Exploring AI-Enhanced Learning Model for Developing Students' Translation Technology Competency

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Abstract: AI-driven innovations in translation technology are transforming the landscape of translation education. This study examines how AI enhances translation teaching, with a particular focus on improving students' competency in building bilingual corpus construction. This research aims to guide students in collecting bilingual terminological data and building specialized corpora. The proposed approach seeks to ensure the accuracy, consistency, and contextual appropriateness of term and concept translation, offering practical insights for advancing translation teaching in the age of AI.

Keywords: Translation teaching; Artificial intelligence; Corpus; Terminology

1. Introduction

The fast-growing technologies, such as artificial intelligence (AI), big data etc., marked a shift in humanities education. And, a new direction of liberal arts education emerges, aiming to cultivate students who can adapt to rapidly changing of modern technologies, such as the machine translation, natural language processing, cloud computing, speech recognition, and large language models. In recent years, machine translation has achieved rapid development due to the emergence of generative AI. However, at this stage, machine translation still has significant defects in translating terms and concepts, and mistranslations frequently occur. As a key carrier of knowledge inheritance, the importance of terminology translation is self-evident when it crosses the boundaries of different languages and realizes interdisciplinary communication.

By leveraging AI-driven technologies, including intelligent term extraction and dynamic alignment, deep learning-based contextual modeling and real-time validation, cognitive visualization tools with adaptive training systems, as well as human-AI collaborative feedback mechanisms. The AI-empowered approach facilitates the continuous refinement and standardization of terminology knowledge bases. In light of this, this paper will

try to design an AI-empowered course to teach students to use AI tools to improve the quality and accuracy of translating terms and concepts.

2. Literature review

The integration of AI into translation teaching is an inevitable evolution. With the advent of generative artificial intelligence, AI transcends being merely an auxiliary tool and constitutes an indispensable component in reshaping translation teaching. And, such a trend urges an overview of the previous studies on AI technology in teaching translation.

2.1. Data sources

The data sources for literature review were collected from the China National Knowledge Infrastructure (CNKI) database, and the Web of Science (WOS) database, respectively. The keywords "artificial intelligence" and "translation teaching" were used to search for journals in CNKI database. The last data update was on June 3, 2025. A preliminary total of 156 relevant articles were found. After deleting unrelated literature, the final confirmed total number of selected articles is 129. The keywords "artificial intelligence" and "translation teaching" were also used to collect research articles for SCI, SSCI, and A&HCI source journals from WOS database. And the last data update was on June 3, 2025. A total of 89 relevant English articles were initially obtained. After removing unrelated articles such as conference papers, book reviews, interviews, and reviews, the final number of confirmed analytical documents was 77.

2.2. Data sources

The earliest article on teaching translation technology appeared in 2017 in China, titled "Research on the Innovative Professional Interpreting Training System against the Backdrop of Artificial Intelligence" [1], which explored the interpreting training based on AI language-service tools. Research on this topic can be traced back to around 2017, when only three related publications were recorded. These early studies primarily examined the initial impact of artificial intelligence (AI) technologies on professional interpreting education, the development of national language service infrastructure, and corpus construction, reflecting the academic community's nascent interest in the transformative potential of technology. From 2018 to 2019, the number of publications saw a modest increase, totaling 17. During this period, research themes mainly focused on the influence of AI in translation teaching. Between 2020 and 2022, the field entered a phase of steady development, with the publication count rising to 47. Studies delved into the impact of AI on specific areas of translation teaching, such as financial translation, political discourse translation. The year 2023 marked a pivotal turning point, with the number of publications surging to 26. The advent of large language models (LLMs), such as ChatGPT, became a major driving force behind this surge. Research rapidly pivoted toward the deep integration of LLMs into translation teaching. By 2024, the field saw a growth, with 36 publications. Prominent areas of focus included the application models and effectiveness of LLMs in translation teaching.

Among them, the earliest English literature focusing on translation technology teaching appeared in 2012, titled "Text corpora in translator training: a case study of the use of comparable corpora in classroom teaching" [2]. This paper discussed that comparable text corpora and concordance are should be used for teaching translation to train students into professionals in rendering specialized domain texts, such as economics, technology, and law. Analyzing from a temporal perspective, the English literature on teaching of translation technology shows a slight lag compared to Chinese literature; however, the increasing trend in the number of domestic and foreign

literature is nearly consistent. From 2012 to 2020, the average annual number of foreign literature focusing on this topic was about 5 articles. A turning point occurred in 2021, when the number of foreign literature significantly surged to 21 articles, further increasing toĺ 35 articles in 2022. Although there was a slight decline in 2023, it remained at 21 articles, stabilizing at 28 articles by 2024. This indicates that in recent years, the field of translation technology teaching has received increasing attention in the international academic community, with its research activity and influence rapidly expanding. In summary, it is worth noting that the reviewed articles all urge teachers to empower students with the required competencies and skills of translation tools and technologies.

3. Research objective

In recent years, with significant advancements in generative AI technology in the field of machine translation, the quality of machine translation has greatly improved. According to the "2023 China Language Service Industry Development Report," translation and language service companies generally agree that translation technology has significantly improved translation efficiency. 90% of translation and language service companies believe that adopting the 'machine translation + post-editing' model has increased efficiency and reduced translation costs, and they are willing to invest more funds in the future to enhance their machine translation-related technical capabilities [3]. To this end, the "human-machine collaboration + post-editing" model has emerged and gradually become the mainstream translation model to meet the current demands of the language service market. Given this development trend, translation courses also need to keep pace with the times, focusing on adapting students to the workflow of "machine translation + post-editing."

The translation of terminology involves the transfer of ideas, where different languages, traditions, and ideas interact and collide directly, and where the transformation of meaning and the generation of new meanings also occur. Even though translators have already mastered their working languages proficiently, they may not also possess certain knowledge in a specific domain, nor does it guarantee that they are acquainted with the terms and concepts of every domain within their working languages. Traditionally, translators refer to dictionaries or professional references when they come across unfamiliar terminology, which is time-consuming. Nowadays, thanks to the advancement of machine translation technology, the efficiency of translation has been greatly improved.

4. Theoretical basis

The paradigm shift in the language service industry calls for the integration of AI-empowered technologies into curricula; however, students with humanities backgrounds often encounter some barriers when engaging with AI tools. To address this challenge, this paper draws upon Piaget's cognitive development theory and Bruner's discovery learning theory as the theoretical framework for exploring AI-empowered strategies for fostering a student-centered learning model.

Piaget's theory provides a cognitive guide in the curriculum design for developing students' cognition in learning AI-empowered translation techniques. Piaget's cognitive development theory emphasizes that knowledge cannot be simply transferred through teaching, but rather through learners' collaboration, especially within their specific learning contexts, such as experiences, psychological states, and so on [4]. Jean Piaget outlined two principles that form the foundation of the learning process [5]. First, learning is an active process, requiring learners to engage in interactions with their environment, develop their own understanding, and play

an active role in acquiring knowledge rather than passive absorption. Secondly, Piaget underscored "learning in real scenarios" as the cornerstone of the most effective learning habits. He posited that knowledge is best acquired and retained when learning is associated with a positive situation.

Meanwhile, Bruner's theory of learning advocates the construction of knowledge systems through structured exploratory activities [6]. Bruner's theory can be applied to the curriculum design process in the post-translation revision process. For instance, in adopting to machine translation post-editing workflow, students may initially focus on formatting norms, then consider semantic modifications, and finally address cultural adaptation issues. For example, when improving machine-translated texts, students might begin by identifying errors in translated texts, propose potential solutions by refining attention-based neural network translation models, and then evaluate these modifications with established systems such as BLEU scores.

Building on Piaget's cognitive development theory and Bruner's discovery learning theory, this paper aims to create a learning situation in which students can deal with real translation projects with academic texts containing professional terms and concepts. Within these problem-centered learning situations, students' competencies in terminology management can be developed through situation-driven processes. The integration of technology may further drive cognitive development in three ways, namely, first, source texts are used for terminology identification; second, machine-generated translations serve as materials for comparative evaluation; and third, conversational agents function as adaptive instructional supports. Additionally, students are encouraged to use AI-driven tools as collaborative learning partners or virtual teaching assistants, assisting them in responding to challenges of rendering terminologies.

5. Discussion

Given the importance of ensuring the quality and consistency of translators' terminological work for all stakeholders in the translation process, CAT tools typically provide another database alongside the translation memory: the termbase (from terminological + database) [7]. Despite the development of large language models (such as the GPT series, BERT, etc.), machine translation has achieved a certain level of accuracy in terminology translation in fields like law, medicine, and mechanical engineering [8], but the shortcomings are more pronounced when rendering texts of the humanities and social sciences. The terms and concepts in the humanities and social sciences stand out with diversity and specialization, making them difficult to render in the target text, because they often have deep disciplinary roots and contain rich cultural connotations, which not only require translators to accurately interpret the terms themselves but also to deeply explore the social and cultural information behind the terms. Additionally, there are also aspects such as limited coverage and untimely updates.

5.1. Framework for an online course for building a bilingual terminology corpus in the artificial intelligence era

The core of building a bilingual terminology corpus lies in training students who possess both linguistic and computer literacy. The students should not only be proficient in relevant technologies but also enhance their terminology management capabilities comprehensively with the assistance of artificial intelligence tools [9]. This includes a deep understanding of the basic concepts of terminology management, mastery of the terminology management process, and proficient use of common terminology management tools. An online self-learning course was designed and delivered to 31 third-year translation major students from a university in central China, involving terminology theory, corpus linguistics, as well as technical tools (e.g., AntConc, Sketch Engine), AI-

empowered terminology management systems within CAT tools (e.g., Trados, MemoQ), and scripting (e.g., Python) for terminology data processing and automation.

The course, conducted on the "Xuexitong" platform, spanned three months, with its key chapters illustrated in **Figure 1**. Following the completion of the online course, small-scale, project-based offline activities were organized. During these sessions, students worked collaboratively in groups to explore and construct bilingual terminology.
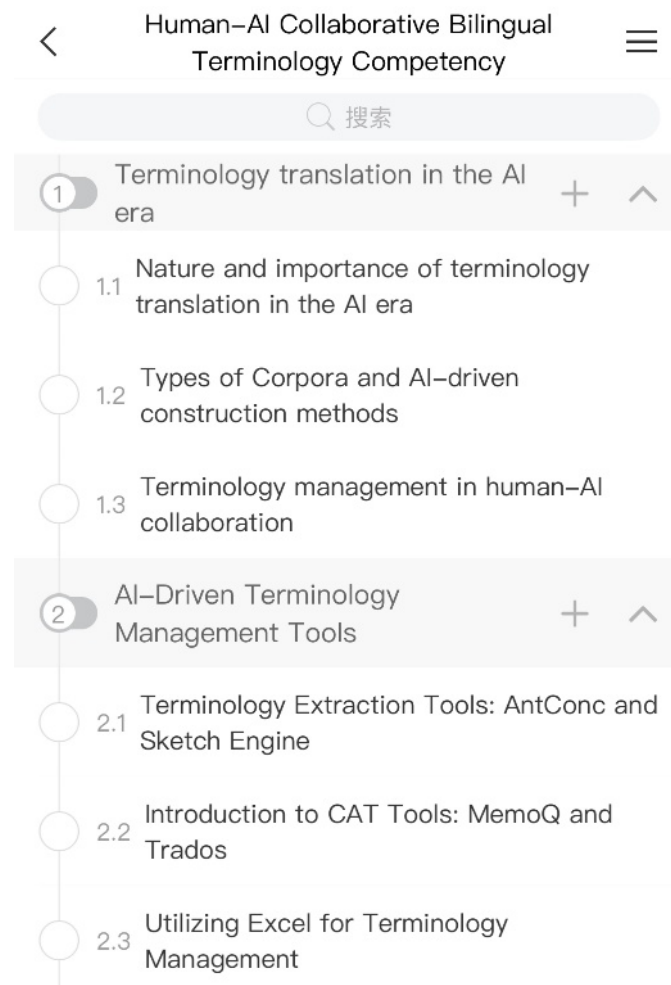

Figure 1. Training program for building bilingual terminology.

5.2. Survey of students' responses to the online self-learning course on artificial intelligence tools

Upon completion of the course, a questionnaire adopting a Likert Scale was conducted to evaluate student feedback. **Table 1** below presents the questionnaire content and the corresponding results.

Question 1 evaluates the effectiveness of the course in teaching AI tools. Terminology and corpus knowledge, such as LLM-based term extraction, corpus alignment, helps enhance the understanding of bilingual terminology processing. Furthermore, the feedback can reveal the extent to which theoretical instruction aligns with practical demands.

Question 2 aims to quantify the extent to which AI tool training enhances productivity and to evaluate the relative learning value of each tool. For instance, low recognition of Python may highlight adaptation challenges for students with non-technical backgrounds, suggesting the need for adjustments. Such feedback can help

improve future tool-focused training.

Question 3 evaluates the AI tools in students' practice. Feedback might indicate the effectiveness of AI tools in improving terminology accuracy and reducing post-editing effort. for greater involvement of industry experts in the project.

Table 1. Students' response to the training program for building bilingual terminology

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. To what extent has the knowledge about AI tools helped you understand of bilingual terminology processing?	5	16	7	2	1
2. How effectively have the AI tools (e.g., AntConc, Sketch Engine, Python, MemoQ, and Trados) enhanced your efficiency in handling terminology tasks?	7	15	6	3	0
3. In what ways have the projects strengthened your ability to improve terminology translation efficiency?	9	18	3	1	0
4. Has the knowledge gained from these modules improved your ability to seamlessly integrate into human-machine collaborative translation workflows?	6	17	5	2	1
5. Do you feel that this program has significantly developed your skills in using AI tools and competencies to become a well-rounded terminology engineering professional?	8	19	4	0	0

Question 4 investigates whether the course fosters a collaborative workflow that integrates AI tools as means to achieve effective terminology management. The results may provide a foundation for incorporating additional training on collaborative platforms.

Question 5 serves as an evaluation. Feedback collected through a Likert scale can identify specific weaknesses in skills to become future professionals with AI competency. Such insights are valuable for refining the program's training framework.

Around 58% (18 participants) said stated that they were better prepared to participate in human-AI collaborative translation workflows. Approximately 10% (3 participants) reported that the use of AI tools substantially improved the efficiency of terminology processing workflows. A total of 32% (10 participants) held a neutral view and thought that an offline course might be more useful for them to learn how to operate those AI tools. Finally, nearly 87% (27 participants) expressed their intentions to further explore advanced AI tools related to translation technology in the future.

6. Conclusion and future work

As technology continues to evolve at an unprecedented pace, mastering skills such as operating natural language processing tools and neural machine translation systems has become an essential competency for translators. This paper proposes an online course centered on human-AI collaborative bilingual terminology competency. Through the analysis of a new AI-assisted human workflow, this research demonstrates that AI tools can significantly enhance students' efficiency in preparation and accuracy when dealing with the translation task of terminology. These improvements better prepare students to meet the demands of the contemporary language services market. However, teachers should guide students in using AI-empowered technologies responsibly,

preventing over-reliance and safeguarding independent thought. For effective prompting, teachers need: 1. content knowledge; 2. critical thinking; and 3. iterative design [10].

Firstly, teachers should guide students in applying comprehensive content and knowledge to craft effective GenAI prompts. This involves ensuring that inputs sum up key parameters, such as learner profiles, instructional objectives, methodological approaches, and contextual constraints, to elicit contextually relevant outputs and facilitate the evaluation of AI-generated content. Secondly, fostering critical thinking is essential for students to assess GenAI outputs. This includes identifying inaccuracies, biases, or hallucinations, and refining prompts based on these analyses. Lastly, teachers should promote iterative engagement with AI tools, integrating design thinking principles through processes of planning, testing, and refinement. Future research and practice will consider the issues about how to integrate GenAI tools into translation courses.

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