Research Article

Exploring the Impact of Artificial Intelligence Tools on Translation Teachers' Self-efficacy Beliefs and Professional Development

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Abstract

Objective: This study aimed to investigate how the integration of artificial intelligence (AI) tools impacts translation teachers’ self-efficacy beliefs and professional development in the context of translation education.

Methods: The research employed a combination of questionnaire surveys and interviews to gather data. A total of twenty-seven translation teachers, who were part of an online learning community for translation teachers in Chinese universities and colleges, willingly participated in the study. All the participants completed the questionnaire survey, and six of them further volunteered to take part in interviews after completing the survey.

Results: The results of the study demonstrated that translation teachers possessed a high sense of self-efficacy in integrating AI tools in their teaching practices. They also recognized the positive impact of integrating AI tools on their professional development. Furthermore, they exhibited flexibility by adapting their instructional approaches to enhance students’ translation skills and accuracy.

Conclusion: The research examined how the integration of AI tools affected translation teachers’ self-efficacy beliefs and professional development, providing valuable insights into the relationship between these factors in the context of AI tool integration. The results showed that AI tool integration had a substantial impact on translation teachers’ self-efficacy and professional learning. This integration resulted in increased self-efficacy beliefs among teachers and contributed to their professional development. Consequently, teachers were motivated to adapt their teaching methods, aiming to enhance students’ translation skills and accuracy.

Keywords: translation technology, artificial intelligence tools, translation teachers, self-efficacy beliefs, professional development

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1 INTRODUCTION

The field of translation has experienced significant technological advancements in recent years, largely driven by artificial intelligence (AI) technology\(^1\). AI translation tools, such as machine translation (the automated translation of text or speech using computer algorithms) and neural machine translation (an advanced approach to machine translation that uses neural networks to generate high-quality translations), have shown remarkable progress in producing automated translations that are increasingly accurate and fluent. These advancements have led to widespread adoption of AI tools in various translation settings, including translation education, professional translation agencies and online platforms.

While AI translation tools offer potential benefits, such as increased translation speed and access to vast amounts of translated content, they also raise concerns among translation professionals and educators\(^2\). Translation teachers, in particular, may be affected by the integration of AI tools into the translation process\(^3\). This integration can change the dynamic between teachers and students, the skills and knowledge required for effective translation teaching, and the overall efficacy beliefs of translation teachers\(^4\). In the context of translation teaching, self-efficacy beliefs play a crucial role in shaping teachers’ instructional choices, strategies, and interactions with students when integrating AI tools into translation teaching practice\(^5\). Several studies have explored translation teachers’ self-efficacy beliefs, focusing on their confidence in effectively teaching and assessing students in the context of AI translation tools. For example, a study by Martins-Todorov and Jackson\(^6\) found that translation teachers who received professional development training exhibited higher self-efficacy beliefs in integrating machine translation technology into their teaching practices.

Additionally, the integration of AI translation tools also raises questions about the professional development needs of translation teachers. As the translation landscape evolves, it is essential for teachers to continuously update their skills and knowledge to remain effective educators. Exploring the impact of AI translation tools on professional development can help identify the specific areas where translation teachers may require additional support or training to adapt to the changing technological landscape. Research has highlighted the importance of targeted training programs that specifically address the integration of AI translation tools into translation education. Lucas et al.\(^7\) conducted a study on a professional development program for translation teachers, which resulted in improved knowledge and skills related to machine translation usage.

These studies have shed light on translation teachers’ self-efficacy beliefs and professional development with the integration of AI tools into translation education. While studies exploring the complex relationship between translation teachers’ self-efficacy beliefs and professional development in integrating AI translation tools into translation teaching are limited\(^8\), it is an emerging area of research with significant implications for translation education. Hence, this study aimed to examine the impact of AI translation tools on translation teachers’ self-efficacy beliefs and professional development and provide valuable insights for translation educators and practitioners.

The research questions for this study are as follows:

1. What are translation teachers’ self-efficacy beliefs in integrating AI tools into teaching practice?
2. What are the impacts of the integration of AI tools on the professional development of translation teachers?
3. What are the teaching methods of integrating AI tools into teaching practice?

2 LITERATURE REVIEW

2.1 Social Cognitive Theory (SCT) and Self-efficacy

Bandura’s SCT is a well-established theoretical framework that has been defined and refined by researchers over the years. Bandura and Walters\(^9\) initially characterized SCT as a theory that emphasizes the reciprocal interactions between individuals, their behavior, and the environment, with a focus on cognitive processes such as self-efficacy and observational learning. According to Bandura\(^10\), SCT posits that individuals learn through observation, imitation, and modeling, and that cognitive processes play a crucial role in shaping and regulating behavior. Furthermore, SCT incorporates the concept of triadic reciprocal determinism, wherein personal factors, environmental influences, and behavior continuously interact and mutually influence each other\(^11\).

Since its formulation, various scholars have expanded upon these foundational definitions, offering nuanced perspectives and emphasizing specific aspects of SCT depending on the context of their research.

Self-efficacy, developed by Bandura\(^12\), is a key concept within SCT that focuses on an individual’s beliefs about their capabilities to successfully perform tasks, overcome challenges, and achieve desired outcomes. Bandura\(^13\) described self-efficacy as a domain-specific construct, meaning that people may possess varying levels of self-efficacy in different areas. In 1999, Bandura et al.\(^14\) further defined self-efficacy as the belief in one’s capabilities to organize and execute the courses of action required to produce given attainments. According to this theory, self-efficacy beliefs influence one’s motivation, effort, persistence, and resilience in the face of obstacles. Researchers have expanded upon these definitions, exploring the antecedents and consequences of self-efficacy beliefs in diverse domains such as education, health behavior, and organizational settings. Overall, self-efficacy theory provides a valuable lens for understanding how
individuals’ beliefs about their own capabilities shape their actions and outcomes.

### 2.2 Teachers’ Self-efficacy Beliefs

Tschannen-Moran and Hoy\cite{12} emphasized that teachers’ self-efficacy beliefs encompass four dimensions: efficacy in instructional strategies, efficacy in classroom management, efficacy in student engagement, and efficacy in fostering a caring and supportive classroom environment. These beliefs play a significant role in shaping teachers’ attitudes, instructional practices, and interactions with students. Numerous studies have explored the antecedents, consequences, and factors that influence teachers’ self-efficacy beliefs, highlighting their impact on teacher motivation, job satisfaction, instructional effectiveness, and student outcomes\cite{13,14}. Understanding and supporting teachers’ self-efficacy beliefs are essential for promoting effective teaching practices, enhancing teacher well-being, improving student outcomes, fostering professional development, and facilitating teachers’ adaptation to technological advancements. By recognizing the significance of self-efficacy in teaching and providing appropriate support, stakeholders can collectively create positive learning environments that benefit both teachers and students.

In this study, translation teachers’ self-efficacy beliefs refer to their beliefs in their own abilities to successfully perform translation teaching-related tasks and positively impact student learning outcomes in the integration of AI tools into their teaching practice.

### 2.3 Translation Teachers’ Professional Development

Translation teachers’ professional development plays a crucial role in enhancing teaching practices, staying updated with advancements in the field, and meeting the evolving needs of translation education. Professional development refers to a continuous and purposeful process of acquiring new knowledge, skills, and competencies that are relevant to a teacher’s professional role, and it encompasses formal education, informal learning experiences, and self-directed professional development activities\cite{15}. The term “teacher professional development” is often used interchangeably with professional development. It refers to any structured activity or program designed to enhance a teacher’s knowledge, skills, and professional growth\cite{16}.

In this study, translation teachers’ professional development encompasses an ongoing and intentional process of gaining fresh knowledge, skills, and competencies, or attending workshops, webinars, participating in collaborative learning communities, engaging in reflective practices aimed at improving teaching techniques and enhancing translation instruction with the integration of AI tools into teaching practice.

### 2.4 Related Studies on Translation Teachers’ Self-efficacy Beliefs and Professional Development

Several studies have explored translation teachers’ attitudes and perceptions towards AI tools, pedagogical approaches for teaching AI-assisted translation, translation teachers’ self-efficacy in integrating AI tools, or professional development and adaptation to AI tools, recognizing their significance in shaping translation teaching practices and students’ learning outcomes.

For instance, Tymozcko et al.\cite{17} examined the attitudes and perceptions of translation teachers towards AI tools. The study revealed a range of responses, including initial resistance, acknowledgment of AI’s benefits, and concerns about job displacement. It emphasized the importance of providing opportunities for translation teachers to familiarize themselves with AI tools to alleviate concerns. In another study, Zeng and Nie\cite{18} explored pedagogical approaches for teaching AI-assisted translation. The study proposed a framework that integrated AI tools into translation curriculum and instructional practices. Results showed that incorporating AI tools enhanced translation teachers’ pedagogical effectiveness and student engagement.

In a different study, Jiménez-Crespo\cite{19} conducted a study exploring translation teachers’ self-efficacy beliefs related to the use of machine translation technologies in the classroom. The findings revealed a wide range of beliefs among teachers, with some perceiving machine translation as a valuable tool for language learners, while others expressed concerns about its impact on translation quality and language proficiency development. Similarly, Chen et al.\cite{20} examined the impact of AI tools on translation teachers’ self-efficacy in a higher education setting. The findings revealed that exposure to AI tools positively influenced teachers’ self-efficacy, leading to improved confidence and perceived competence in translation instruction.

Another line of research focused on translation teachers’ self-efficacy beliefs in the context of AI technologies. Bouilla and Laghzaoui\cite{21} explored translation teachers’ self-efficacy beliefs related to AI technologies, including machine learning and neural machine translation. The study revealed that teachers with higher self-efficacy beliefs were more willing to embrace AI technologies and recognized their value in enhancing teaching and learning outcomes. Additionally, García-Sánchez and Fernández-Vázquez\cite{22} examined translation teachers’ self-efficacy beliefs in using AI-based translation tools. Their study highlighted teachers with higher self-efficacy beliefs exhibited greater confidence in integrating AI-based tools into their teaching practices. These teachers demonstrated an ability to adapt instructional strategies to effectively
leverage the benefits of AI technologies, enhancing student engagement and learning outcomes. Moreover, Huertas-Barros et al. [23] investigated the professional development needs of translation teachers in adapting to AI tools. The study highlighted the importance of continuous professional development to enhance teachers' knowledge and skills in utilizing AI tools effectively. It emphasized the need for training programs and supportive institutional policies to encourage integration.

These studies provide valuable understanding of translation teachers’ self-efficacy beliefs or profession learning in various contexts, including machine translation and AI technologies. However, there is a scarcity of studies that delve into the intricate connection between translation teachers’ self-efficacy beliefs and professional development when it comes to integrating AI translation tools in translation teaching. Hence, the objective of this study is to investigate the influence of AI translation tools on the self-efficacy beliefs and professional growth of translation instructors, offering valuable insights for both translation educators and practitioners.

3 METHODOLOGY AND PARTICIPANTS

The research employed a combination of questionnaire surveys and interviews to gather data. The participants of the research were from an online learning community for translation teachers in Chinese universities and colleges. During an online summer training program, the researcher utilized the opportunity to enlist participants for the study. The criteria for inclusion in the study was a minimum of one year’s experience in using AI tools as a part of their teaching practice. A total of twenty-seven translation teachers willingly participated in the study, and six of them further volunteered to take part in interviews after completing the survey.

The questionnaire was created by drawing on Tschannen-Moran and Hoy’s Teacher Efficacy Questionnaire [12] and relevant literature on translation teachers’ self-efficacy beliefs when using AI in their instruction. It comprised three sections and a total of 25 items. The initial section investigated translation teachers’ self-efficacy beliefs regarding the integration of AI tools, containing 10 items. The second section examined translation teachers’ professional development in AI tools integration, comprising 5 items. Lastly, the third section explored translation teachers’ approaches to incorporating AI tools, with 5 items. All the items were based on a five-point Likert scale, with options ranging from “strongly disagree” (1 point) to “strongly agree” (5 points) for each item. Five participants were randomly selected to pilot the questionnaire, which was modified based on their comments. The questionnaire exhibited strong reliability and validity, as indicated by a Cronbach’s alpha coefficient of 0.857, a KMO measure exceeding 0.800, and a significant result (P<0.001) in Barlett’s spherical test.

One day prior to the conclusion of the training program, the questionnaire was distributed to a group of twenty-seven participants via the online platform QuestionnaireStar. These participants were given a one-week deadline to complete the questionnaire. A week later, a total of 27 valid responses were gathered.

The researcher conducted interviews with six participants using WeChat voice calls. Prior to recording the interviews, consent was obtained from each of the six teachers. The average duration of each interview was approximately 30 min. The purpose of these interviews was to obtain valuable insights into the impacts of integrating AI tools on translation teachers’ self-efficacy and professional development.

The interview consisted of five open-ended questions that focused on various aspects, including teachers’ technical skills and proficiency in utilizing AI translation tools, their level of confidence when using such tools, their beliefs regarding the potential benefits of integrating AI tools for enhancing students’ translation skills, the influence of AI tools on professional development, and the approaches employed to integrate AI tools into the teaching process. Eventually, all the interviews were transcribed into written form.

4 FINDINGS

4.1 Translation Teachers’ Self-efficacy Beliefs with the Integration of AI Tools

The data of obtained from the questionnaire was analyzed using SPSS 20.0. A one-sample t-test was conducted to compare the average self-efficacy beliefs of translation teachers with a predetermined value. Following the interpretation provided by Oxford and Burry-Stock [24] concerning the five-point scale scores, a mean value below 3 indicates a low sense of self-efficacy, a mean value greater than 3 but less than 4 suggests a relatively high sense of self-efficacy, and a mean value greater than 4 represents a high sense of self-efficacy. In this study, the test value was set at 3, corresponding to the category of “neutral”.

Table 1 displayed that the mean value of translation teachers’ self-efficacy beliefs was 4.07. Among the 10 items, the mean values for “positive attitudes towards AI tools”, “positive beliefs in the effects of AI tools”, “positive beliefs of AI tools improving students’ translation quality and skills”, “strong desire to integrate AI tools”, “importance of learning AI tools”, and “strong desire to learn AI tools” were higher than 4. Furthermore, all of these items were found to be statistically significant (P<0.05) in the t-test analysis. This suggests that translation teachers exhibit a high sense of self-efficacy when it comes to integrating AI tools into their teaching practices.

The findings of this study confirmed the research conducted by Chen et al. [20], which demonstrated that the integration of AI tools had a positive impact on teachers’
self-efficacy, and this led to increased confidence and perceived competence in translation instruction. Similarly, 
Wang and He\textsuperscript{[25]} found that the use of AI translation tools enhanced teachers’ self-efficacy and confidence in their ability to provide high-quality translations. Using AI tools in translation instruction allows teachers to observe the effectiveness and efficiency of these tools. When teachers witness the successful use of AI tools in producing accurate translations, it serves as a model for their own behavior. This observational learning can increase their self-efficacy, as they believe they are capable of achieving similar results by utilizing these tools.

Furthermore, during the interview, it was revealed that all the teachers acknowledged the efficiency of AI tools as translation assistants. They stated that students often rely on these tools in their translation process. Additionally, a majority of their colleagues were also exploring the use of AI tools for translation instruction and achieved favorable results. Failure to adapt to this trend could potentially make them feel pressured or inadequate in their ability to teach translation in the future. Notably, approximately 83.3% of the teachers expressed confidence in incorporating AI tools in their teaching, as they recognized the positive impact it can have on enhancing students’ translation abilities and overall translation quality. According to SCT, individuals can also gain self-efficacy through vicarious experiences by observing others’ successes\textsuperscript{[73]}. When translation teachers witness their colleagues, experts, or even students effectively utilizing AI tools in translation, it could positively influence their own self-efficacy. Employing AI tools also provides translation teachers with opportunities for mastery experience, which is a key factor in enhancing self-efficacy. When teachers successfully use these tools to help students or themselves produce high-quality translations, it reinforces their belief in their own abilities. This mastery experience helps build confidence and competence in their instructional practices.

### 4.2 Translation Teachers’ Professional Development with the Integration of AI Tools

The study calculated the percentage distribution of the item choices in the second section of the questionnaire, which concerned the relations between the integration of AI tools and translation teachers’ professional development. The results from Figure 1 demonstrated that approximately 81% of translation teachers expressed positive attitudes towards the utilization of AI translation tools for their professional development. Similarly, around 80% of teachers indicated strong beliefs in the effectiveness of AI translation tools for enhancing their professional growth. Moreover, about 88% of participants reported an improvement in their skills through the utilization of online learning resources or training in AI tools. Additionally, approximately 85% of teachers felt motivated to continuously enhance their abilities by utilizing AI translation tools. Furthermore, about 88% of respondents expressed their desire for further training and support in integrating AI tools into translation teaching.

In addition, during the interviews, the majority of teachers expressed that the integration of AI in their teaching methods offered numerous benefits, such as the opportunity for teachers to continuously acquire knowledge about new translation technologies, keeping abreast of advancements in the translation industry, and exploring innovative approaches to teaching translation. This ongoing process of learning could significantly enhance their own translation skills, expand their knowledge, and refine their teaching strategies. To illustrate, one interviewee explained that AI tools offered a diverse range of resources and techniques that enable translation instructors to employ more varied and effective teaching methods. Through the utilization of machine translation software with interactive feedback, students were able to compare their translations with suggested solutions provided by the system. This allowed them to analyze and enhance their work. Furthermore,
Figure 1. The results of translation teachers’ professional development with the integration of AI tools. 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree. A: Positive attitudes towards using AI translation tools for professional development; B: Strong beliefs in enhancing professional development by using AI translation tools; C: Improved skills in using AI tools with online learning resources or training; D: Motivated to keep improving by using AI translation tools; E: Hope for more training and support of AI tools integration.

another interviewee highlighted that AI tools assisted teachers in staying updated with the latest developments in the field, such as neural machine translation and post-editing techniques. By gaining mastery over these technologies, teachers could broaden their knowledge base, refine their translation techniques, and effectively guide students in adapting to the rapidly evolving translation industry. Every single interviewee expressed a belief that they require additional training or support to effectively utilize AI tools in their teaching practice.

Based on the information provided, it can be inferred that the majority of teachers believed that incorporating AI tools into translation teaching could enhance their professional development. The result of the study validated Huertas-Barros et al.’s findings[23] that translation teachers had positive beliefs in the effect of AI tools on continuous professional development to enhance teachers’ knowledge and skills in instruction and translation teachers needed further training programs and supportive institutional policies to encourage AI tools integration. Overall, the integration of AI tools in translation teaching empowers teachers by providing them with advanced resources, nurturing continuous learning, ensuring accuracy, etc. These benefits contribute to the professional development of translation teachers, enabling them to evolve with the changing translation landscape and better prepare their students for real-world translation challenges.

4.3 Translation Teachers’ Methods with the Integration of AI Tools

The researcher calculated the proportion of levels chosen by the participants of the study in the third section of the questionnaire, which focused on approaches translation teachers take when incorporating AI tools, as shown in Figure 2. Notably, a majority of teachers (73%) actively encouraged their students to utilize AI tools in order to enhance the accuracy and fluency of translations. Furthermore, a significant proportion of teachers (81%) recognized the importance of facilitating their students’ understanding of AI translation tools. In addition to training, 77% of the teachers demonstrated a crucial role in guiding students to evaluate and compare various AI translation tools. It is worth noting that 74% of the teachers actively engaged their students in discussing the advantages and limitations of AI tools. Lastly, an overwhelming majority of teachers (89%) showed adaptability in tailoring their teaching strategies related to AI translation technologies to meet the specific needs and proficiency levels of their students.

In the interviews conducted, the majority of teachers mentioned that they incorporated AI tools while providing guidance to students throughout the translation process. For instance, one interviewee mentioned conducting monthly training sessions to offer tips on effectively utilizing AI translation tools. Additionally, they provided feedback on students’ translations, considering both the usage of AI tools and their own linguistic analysis. Another interviewee described their methods, which included demonstrating how to analyze and compare AI-generated translations with their own translations. They emphasized the identification of potential errors or areas for improvement, enabling students...
to make informed decisions based on AI suggestions. This approach aimed to help students develop critical thinking and evaluation skills alongside the utilization of AI tools. Furthermore, another interviewee stressed the importance of actively engaging with AI tools rather than solely relying on them. They encouraged students to use AI suggestions as a reference, while actively analyzing and evaluating translations, taking into account linguistic and contextual factors. This encouraged a reflective and critical approach, ensuring that students benefited from AI tools while simultaneously building their translation competencies.

The results of the study indicated that translation teachers possessed the ability to adapt their teaching approaches in a flexible and efficient manner when incorporating AI tools to enhance students’ translation abilities and accuracy. By successfully utilizing AI tools in teaching, teachers can reinforce their own confidence and belief in their instructional abilities. The findings of the study aligned with the discovery made by García-Sánchez and Fernández-Vázquez[22], highlighting that teachers exhibited adaptability in their teaching strategies to effectively harness the advantages of AI technologies, ultimately leading to enhanced learning outcomes for students.

From SCT perspective, teachers exhibit adaptability in their teaching strategies to effectively use AI tools for multiple reasons. SCT emphasizes observational learning, where teachers observe others’ successful integration of AI tools and witness the positive impact on student learning. This observational learning serves as a model for teachers, encouraging them to be adaptable and open to incorporating AI tools in their own classrooms. Moreover, SCT highlights the significance of self-efficacy, as teachers who witness their own successful implementation of AI tools develop a belief in their ability to effectively utilize these tools to enhance student learning. Additionally, SCT stresses outcome expectations, as teachers are more likely to embrace a behavior if they expect positive outcomes. Teachers who observe or experience firsthand the positive outcomes of using AI tools, such as enhanced student engagement, academic performance, and time-saving benefits, are motivated to adapt their teaching strategies to incorporate these tools. In conclusion, from an SCT perspective, teachers’ adaptability in using AI tools is influenced by observational learning, self-efficacy, and outcome expectations.

5 CONCLUSION AND IMPLICATIONS

The objective of this research was to examine the impacts of the integration of AI tools on translation teachers’ self-efficacy beliefs and professional development. By investigating this relationship within the context of AI tool integration, this study adds to the existing scholarly understanding. The findings of this research reveal that the integration of AI tools significantly influences translation teachers’ self-efficacy beliefs and their professional development. Specifically, the incorporation of AI tools has a positive impact on teachers’ confidence in their abilities, aids in their professional growth, and acts as a driving force for adjusting teaching approaches to improve students’ translation skills and precision.

Nevertheless, there are several limitations of the study that should be addressed. Firstly, the study involved only
a limited number of translation teachers from Chinese universities and colleges who were members of an online learning community. Consequently, the results of the study may not accurately represent the status of the impact of AI integration on teacher self-efficacy and professional development in other academic fields. Secondly, although interviews were conducted as part of this study, there was a lack of thorough qualitative analysis of the interview content. This limitation may have hindered the researcher to analyze the underlying cause of the impact of AI tools on translation teachers’ self-efficacy and professional development. Additionally, the study did not consider factors such as sex, age, qualification, and teaching experience when examining the impact of AI on translation teachers’ self-efficacy beliefs and professional development. However, these variables are significant factors that may also influence teachers’ self-efficacy beliefs and professional development, particularly in the context of AI tools integration.

Despite the identified limitations, this study offers valuable insights into the realm of translation education. Firstly, the utilization of AI tools significantly bolsters translation teachers’ self-belief, equipping them with the confidence to effectively employ these tools and improve students’ translation skills and precision. Furthermore, the integration of AI tools creates avenues for professional development among translation teachers, empowering them to augment their expertise and adapt to the ever-evolving translation landscape, thus providing exemplary instruction and guidance. Lastly, the incorporation of AI tools serves as a catalyst for translation teachers to modify their teaching methodologies, as they acknowledge the potential of these tools and actively explore ways to integrate them into classroom settings, augmenting student learning outcomes and translation proficiency. Consequently, teachers are encouraged to explore viable means of integrating and applying AI tools to facilitate student development in the field of translation, fostering self-assurance and professional competence in the process.

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Conflicts of Interest
The author declared no conflict of interest.

Author Contribution
Ma G contributed to the manuscript and approved the final version.

Abbreviation List
AI, Artificial intelligence
SCT, Social cognitive theory

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