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On the Cultivation of Critical Thinking Ability of Zhuang Medicine English Translation Talents in the Era of Generative AI

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In the era of generative AI (artificial intelligence), the translation field is undergoing unprecedented changes. Generative AI technology improves the quality and efficiency of translation and opens a new chapter in human-machine interactive translation. Due to the limitations of generative AI, the complexity of translation, and the uniqueness of Zhuang medicine English translation, it is crucial to improve the critical thinking ability of Zhuang medicine English translation talents in the era of generative AI. This study reforms the teaching content, teaching design, teaching evaluation of the course Computer-Assisted Translation Technology and constructs a teaching model to improve the critical thinking ability of Zhuang medicine English translation talents.

Keywords: generative AI, Zhuang medicine English translation talents, critical thinking ability

Introduction

Generative artificial intelligence (GAI) is a technology that can effectively understand human instructions and generate corresponding content by inputting "prompts". The rapid development of GAI technology has brought revolutionary changes to the way translation is learned. On the one hand, the widespread application of GAI provides convenience for learners of Zhuang medicine translation in accessing information and effectively improves translation efficiency. On the other hand, the limitations of GAI, the complexity of translation, and the uniqueness of Zhuang medicine English translation require learners to possess higher-order thinking skills to analyze, argue, judge, and choose translations generated by GAI.

Critical thinking is "the ability to make purposeful, reasoned judgments about things or views based on criteria" (Wen, 2012, p. 6). Critical thinking is a central goal of learning and a core requirement of higher education, occupying a very important position in education and teaching (Moon, 2008). Due to various factors in teaching content, teaching design, and assessment methods that are not conducive to the cultivation of thinking skills, foreign language students generally suffer from a "critical thinking deficit" (Gao & Xu, 2015). In the era of generative AI, how to construct a teaching model that is conducive to cultivating critical thinking among Zhuang medicine translation talents is an urgent issue that needs to be addressed in the current training of such

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talents.

Characteristics of Translation in the GAI Era

Both Translation Quality and Efficiency Can Be Achieved

Traditional translation methods often required a trade-off between quality and speed; GAI enables both to be achieved. In the translation field, GAI technology has been widely applied to generate fluent target-language texts, performing particularly well in handling common sentences and expressions. Taking ChatGPT as an example, compared with traditional translation software, it performs excellently in overall translation quality and performance, especially for translations between high-resource language pairs (Peng et al., 2023).

Human-Machine Situational Interactive Translation Becomes the Norm

GAI technology has changed the linear, single-mode human-computer interaction of traditional AI, demonstrating situational generation capabilities. Translators can guide the model to produce more accurate translations that better fit specific scenarios by providing context, reference translations, terminology intervention, and other situational interactions. Conversely, GAI can self-learn and train based on translator feedback, continuously improving translation quality. Human-machine collaboration not only improves translation efficiency but also makes the translation process more intelligent and humanized, and will gradually become the norm in the translation industry.

Customized and Personalized Translation Become Possible

GAI's situational generation capability and human-machine interaction characteristics make customized and personalized translation possible. Translators can provide specific scenarios or preference settings according to particular needs, training GAI to generate translations that fit specific scenarios and user requirements. For example, GAI can adjust translation style and tone according to user instructions, such as formal or informal, literary or colloquial, making translation results more personalized. Whether in business negotiations or daily communication, GAI can provide appropriate translation suggestions based on users' preferences and contexts, making communication smoother and more natural. In the future, with the widespread application of GAI technology, personalized translation will become the new normal in language communication, greatly improving people's communication efficiency and quality.

The characteristics of translation in the generative AI era reflect technological progress and changes in market demand, which will drive the translation industry toward efficiency, intelligence, and personalization. Translators need to continuously learn and adapt to these changes, improving their skills and qualities to meet the demands of the times. Translation education also needs to reform teaching models, cultivating students' ability to apply GAI technology while also examining its limitations and potential risks.

The Necessity of Cultivating Critical Thinking Ability in Zhuang Medicine English Translation Talents in the Era of GAI

Requirements Due to the Limitations of GAI

GAI has powerful natural language generation and communication capabilities, but it also has limitations. Open AI explicitly states that GPT-4 has at least three limitations: "social bias," "cognitive illusions," and "malicious prompts" (Du, 2023). Studies have found that GPT has limitations in the medical practice field, such as authenticity issues and fact-checking problems (Lee, Bubeck, & Petro, 2023); in the literary field, it has

shortcomings such as lack of originality and experiential impoverishment (Yan, 2023); in the translation field, it may exhibit gender bias, translating neutral words into gender-specific terms (Eleni, 2023), and making errors such as "inability to recognize term morphology, inability to determine term semantics, inability to use standardized translated names, and inability to use conventional translated names" (Gu & Leng, 2024, p. 24). Translation learners need to face up to the limitations of GAI, using critical thinking and professional knowledge as two wings to continuously improve their translation level, in order to stand out in the GAI era.

Requirements Due to the Complexity of Translation

The complexity of translation is manifested in the widespread "ambiguity, interference, and asymmetry" in translation (Li, 2015), requiring translators to collect and compare information, make judgments and choices. Translators with good critical thinking can overcome cultural barriers and solve translation problems through conceptualization, judgment, reasoning, and other thinking activities (Ouyang, 2009). Therefore, cultivating learners' translation thinking ability is key to translation teaching, and cultivating thoughtful translators should become a goal connotation of translation teaching (Li, 2011, p. 49).

Requirements Due to the Uniqueness of Zhuang Medicine Translation

Zhuang medicine has distinct regional and ethnic characteristics, and differs greatly from Western medicine in the English system. At the same time, influenced by Han culture, especially Traditional Chinese Medicine (TCM) culture, Zhuang medicine shares both differences and consistencies with TCM. Therefore, Zhuang medicine English translation involves not only exchanges between different languages and cultures, but also transformations between different medical systems and ways of thinking.

First, Zhuang medicine has a unique theoretical system, including "Three Qi Synchronization", "Three Paths and Two Routes", and other contents, which have significant cultural differences from modern Western medicine in terms of history, culture, theoretical foundation, and language expression. The cultural connotations embedded in Zhuang medicine are often difficult to accurately convey in GAI-generated translations, as shown in Example 1.

Example 1.

Prompt: Please translate into English: 壮医的三气，是指天气、地气、人气三种气及其运动变化。

ChatGPT-4.0: The three energies in Zhuang medicine refer to the energies of heaven, earth, and humans, and their movements and changes.

In Zhuang medicine, "qi" is a complex and abstract concept, covering all aspects of nature and human life activities. In the above example, the GAI model translates "气" as "energy", which is difficult to convey the rich meaning of "qi" in Zhuang medicine.

Second, Zhuang medicine has absorbed TCM theories such as yin-yang, qi-blood, and zang-fu to enrich its own unique theoretical system. Zhuang medicine and TCM share terms with identical names and connotations, such as yin, yang, qi, blood, etc. When answering questions related to Zhuang medicine, GAI may generate texts that resemble the style of TCM, as shown in Example 2.

Example 2.

Prompt: Please translate into English: 壮医三道两路。

Claude 3.0: The three paths refer to the three main approaches or modalities used in Zhuang traditional medicine:

Herbal Medicine (草药);

Massage/Manipulation (推拿);

Divination/Ritual (神道).

The two routes refer to the two main ways the Zhuang medical practitioners diagnose and treat patients:

Observing the patient's symptoms and condition (望);

Asking the patient questions about their health (切).

"Three Paths and Two Routes" is the core theory of Zhuang medicine, mainly studying the connotations and movement patterns of the grain path, water path, air path, dragon route, and fire route within the human body. The grain path refers to the channel through which grains enter the body and are digested and absorbed; the water path refers to the channel for water and fluid entering and leaving the body; the air path refers to the place and channel for the exchange and interconnection between human qi and nature's qi; the dragon route refers to the channel for blood in the body; and the fire route refers to the sensory transmission channel in the body (Huang, Song, Huang, & Su, 2017). In Example 2, Claude 3.0 mistranslates "grain path", "water path", and "air path" as "Herbal Medicine", "Massage/Manipulation", and "Divination/Ritual", and mistranslates "dragon route" and "fire route" as "Observing the patient's symptoms and condition" and "Asking the patient questions about their health". This not only fails to accurately convey the essence and characteristics of Zhuang medicine, but may also cause serious consequences for academic research and clinical application of Zhuang medicine.

In addition, core terms of Zhuang medicine such as "grain path", "water path", "air path", "dragon route", and "fire route", like TCM terms, have characteristics such as philosophical speculation, literary metaphor, high generality, polysemy, and stylistic casualness (Mao, Cao, & Wen, 2013). As shown in Example 3, the quality of GAI translation of Zhuang medicine terms is worrying.

Example 3.

Prompt: Please translate into English: 壮医三道两路中，三道指谷道、水道、气道，两路指龙路、火路。

Chat GPT-4.0: In the grand medicine, there are three paths and two routes. The three paths refer to the grain path, water path, and air path, while the two routes refer to the dragon route and fire route.

Gemini: In Zhuang medical "three courses, two paths", the three courses refer to the gastrointestinal tract, urinary tract, and respiratory tract, while the two paths refer to the Dragon Path and the Fire Path.

Claude 3.0: In the Zhuang medical system, the "three paths and two routes" refers to: "Three paths"—the valley path, the water path, and the air path. "Two routes"—the dragon route and the fire route.

iFlytek Spark: Three ways of Zhuang medicine refer to valley way, water way, and Qi way; two paths refer to dragon path and fire path.

As shown in the table below, the translations of Zhuang medicine terms by various GAI models are unsatisfactory. For example, GPT-4.0 mistranslates "壮医" as "the grand medicine"; Gemini translates "道" as "course", deviating from the original and inconsistent with the later "tract"; Claude 3.0 and iFlytek Spark translate "谷" as "valley". Different models also have inconsistent translations of the same term, e.g., "道" is translated as "path", "tract", "way", and "路" as "route", "path", lacking standardization and uniformity, which undermines the scientific attributes of Zhuang medicine.

The characteristics of Zhuang medicine require learners of Zhuang medicine translation to deeply study and understand its unique theoretical system and terminology, continuously improve their critical thinking ability, objectively analyze GAI translation results, integrate the cultural background and context of Zhuang medicine, use GAI dialectically, and ensure the accuracy and professionalism of the translation.

Cultivation of Critical Thinking Ability in Zhuang Medicine English

Translation Talents in the Era of GAI

Cultivating learners' translation thinking ability should be permeated and embodied at three levels: teaching content, teaching design, and teaching evaluation (Li, 2011, p. 50). Based on this three-level framework and relying on the course Computer-Assisted Translation Technology, this study explores the construction of a teaching model conducive to cultivating critical thinking among Zhuang medicine translation talents.

Teaching Content

This study integrates GAI technology into Zhuang medicine translation practice as the main teaching content of the Computer-Assisted Translation Technology course. On the one hand, as the accuracy of GAI translation continues to improve, technology is constantly reshaping the content, methods, and approaches of translation teaching; incorporating GAI tools into teaching content reflects new developments in society and industry needs. On the other hand, Guangxi's Zhuang medicine culture has unique characteristics and high cultural and economic value; incorporating Zhuang medicine translation practice into teaching content reflects the situatedness, contemporariness, and communicativeness of translation.

GAI teaching content mainly includes evaluation of mainstream GAI tools for Zhuang medicine translation, common errors or biased outputs of GAI, human-machine collaborative Zhuang medicine translation practice using GAI, and application of GAI tools for building Zhuang medicine term bases and translation memories. Taking the translation practice of commonly used acupoints in Zhuang medicine acupuncture using GAI human-machine collaboration as an example, teachers first guide students to analyze existing bilingual corpora of Zhuang medicine acupuncture points, extract key terms (such as location, method, function, indications, operation, etc.) and typical sentence patterns (such as oblique needling 0.3-0.8 cun, point moxibustion 1-2 times, lotus needle tapping, etc.), and then use the extracted corpora to train the GAI model so that it can deeply learn the relevant terms and typical sentence patterns of Zhuang medicine acupuncture points, thereby improving the accuracy of GAI translation. Finally, students are guided to review GAI translation results and make necessary modifications and corrections to ensure translation quality.

The content of Zhuang medicine translation practice mainly involves providing translation services for materials related to Zhuang medicine (including paper abstracts, EI/SCI/SSCI papers, translated works, etc.) from teachers and students of our university. In translation practice, students need to communicate effectively with teachers and clients, accurately understand teachers' requirements and client needs, and respond in appropriate ways and language; in complex translation scenarios and unexpected situations, they need to respond quickly and solve problems in a timely manner; they actively cooperate in the translation team, share knowledge and experience, and improve translation efficiency and quality. By combining with actual translation projects, students can be exposed to real translation scenarios and needs, exercising their practical translation ability and problem-solving skills.

Teaching Design

The teaching design for cultivating students' critical thinking in this study is reflected in three stages: pre-translation, while-translation, and post-translation. The following uses the translation practice of Chapter 2 "Theoretical Basis of Zhuang Medicine Acupuncture and Moxibustion" from the monograph Introduction to *Zhuang Medicine Acupuncture and Moxibustion* as an example to demonstrate a complete teaching process.

Pre-translation. The course is intended for 14 MTI (Master of Translation and Interpreting) students,

divided into four groups of 3-4 people each. Before class, students familiarize themselves with the GAI tools designated by the teacher. During class, after the teacher's demonstration, students first input prompts into the GAI tools to extract terms from the source text, and then continue to input prompts to match the extracted terms with an existing term base. If matched successfully, the term translation in the base is directly adopted; if not, students continue to input term definitions, context, etc., to help GAI generate term translations. During this process, the teacher walks around, observes, and provides timely suggestions or hints to guide students in adjusting prompts to obtain the best results.

After class, each group summarizes the term translations generated by different GAI tools, compares and analyzes different translations, verifies doubtful translations, and forms a bilingual term list to submit to the teacher. At the same time, they organize and compile comparisons of GAI tool translations, experiences in writing prompts, problems encountered and solutions, argumentation processes for controversial translations, etc., and present them in class via PPT. The teacher comments on the presentations, guiding students to argue about controversial translations and forming a standardized and unified pre-translation term base.

While-translation. Before class, students first import the pre-translation term base into GAI tools for term intervention, input the source text into GAI to generate an initial translation, review, verify, and revise the translation, and record the verification, analysis, and argumentation process for doubtful translations. Then they compare the translations generated by different GAI tools with group members, revise and optimize suboptimal translations, and form a final translation to submit to the teacher. During class, each group presents via PPT on the use of GAI tools and the project translation status, summarizes term intervention and pre- and post-editing skills, reports the argumentation methods, processes, and ideas for controversial translations, and reflects on shortcomings and problems in translation. The teacher comments on the students' PPT presentations, guiding them to compare the advantages and disadvantages of different GAI tools, reflect on the reliability and rationality of the argumentation process, and discuss, analyze, and revise controversial translations to form the final translation.

Post-translation stage. After class, students write reflective journals to review the project translation process, analyze problems encountered, summarize solutions, and think about how to optimize the translation process to improve efficiency and quality. Through repeated practice and continuous reflection, they build a bridge between knowledge and skills, consolidate deeply, and continuously improve their critical thinking ability. The teacher reviews the students' reflective journals, provides one-on-one feedback, and guides students to actively raise, analyze, and explore different solutions to problems.

Teaching Evaluation

The study adopts a combination of formative assessment (70%) and final summative grade (30%) to comprehensively evaluate students' ability to use GAI tools for translation practice and the improvement of their critical thinking ability. The usual performance includes annotated translation tasks (20%), PPT presentations (20%), reflective journals (20%), and attendance (10%). The final exam requires students to complete a 1,000-word Zhuang-English translation task using GAI tools within two hours, submitting an annotated translation (20%) and a 500-word reflection (10%).

It can be seen that in the pre-translation stage, students extract terms and build term bases using GAI tools, exercising information screening and processing abilities; in the while-translation stage, students compare and analyze different translations and evaluate the advantages and disadvantages of different GAI tools, cultivating

critical thinking; in the post-translation stage, writing reflective journals improves self-reflection and self-improvement abilities. The combination of formative and summative assessment comprehensively evaluates students' improvement in GAI application, critical thinking, and translation ability.

Conclusion

Based on Professor Li Ruilin's teaching philosophy, this study has constructed a teaching model for cultivating critical thinking ability among Zhuang medicine translation talents. This model integrates generative AI technology with Zhuang medicine translation practice, creating an open, multidimensional, and reflective teaching system, providing students with an independent thinking and free exploration learning environment, and helping to enhance their critical thinking, translation, and communication abilities. This teaching model can be extended to translation talent cultivation in other fields, helping students improve their independent thinking and problem-solving abilities in GAI-era translation practice, so as to adapt to the increasingly complex and changing needs of the translation industry.

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