, 2020). Based on a CAS research finding, around 71% of linguists prefer an adaptive machine translation solution, one that learn from and train as a result of instantaneous feedback given by the translator.

2.4 Interactive Machine-translation Technology (IMT)

Adaptive machine translation needs human translators' instantaneous feedback and post-editing to ensure the quality and accuracy of translated texts. With the integration and development of big data and artificial intelligence technology, especially the advancement of deep learning technology, new progress has been made in machine translation technology using online adaptation technology, that is, human-machine interactive translation system capable of trading off translation quality and efficiency. The concept of interactive machine translation was first proposed by Church & Hovy (1993). The core concept is the unity of the accuracy of manual translation and efficiency of machine translation through the interaction between translators and machine translation engines. At present, the interactive machine translation system is still on its infant stage, which needs further research and wider applications. Now, the available IMT mainly

include CASMACAT(Cognitive Analysis and Statistical Methods for Advanced Computer Aided Translation, co-developed and supported by European community), LILT(developed by a US company), and LanguageX (a translation platform developed by Besteasy Language Technology, a company of China). The main advantage of interactive machine translation is interactivity, and its core is online adaptive technology. During the translation process, the system will automatically predict the content of the upcoming translation according to the translated part of the translator, and dynamically generates the follow-up translation for reference. Translators can accept the translation provided by the system, or they can edit or employ new translations in accordance with their own thinking and choices. The system will use each input as a feedback to "learn" and make adjustments and updates in real time, and the interaction process will continue till the translation task is completed. This can not only improve the quality of the translation, but also avoid the sense of frustration due to repeated correction of the same errors during the post -editing process. Problems for IMT are not yet completely known or proved, more time and applications are needed in the future. However, unknown areas of problems doesn't mean unknown challenges of IMT, for example, the input quality of resource language, the handling with mistranslations and many more challenges to come and overcome.

3. RESEARCH ON TRANSLATION TECHNOLOGY TEACHING IN CHINA

Wang Junsong (2023) explained the transformation, reasons and indications of the translation mode with reference to technological advancement, and put forward suggestions such as establishing a human-machine harmonious ecosystem and people-centered technological innovation. Wang Huashu (2023) retraced the papers with the key word of "computer-assisted translation" during 1980-2021, and found that domestic research on CAT is insufficient, especially the insufficiency in industry-academia integration. Since 2021, the translation researchers like Ren Wen(2021, 2023), Li Juanjuan(2021), Yang Feng(2021), Lan Hongjun(2021), Zhao Renan(2023) put forward the concept of national translation technology capacity, but none of them was able to decide on the exact definition of this concept. Wang Huashu (2023) generalized the concept of national translation technology capacity

with four key aspects: capacity in planning, standardization, research and development, application and popularization, and he based his generalization on advances in telecommunication technology and quantitative evaluation research. On this, he put forward suggestions for accelerating the cultivation and support of the translation technology industry and the necessity of putting the upgrading of the industrialization structure in a prominent position. Wang Huashu (2022) pointed out that at present, the principle of teaching design in domestic translation technology are still short of sufficient knowledge systems, clear curriculum positioning, and appropriate curriculum design. By sorting out the 1990-2020 research papers on translation technology teaching, important books and textbooks, Tao Youlan (2023) divided translation technology teaching into three stages: initial stage (1990-2006), expansion stage (2007-2015), and recent stage (2016-) , among which, the recent stage includes the curriculum system construction, textbook writing, and translation talent training, but the current status of translation technology teaching is still not satisfactory, such as lagging behind in curriculum construction, insufficient teaching resources, old and traditional teaching methods. There are also many other problems such as backward teaching environment, incomplete teaching evaluation methods, and weak teaching research and so on.

4. SUGGESTIONS ON MTI TRAINING MODE

From above, it's clear that the need of integrating translation technology teaching into MTI talent cultivation system is both necessary and urgent. As to answer the "how to" question, a three-in-one model is suggested here: 1) to be in line with national demand on language talents; 2) to follow and keep pace with the technological advancement but not to negate or avoid it; 3) to strengthen school enterprise cooperation.

4.1 To Be in Line with National Demand on Language Talents

Based on the data by CAS Research (a comprehensive primary research focused exclusively on the global content and language services markets), the market for outsourced language services and supporting technology grew 6.62% to US$49.60 billion from 2018 to 2019, and it predicts that the language services industry will continue to grow and that the market will increase

to US$56.18 billion by 2021. For the "increase", the need of translation technologies is growing at annual rate of 7.99%, which requires the acceleration of translation technology research and development. On the national level, in 2017, the State Council promulgated the "New Generation of Artificial Intelligence Development Plan". For the first time, artificial intelligence development was raised to the national strategic level, which was projected into language service with the technological development of translation memory, terminology management, neural machine translation. Wang Huashu (2022) proposed that the design of translation technology curriculum should draw the "New Liberal Arts Construction Declaration"(2020) and "Guidance for Ideological, Political Courses Construction for Higher Education"(2020_, then ensuing systematic design of teaching content, teaching goals, teaching resources, environment, teaching evaluation and other elements should be carried out.

4.2 To Follow and Keep Pace with the Technological Advancement But Not to Negate or Avoid It

With the development of globalization and science and technology, especially the development of artificial intelligence, in order to adapt to the development trend of world language ecology, the world's increasing connection, the translation industry has gradually switched to the language service industry. This trend put higher demand on MTI cultivation. The language service industry is no longer limited to the category of traditional translation, but is "the product of the professionalization process. It is an emerging industry that includes localization services, language technology tool development, language teaching training, and language -related consulting business, which has become an important part of the global industrial chain "(Zhao Junfeng, 2017). He Enpei (2019) proposed that China's language service industry "has become an infrastructure for China's foreign exchanges, the basic guarantee of economic growth". The integration of translation technology has become an indispensable part of the translation talent training system in the new era. The rapid development of digital and cloud technology has improved the efficiency and quality of translation, and reduced the cost and human time and energy to a great extent. Therefore, confronted with the growing needs of language-oriented services, the cultivation of translation talents, especially the cultivation of MTI postgraduate

students, needs to keep up with the needs of the times, industry needs, and market demand. Against the AI era, translation capabilities and proficiency are not the sole requirements on translation talents, capacity for natural language processing, CAT tools with the computer cloud technology, machine translation, machine translation post-editing, batch information searching and integration, multimedia document processing and many other upcoming technologies are all on the list. In this way, the upgrading of teaching staff's knowledge structures under technical empowerment, the upgrading of talent training plans, and reconstruction of curriculum system are all urgent problems to be dealt with now and in the near future.

4.3 To Strengthen School Enterprise Cooperation

The switch of translation industry towards the language service industry, simultaneously requires that the training system of translation talents must be changed and adjusted to the needs of the language service industry accordingly. In the language service industry, machine translation is more common. According to data statistics, more than 50% of the language service providers are currently satisfied with the quality of machine translation, more than 70% predict with confidence that machine translation will replace human translators in the future, more than half of the universities already integrated translation technology in their talent cultivation system. Wang Huashu (2022) pointed out that translation technology courses have four basic characteristics: technical, practical, professional, and interconnection. Among them, the "professional" feature should be in accordance with the development trend of the industry, and the talent training programs must be combined with the development needs of the professional industry. In the case of lack of teaching staff or qualified teaching staff, it is still necessary to expand and strengthen school-enterprise cooperation, deepen enterprise and industry integration and to open up courses centered around "artificial intelligence", "terms management", "translation data digging", "translation ethics" and etc. with language service industry to match their demand and advancement. On higher education management level, colleges and universities should take the initiative to strengthen the interoperability of the industry and school, to increase the budget investment and policy support for school-enterprise cooperation, to encourage teaching staff to work in the company for a short or long period of time, and to encourage students to actively participate in the diversified internship activities of language service enterprises.

5. CONCLUSION

With the development of artificial intelligence, the increasing expansion of international communications, translation has been playing an indispensable role, and the role will be more prominent in the future. However, many colleges and universities are lagging behind with the trend and requirements: one the one hand, qualified teaching staff is not adequate; on the other hand, institutional support like investment, policy is not strong enough. These challenges may not be ignored and avoided, but to be confronted and handled. This paper has listed the major advancements in translation technologies and analyzed their impact on translation talents especially MTI talents training program. For higher education, the integration of translation technology into the existing MTI training programs is a must, and the integration is not static, but to be improved and adjusted in pace with the development of technological advances.

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