



Translator Education in the AI Era: Challenges and Opportunities

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Abstract: Graduates of translation programs are increasingly encountering the structural changes in the language service industry brought about by machine translations. In response to this phenomenon, translator education programs need incorporate translation technology into the curriculum and shift the goal of translator training towards cultivating interdisciplinary-talents capable in both translation and language technology. We advocate for differentiated incorporation of translation technology. Universities could formulate differential cultivation programs in accordance with the varied background of students, in order to develop MTI graduates who either excel chiefly in translation and secondarily in technology or do well primarily in technology and secondarily in translation. Furthermore, course modules concerning technologies can be selectively added to the syllabus based on the learning objectives and faculty strength.

Keywords: machine translation, translator education, challenges, opportunities

Artificial intelligence (AI) has increasingly become part of our day-to-day life. Walmart robots have taken the place of humans in some posts which do not involve direct human interactions with the customers, and McKinsey predicted that machines would replace 30% of all bank employees in two to three years. Thanks to the combination with AI, machine translation (MT) has similarly switched to an all-new fast track. In a 2018

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statement, Microsoft said its own MT system had overtaken professional human translation (HT) for the first time in terms of the quality of Chinese-to-English general news translations. Since the invention of AI-based neural machine translations (NMT), there has been much talk about HT being replaced by MT. Is the major of translation already facing a crisis of survival? What steps should be implemented to enhance the existing university talent programs? Does the advent of the MT era mean both challenges and huge opportunities for translator education? All these are concerns university educators must solve with urgency.

MT Status Quo in the AI Era

MT, in its “triple-jump” quality evolution from rule-based machine translation (RBMT), to statistical machine translation (SMT) and then to present-day AI-based NMT, has infused obvious vitality into academia and the translation service industry. What’s more, MT is beginning to find its way into our daily lives, compelling academia and the industry to review the latest developments and challenges in this domain.

Linguist-developed translation rule bases play a key role in RBMT, i.e. the RBMT model converts the source language to the target language employing rule bases. It has the advantage of producing a high-quality rendering of any rule base-compliant source texts. The disadvantage is that no quality can be guaranteed in the case of noncompliance with the established rules. The insurmountable bottleneck of RBMT lies in the countless linguistic rules that must be followed. The invention of the SMT model came as a significant MT improvement in that it employs the machine, in lieu of the complex rule bases, to learn the complex linguistic knowledge, a process which involves learning corpus-stored linguistic knowledge and converting the source language content into the target language. As the machine learns more linguistic knowledge, its translations become higher in quality. However, due to the quality and quantity limitations of the needed knowledge, SMT may fail to acquire adequate linguistic knowledge (Feng, 2013), therefore resulting in target language accuracy limitations. NMT is an MT model unlike its past-day MT counterpart in that it uses neural networks to actualize conversion of the source language to the target language by means of direct mapping which renders the target language with better fluency than RBMT and SMT. Nevertheless, NMT involves a nontransparent process and may fail to be fully interpreted with linguistic knowledge (Li, 2018). This is one of the challenges facing NMT to this date, i.e. it is impossible to go into the genesis of NMT-related errors of machine translation works. The emergence of NMT does not mean the end of SMT in that its statistical methods for corpus-stored linguistic models are irreplaceable compared with NMT. “How to apply SMT’s maximum advantages to make up for NMT’s disadvantages” (Li, 2018) will become an effective remedy for improving NMT quality.

Be it SMT or NMT, corpus resource preparation is a must. This resource attribute controls MT quality based on corpus data quantity and quality (Chen, 2018). In the case of unavailability of more bilingual corpus resources, it is acceptable, as a substitute, to develop both MT (Karakanta & Henabith, 2018) for resource-scarce languages and MT based on a monolingual corpus of two languages (Li,

2018). Irrespective of the cases, data resources play a positive role from beginning to end, especially in corpus data quality. This is the very reason why it becomes impossible to accurately predict when MT products will overtake professional human translators in quality. A 2011 empirical study indicated that Google translation was not perfect enough (Garcia, 2011). Tencent's AI-aided simultaneous interpretation also made frequent and obvious mistakes at the 2018 Boao Forum for Asia. We conducted a contrastive study of differences between English and Chinese by comparing the translation works of sophomores of the MTI (Master in Translation and Interpreting) major of the Shanghai Jiao Tong University with the renderings of three MT technologies, i.e. Google translation, Baidu translation and an MT solution of a renowned international company. MT renderings were found to have a poorer quality than MTI renderings in three respects, i.e. the overall quality, the fluency, and the rendering of complicated sentence patterns.

Despite its world-stunning achievements, present-day MT technology has many drawbacks. Undeniably it is being applied to many fields to reduce and even replace HT. Based on the different requirements for the final translations, MT can be applied to different degrees. Referential texts, intended to acquire basic information, allowing for some missing renderings and serving only as a reference to the readers, may be based primarily on MT, and on adequate post-translation supplements by professional human translators related to the text-relevant fields. Conventional texts, generally referring to operation manuals which require faithfulness, precise terminology and integrity of meaning, allowing for isolated sentences with slightly poor readability and may combine MT with translation memories (TM), can be supplemented by a proper post-translation process. As for publication-level texts used for publication or official releases, the target language must be faithful, fluent and even graceful and currently its translation needs to be done by translators of high competence (Cui & Lei, 2016).

The replacement of HT by MT is not just rumor, but it is not predicable when and to what extent the replacement will come true. Therefore, bachelors and masters in translation and interpreting, are not the only stakeholders in this field. We must take account of how to train professional translation majors in this era of fast MT development. How on earth will MT "replace" HT? How should we prepare for the rapid development of the gate-crasher MT? And what adjustments should we introduce to the curriculum of the translation major in response?

Challenges to the Existing Translator Training Model

The Translator Training Program Must Keep Up with the Development of the Translation Service Industry

Since the Ministry of Education approved the BTI (Bachelor in Translation and Interpreting) as a college major, the discipline of translation has developed by leaps and bounds. In 2008 the first 15 colleges began MTI enrollment. So far, 249 universities have had MTI education, with the annual enrollment climbing from 350 in 2008 to more than 10000 a year. In the past, bidirectional translation

concerned mostly Chinese and English. Today, bidirectional translations are between Chinese and French, Russian, Japanese, Arabic, Spanish and German, among others. The introduction and fast development of BTI and MTI symbolizes that translation as an academic discipline has been extensively recognized, yet academia still has many erroneous views on how to train professional translators. The duality of translation as a discipline and a profession determines the training of professional translators to be different from that of conventional foreign language learners in that professional translators, in addition to societal requirements for the profession, must place emphasis on extensive language abilities and cultural qualities. However, the existing translator training model “still fails to discard outdated perspectives and practices which fetter foreign language learners” (Chai, 2017). The academic education model is generally inherited, with few links between professional translator education and the commercial translation industry (Murray, 2012). This has resulted in a mismatch between the education programs and professional capability development. The market demands for professional translation personnel is not being met.

Economic globalization comes with increasingly high requirements for professional translators, and promotes the professional translator education, which focuses the specific translator jobs and analyses the specific professional qualities needed by translators. It is the requirements of these jobs that curriculum design should be based on (Murray, 2012). Although universities are not expected to degrade into training establishments for the language service industry, developers of professional translator training programs must understand and keep up with the latest dynamics of the language service industry in both training solutions and curriculum designs.

Since the 1980s, European and North American language service providers have been applying MT systems, like RBMT, SMT or hybrid machine translation (HMT), in increasing quantities. In the TAUS Machine Translation Market Report, the Translation Automation User Society (TAUS) put stress on a “global explosion of communications” expected to be brought about by the combination of big data, machine learning (ML) and personal equipment in the decade to come. With the explosive growth of worldwide communications, the demand for translation services will grow explosively and the wide application of MT is the inevitable trend. In recent years, increasing numbers of language service providers (LSP) have adopted the “MT plus post-editing” model (Kelly & Stewart, 2012). A 2012 survey revealed that 40% of the LSPs had provided MT plus post-editing. In a 2013 investigation of translators and LSPs, 61% of the freelance translators and 43% of the LSPs claimed MT was used for at least some of their translations (DePalma. D. A., 2013). Apart from this, international organizations have also begun to employ MT on a large scale to process translation tasks that have lower quality requirements. Take the Council of Europe for instance, where everyday translation is completed with MT-aided HT because HT alone falls far behind the gigantic daily demand of the Council of Europe (Mellinger, C. D., 2017).

In the face of the gigantic future demand, both the freelance translators and the LSPs will require MT to stay competitive. Therefore, we have explored the challenges that the translator education programs will face in the MT era.

Translator Education Programs and the Current Challenges

In recent years, higher education institutions with MTI and BTI programs have extended their reach from foreign language colleges and high-level comprehensive universities to other types of universities and colleges, including local universities and colleges. Considering the disparity among these schools in regard of resource endowments, operational performance, staff quality and source of enrollees, we feel the translators should be divided into four types, i.e. high-end translators and interpreters, high-end translators & researchers, multi-talented translators, and applied commercial translators.

Table 1. Types, knowledge structures and career outlooks of translators

Translator types	High-end interpreters and translators	High-end translators and researchers	Multi-talented professional translators	Applied commercial translators
School type	Foreign language universities and national comprehensive universities	Foreign language universities and national comprehensive universities	National comprehensive universities and professional colleges	Local applied colleges
Occupation and posts	Interpreters and translators employed as diplomats and international public servants	Translators, copy editors, reviewer, and researchers in such fields as literature, philosophy, humanities and academic works, as well as translation editors, senior editors & proofreaders and university academics	Interpreters and translators expert in special fields, like business, law and transportation	Clerks in foreign entities, tour guides and declarants who do assistant text translation jobs
Knowledge structure and qualities	Good native language proficiency, mastery of one to two foreign languages, good cross-cultural communication capability, cultural traits and tool-using capabilities. Acquainted with knowledge re international trade, economy and law	Good native language proficiency, mastery of one to two foreign languages, deep understanding, good cultural traits, and good research & tool-using capabilities	Mastery of one to two foreign languages and acquainted with knowledge of a certain field; good cross-cultural communications capability, tool-using capabilities, and program management capabilities	Mastery of one foreign language, cross-cultural communications capability, good cultural traits and tool-using capabilities
Market demand	Less	Less	More	Shrinking
Replaceable by MT	Irreplaceable	Irreplaceable	Partially replaceable	Replaceable to a great extent

Diplomacy-oriented high-end interpreters and translators must be capable of flexible cross-cultural communication to contribute to diplomats' handling of diverse power struggles and international relations within a volatile international community. This requires translators to develop well-structured knowledge systems and high professional capacities which are irreplaceable by MT. The translation, proofreading, editing and research of literature and humanistic academic works involve high creativity for which interpreters and translators must be well trained in the fields of humanities and develop a deep understanding of Chinese & Western cultures. Given the current situation, machines do not possess human feelings or flexible communications capabilities. That is why human translation is irreplaceable by machine translation in these fields.

System #17 Rename translation system | Remove translation system

TRAIN SYSTEM | EVALUATE RESULTS | REQUEST DEPLOYMENT | TEST SYSTEM | TRANSLATE DOCUMENTS

EVALUATE RESULTS - Compare machine translations of test dataset with original translations.

BLEU Score: 31.38 (+7.16)
[Download Translations](#) | [Assign Reviewers](#) Request deployment »

Page 1 of 34

English	Chinese (Simplified)
The States parties to this Agreement and the African Development Bank have agreed to establish hereby the African Development Fund which shall be governed by the following provisions:	Ref: 本协议参与国和非洲发展银行同意特此建立非洲发展基金，该基金受制于下列条文： MT: 本协议和非洲发展银行的缔约国同意，特此建立非洲发展基金组织，应按下列规定：
1. The following terms wherever used in this Agreement shall have the following meanings, unless the context shall otherwise specify or require:	Ref: 1. 凡在本协定中任何地方使用过的下列用语，在上下文中若无其他专门说明或要求，则具有下列含义： MT: 一、下列条款在本协定应具有下列含义，除非文中另有规定应指定，或要求：
CHAPTER I. DEFINITIONS	Ref: 第一章 定义 MT: 第一章 定义
"Fund" shall mean the African Development Fund established by this Agreement.	Ref: "基金"是指协议建立的非洲发展基金。 MT: "基金组织"是指根据本协议建立的非洲发展基金组织。
"Bank" shall mean the African Development Bank.	Ref: "银行"是指非洲发展银行。 MT: "银行"应指非洲发展银行。

Figure 1. Assessment of the MT-based Microsoft Translator Hub (Ref is the reference rendering and MT is the rendering of machine translation)

High-end translation irreplaceable by MT is limited in demand, proven by the fact that market demand is filled primarily by multi-talented professional translators. As shown by a 2015 investigation, the greatest demand for translation services came mainly from industry, computing and IT, management, banking, business, economy and finance (Gaspari & Doherty, 2015), where multi-talented professional translators are required to have high proficiency in a foreign language and familiarity with knowledge specific to a certain field. Translating documents of a specific field requires the translator to grasp a large number of terms, special expressions and sentence patterns and machines can be trained to gain these abilities through high quality corpus. That explains why modern technology has partially enabled MT engines in lieu of HT. Along with our students, we trained an engine scoring 31.38 BLEU (Bilingual Evaluation Understudy) points with Microsoft Translator Hub (a statistics-based MT engine) using an international law corpus. As indicated in Figure 1, even with some errors in expression and logic, the engine can replace HT in some tedious work to quite a considerable extent.

This does not mean that multi-talented professional translators will be wholly replaced by MT. Indeed, MT cannot wholly replace HT due to linguistic complexities and the necessity for flexible cross-cultural communications. After MT replaces the most tedious parts of textual renderings, HT can involve itself with pre-editing and post-editing to complete the work with more ease and efficiency. With the aid of the working mechanism of MT, HT can further increase translation accuracy by adjusting the corpus, upgrading the terminology base and identifying typical MT errors to involve HT in the entire MT process to realize an HT-MT combination. Therefore, what MT replaces is not human work in its entirety, but the

tedious and monotonous part of human work, which involves little expertise and creativity. Beyond doubt, higher requirements will be made of the multi-talented professional translators. For instance, they must be skilled in MT technology, terminology management and pre/post-editing, among others.

Society formerly showed a tremendous demand for application-oriented translation talents but this demand will be steadily reduced as the popularity of machine translation for general texts increases in the future. Translation practitioners of this sort would chiefly be assigned with general texts, which feature low technical requirements, high repetition and low delivery standards (e.g. basic readability). In these cases, free online translation platforms will be able to take most of these tasks, making low-end translation services easily replaceable. Universities originally aiming at cultivating students of this type should prudently consider the future development trends and seek new development routes to prevent students from remaining unemployed after graduation.

Connotation and Development Mode for Translation Talents in the Machine Translation Context in the Future

Technological Literacy Will Be the New Connotation of Translation Professionals in the Future

The rapid development of machine translation will bring structural changes to the translation industry and propose new requirements to translation practitioners in the future. Apart from the traditional requirements of the four core abilities, i.e. the bilingual capability, translation ability, relevant knowledge, and humanistic qualities, technological literacy will mark an ace in the hole for future translators. While more and more scholars at home and abroad have kept an eye on the technological literacy of the translator in recent years, the EU MTI Program and the Translators Association of China have clearly listed technological literacy an essential ability for translators. Looking ahead, translators will need to aptly use emerging technologies to serve their translation tasks, and more actively grasp and study technologies to improve their working efficiency. More than cultivating full-time translators/interpreters, the translation/interpretation major ought to target the preparation of “translation + language engineers” that excel at humanistic and technological literacy.

Existing Translation Majors Needs Improvement in Technological Literacy Preparation for Students

What elements does a translator’s technological literacy consist of? Ye Na et al. (2012) believe that it comprises knowledge of machine translation, term management techniques and programming capacity. Wang Huashu et al. (2016) hold that it must cover basic computer operation techniques, information retrieving capacity, CAT application ability, term ability and post-editing capacity, which involve CAT technology, localization engineering technology, corpus technology, translation collaboration platform technology and machine translation technology. Apart from these elements, we maintain that it is

necessary to add translation evaluation capacity.

Now that technological literacy covers a large scope, several courses and teaching modules are required. Nevertheless, domestic universities generally have attached inadequate importance to the education needed for translation. An investigation involving 43 universities in 13 provinces and municipalities, including Beijing, Tianjin, Shanghai, Chongqing, Liaoning, Jilin, Anhui, Hebei, Hubei, Zhejiang, Guangdong, Jiangsu and Sichuan, revealed that there is no course focusing on translation techniques available in 25% of “985” and “211”^① universities (Wang & Wen, 2016). The situation is even less promising in second-tier universities and “Computer Assisted Translation” (CAT) turns out to be the only related course available in most universities. Another national investigation for 249 MTI course presenters conducted in 2018 indicates that 44.2% of universities had no translation technique courses at all and it was a common phenomenon that translation technique equipment was not completely in place, translation technique teachers were in urgent demand, and the syllabus for translation techniques demanded improvement (Wang, Li & Li, 2018).

Cultivation Plans and Syllabus Improvements Shall Be Based on the Enhancement of Technological Literacy

The group led by Wang Huashu argues that regarding the composition of translator’s technological literacy, courses may be established as: computer assisted translation, translation and corpus, machine translation and post-editing, localization and internationalization, film & TV translation (subtitling), technological communication and writing, and computer program design. Course modules involved include: basics about CAT, application of CAT tools, corpus alignment and treatment, term management, translation quality assurance (QA) technology, basics about Microsoft’s Office software, translation management technology, desktop publishing, localization and internationalization, project and content management systems, technical writing, basics regarding computer programing, and basics about webpage coding (Wang, Li, & Li, 2018) . Since this covers a wide range of subjects, universities could formulate specific curricula according to their existing course settings and faculty conditions. Contents, such as basics of Microsoft’s Office software, desktop publishing and computer program designs could be taught in public classes without the need of establishing specific classes. Others like the CAT, corpus alignment and treatment, term management, MT engine practice, pre-translation (writing with controlled language) and post-editing, and translation quality assessment (QA) could be added optionally, level by level, into the existing curriculum in accordance with the program objectives and faculty conditions.

Although most universities in the Chinese mainland have established CAT courses, they fail to cover all core modules, leaving a relatively large gap between overseas counterparts or those in China’s Hong Kong, Macao and Taiwan. Setting good examples in this regard, the Middlebury Institute of International Studies at Monterey (MIIS), Dublin City University, and The Chinese University of Hong Kong have

^① “211” and “985” are China’s projects to build a number of world-class universities and a group of internationally renowned high-level research universities.

formed complete systems and effective modes to teach CAT, term management, pre-/post-editing, MT engine practice, and setting of localization course and module. Next, we will discuss the setting of translation technology courses and content modules with a few universities as examples.

The MIIS opens two CAT courses for postgraduates in translation/interpretation majors, the “Basics about CAT” and “Advanced Course for CAT”. “Basics about CAT” is given to allow students to understand and use CAT tools, and learn about the basic principles of machine translation, as well as pre-/post-editing. It covers such courses as overview of translation memory (TM) and translation environment tools (TEnTs), corpus alignment and treatment, use of Trados, term extracting, construction and management of termbase, translation specifications and style guides, automatic quality assessment, overview of machine translation, overview of post-editing, and writing with controlled language. “Advanced Course for CAT” is intended to train students to skillfully use CAT software, understand its management and technological principles, learn about the principles to train machine translation engines, and develop a translation engine for a specific field. It incorporates courses including advanced functions of Trados, working principles of machine translations (rules, logistics and nerves), quality assessment of machine translation (counting of BLEU scores), corpus required for machine translation, various QA tools, and practice for machine engine training. The institute gives all students learning translation/interpretation access to optional courses related to translation technologies, such as website localization, multilingual desktop publishing, film & TV localization, management of localization projects, and software and game localization.

MIIS translation and localization programs for postgraduates have three distinctive focuses, i.e. translation, localization and management. The translation-oriented program has the highest requirements for bilingual capacity encompassing not only practical translation courses but also technology-oriented ones such as “term management”, “website localization”, “localization project management” and “software and game localization”. Then, the localization-focused program proposes reasonable requirements for the proficiency of a second language with practical translation courses excluded from the syllabus and technological ones added, such as “Python Programming Language”, in addition to the same modules as the translation-oriented students. The management-specific program also entails medium-level proficiency of a second language which inscribes on its syllabus the finance, economics and management related courses apart from ordinary localization courses. It is worth noting that MIIS positions the Translation and Localization Management Program as an STEM type of program for postgraduates to distinguish it from traditional translation/interpretation programs. It makes it clear as translation technologies play increasingly important roles in real practice the cultivation of translation talents will highlight both the humanistic and engineering aptitude of the translator and transform the program from preparing full-time translators to preparing “translation + language engineers”.

The linguistic application and the cross-cultural research school of Dublin City University (DCU) set up two master programs for translation, the Master of Translation and Interpretation (MA) and the Master of Translation Technology (MSc). Among the five core courses of the MA program, two are technology-related – Translation Technology and Computerized Terminology (Doherty & Kenny, 2014).

Translation Technology is intended to instruct students on translation memory technology, learn how to use SDL Trados, shape an understanding of machine translation and post-editing, and learn about quality assessments of translated texts.^① Computerized Terminology was established to allow students to form a conceptual system for a specific field, define professional terminologies, identify synonyms, antonyms, hyponyms and hypernyms in a single language and default translations of words between two languages, and extract useful concepts and linguistic knowledge from specific corpus. Apart from the two technology-related courses, the MA program also offers three optional courses oriented to technology, Localization, Audiovisual Translation and Digitalization Methods for Language and Discourse. The localization program involves the skills and technology tools used in website localization, Audiovisual Translation encompasses subtitling technologies, and Digitalization Methods for Language and Discourse chiefly focuses on the construction and use of corpus.

The Master of Translation Technology (MSc) program of DCU offers a syllabus more inclined to science and engineering. In addition to the technology-related courses mentioned in the previous paragraph, it also includes a course concerning software development. DCU's two translation programs (MA and MSc) reflect the requirements for both literary and scientific capacities. This gives Chinese MTI trainers new ideas in MTI development, i.e., to formulate different development plans based on the students' background and aptitude through a varying proportion of translation and technology related modules and to graduate students "primarily specialized in language and secondarily in technology" or "primarily proficient at technology and secondarily in translation". The School of Software & Microelectronics, Peking University, started to admit Master of CAT students as early as 2017, aiming to cultivate modern translation talents who can skillfully use two languages and master the principles of CAT and linguistic information processing technologies and tools.

The Chinese University of Hong Kong offers translation technology related courses in its programs for both undergraduates and graduates, including "Basics about CAT", "Machine Translation", and "Translation of Film & TV Subtitles" as well as "Bilingual Editing Techniques" and "Terminology Management" exclusively for MTI students. It is noteworthy that the "Bilingual Editing Techniques" cover such modules as translation editing skills, pre-translation editing, data customization for pre-translation editing, interactive editing, post-editing (including words, sentences, semantics, pragmatics and culture), and integrated computer-based editing. Now that the linguistic service sector is offering post-editing courses, most universities could not follow the pace due to a lack of qualified teachers. Thus, it will be an effective method to involve post-editing in CAT or localization courses. As pioneers in this regard, Kent State University in the US has ushered in the "occupational editing for translators" module and Zhejiang University has launched the module "translation technology features". When conditions are met, post-editing courses will be provided separately (Feng & Liu, 2018).

Trials in cultivation methods and syllabus preparation of these universities at home and abroad

^① For specific syllabus, please refer to Doherty & Kenny (2014).

have offered new ideas for domestic counterparts: First, as translation technologies are playing more important roles in the translation process, the objective of training programs for translation talents that previously focused on the training of full-time linguistic practitioners will transition to “translation + language engineers” in the future. Second, to meet the future demand for translators with a humanities and technological background, MTI program providers could admit undergraduates with both foreign language and technology backgrounds. Through a flexible blend of translation and technology oriented courses, different curricula could be designed for students from varying backgrounds making them professional “chiefly in translation and secondarily in technology” or “mainly in technology and secondarily in translation”. Third, seen from technology courses offered in said universities, application of CAT tools, terminology management, pre-/post-editing, machine translation principles and engine training are core modules, which ought to be inscribed on technology-oriented syllabi of MTI programs. Other options, such as QA, construction and application of corpus, websites, software and game localization, subtitle technology and Python programming could be included selectively according to program objectives and faculty strength of related universities.

Conclusion

Machine translation has become part of the life and work of ordinary people. Though there are still issues to be addressed, the development trend has become increasingly evident. This has posed menacing challenges to the training of translation personnel. Universities formerly aiming to train students for translation of general texts, a job requiring a low technological background and featuring high repetitiveness, will have to seek other options.

Nonetheless, the linguistic complexities, flexibility in cross-cultural awareness in communications, and human emotions have made it difficult for MT to completely replace HT. When a machine takes over the entry-level work, humans could spend more time and energy on processes that require higher technological eligibility and greater initiative. Thus, what lies ahead may be a “human-machine collaboration” era. Instead of simply focusing on training translators, MTI programs in the future will expect to train “translation + language engineers” who excel in both translation and technology. Moreover, in accordance with the different academic backgrounds of the students, universities could develop targeted program plans to foster MA in translation who excel “chiefly in translation and secondarily in technology” or “predominantly in technology and secondarily in translation”.

Looking back at the development history of human societies, all innovative technologies worried the cultures soon after their inventions as the people then faced drastic, often unpredictable changes. However, history proves that humanity eventually adapted to and made full use of these inventions to benefit our social practices. Likewise, machine translation is bringing both tough challenges and massive opportunities. Making good use of it, the translation society will create a new epoch of translation.

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