Integration of CAT and Corpus Tools in Legal Translation Teaching under TPACK Framework

Zhao Lijin[1, 2*], Noor Mala Ibrahim[1], Ji Xiaomeng[3], Feng Jinghan[1], Shao Wenjing[3]

[1]School of Education, University Technology Malaysia, Johor Bahru, Malaysia

[2]Faculty of Foreign Languages, Yulin University, Shaanxi Province, China

[3]Language Academy, University Technology Malaysia, Johor Bahru, Malaysia

***Corresponding Author**

DOI: https://dx.doi.org/10.47772/IJRISS.2025.907000376

Received: 12 July 2025; Accepted: 19 July 2025; Published: 18 August 2025

ABSTRACT

This study explores the pedagogical integration of Computer-Assisted Translation (CAT) and corpus tools in a legal translation course at a Chinese university, using the Technological Pedagogical Content Knowledge (TPACK) framework as a guiding model. The research addresses two questions: (1) What are the measurable impacts of integrating CAT and corpus tools on students' translation competence, technological fluency, and collaborative performance under the TPACK framework? (2) What are students' perceptions of the affordances and challenges associated with CAT and corpus tools in legal translation learning?

A mixed-methods approach was adopted. Quantitative data were collected through pre- and post-course questionnaires (N=38) covering six TPACK-informed dimensions. Paired-sample t-tests revealed statistically significant improvements across all areas, particularly in translation accuracy, technologies operation skills, and collaborative performance. These improvements underscore the combination of content knowledge, technological fluency, and pedagogical design promoted by the TPACK framework..

Qualitative data were obtained from semi-structured interviews with 12 students and the course instructor. Thematic analysis indicated that while students valued the authenticity and practicality brought by CAT and corpus tools, they also experienced challenges in mastering complex functions, especially early on. Teaching scaffolding, team-based engagement, and task-driven learning design were found to be critical for facilitating tool engagement and skill transfer.

The findings support the relevance of the TPACK framework in translator training, demonstrating that meaningful technological integration can improve not only students' tool literacy but also their legal translation performance and professional mindset. The study also highlights the importance of aligning tool teaching with disciplinary content and collaborative practices.

Keywords: TPACK, CAT tools, Corpus tools, Legal translation

INTRODUCTION

In recent years, the technological transformation of higher education has prompted a re-evaluation of teaching strategies across disciplines. For translation teaching in particular, the integration of technology is not merely

optional, but essential (Hu & Li, 2023; Wang & Zhang, 2025; Hu & Gao, 2024). As the translation industry increasingly relies on technological tools such as Computer-Assisted Translation (CAT) and corpus tools, university-level translation courses must prepare students with both linguistic competence and technological literacy (Bowker, 2002). However, one persistent challenge lies in how to effectively integrate these tools within a coherent pedagogical framework that supports both content knowledge and tech skills.

Traditional translation pedagogy has largely focused on textual analysis, bilingual competence, and theory-driven teaching (David et al., 2019; Albrecht et al., 2023). Yet, students often struggle with applying theoretical knowledge to real-world translation tasks, especially when technological tools are involved. The lack of structured guidance in tool-based translation leads to fragmented learning experiences. CAT tools facilitate memory-based translation, terminology management, and workflow automation. Corpus tools enable students to observe authentic language use patterns, verify collocations, and compare parallel texts. However, without a clear teaching framework, the educational value of these tools may be underutilized.

Furthermore, research by Liu & Afzaal (2022) and Xu (2013) has shown that students face difficulty in transferring corpus or CAT tool use from classroom activities to independent professional practice. A major reason for this gap lies in the absence of structured, theory-driven models like TPACK to provide structured support for integration. This calls for a pedagogical redesign that merges technological tools with teaching goals and content knowledge, ensuring that students learn not only how to use tools but also when and why.

In this context, Technological Pedagogical Content Knowledge (TPACK) framework, proposed by Mishra and Koehler (2006), represents the essential knowledge base for teachers to integrate technology into content-specific teaching. It is widely recognized as one of the key factors influencing teachers' willingness and behavior regarding technology use.

However, current research shows that the TPACK level among university teachers in China remains relatively low, and the application of educational technologies is often inefficient (Ren & Ren, 2015). One major issue lies in the superficial use of technology, where university teachers primarily employ technologies for presenting translation content and locating linguistic resources (Liu & Kleinsasser, 2015). They often lack the knowledge to use technology to promote teacher-student interaction, design learning activities, simulate real-life teaching scenarios, or reflect on their technology usage. Taking university foreign language teachers as an example, their use of technology tends to be teacher-centered (Han & Ge, 2018), rather than engaging students through interactive or student-driven learning processes.

Although there is a considerable amount of research on the application of TPACK in teaching, with most studies focusing on contents such as mathematics, chemistry, and physics etc. (Niess, 2005; Deng & Wang, 2022; Wang et al., 2025), its application in the field of translation teaching, particularly legal and technical translation—remains underexplored. Existing research (Du, 2022; Zhang, 2023) has demonstrated that the integration of tools into translation curricula can significantly improve learners' cognitive and procedural translation abilities. However, these studies often lack a theoretical lens that aligns tool use with teaching and disciplinary goals. Moreover, as Xu (2014) and Wang (2021) observed, technology integration in translation teaching has often been tool-centered, emphasizing technical operation over pedagogical alignment. This results in fragmented learning outcomes where students may acquire software skills but lack the ability to apply them critically and contextually.

This study was conducted in an undergraduate legal translation course at a Chinese university, addressing the critical need to bridge this gap by investigating how CAT and corpus tools can be effectively integrated into a translation curriculum within the TPACK framework. Specifically, it explores how students' translation competence, technological literacy, and collaborative performance are impacted when teaching design explicitly incorporates tool use aligned with pedagogical goals and content mastery, meanwhile, poses the

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue VII July 2025

following questions:

RQ1: What are the measurable impacts of integrating CAT and corpus tools on students' translation competence, technological fluency, and collaborative performance under the TPACK framework?

RQ2: What are students' perceptions of the affordances and challenges associated with CAT and corpus tools in legal translation learning?

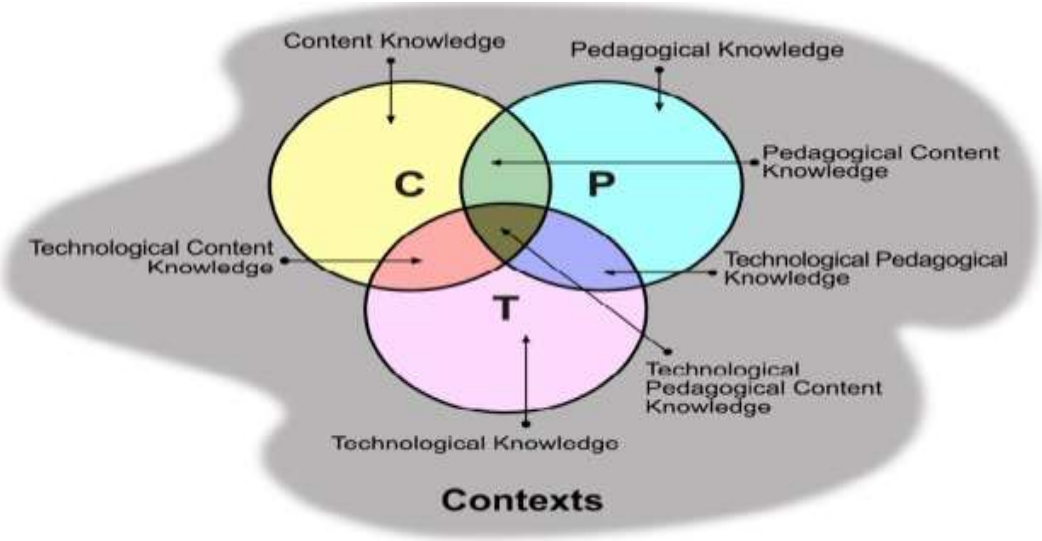
LITERATURE REVIEW

Originating from Shulman's (1987) concept of Pedagogical Content Knowledge (PCK), which emphasized the integration of content matter knowledge and pedagogy as the core of effective teaching, PCK has since become a foundational framework in teacher education research. Continuous appearance of technologies also showed an impact on the development of scholars' understanding towards PCK, as teachers had to enable themselves to involve latest technology in teaching with informative era approaching. From here on, scholars became interested in defining PCK from technological perspective. Mishra and Koehler (2006) first proposed a new notion, technology pedagogical content knowledge (TAPCK). Based on their study, TAPCK was a combination of technological knowledge, content knowledge and pedagogical knowledge. With the rapid advancement of technological technologies, TPACK is increasingly relevant for university-level teaching reforms, particularly in specialized contents such as translation. However, research integrating TPACK with specific technological tools, like CAT and corpus tools, remains limited.

TPACK Framework and Its Application

TPACK consists of seven key components: Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006). This framework emphasizes the complex interactions between these components, suggesting that effective technology integration involves a harmonious combination rather than isolated applications (Du, 2022; Wang et al., 2023).

Fig 1: TPACK framework and its components (Koehler & Mishra, 2006)



Existing studies demonstrate that while TPACK is widely applied in general educational contexts, its specific applications in higher education, particularly translation teaching, are underexplored. Teachers often lack adequate technological competencies (TK) and struggle to effectively integrate technology with pedagogy

(TPK) or content knowledge (TCK) (Wei et al., 2021; Wang, 2018). Additionally, studies highlight the need for deeper empirical investigations into how teachers develop their TPACK through practical experience (Wei, Hu, & Liu, 2021).

Recent research indicates that incorporating TPACK into translation teaching significantly enhances teaching effectiveness and student engagement. Du (2022) investigated technological technology-based TPACK applications in college English translation classes, emphasizing improved student interactions, cognitive development, and translation competencies. However, most existing studies remain theoretical or qualitative, lacking robust empirical methodologies and quantitative evaluations.

Furthermore, studies like Wei et al. (2021) and Du (2022) emphasize the nonlinear, complex, and highly context-dependent nature of TPACK development among translation teachers. Teachers demonstrate uneven growth across different TPACK dimensions, with significant gains in technological knowledge (TK, TPK) but persistent challenges in integrating pedagogy and content knowledge effectively (PCK, TPACK) (Wei et al., 2021).

Integration of CAT Tools in Translation Teaching

CAT tools have significantly reshaped contemporary translation training by enhancing translators' productivity and translation consistency. Xu (2007) categorizes CAT tools into general software and specialized translation memory software. CAT tools have evolved from simple translation aids to comprehensive platforms capable of managing entire translation workflows, including translation projects, terminological consistency, and quality assurance (Xu, 2010).

Despite their clear benefits, CAT tools also present significant challenges in educational settings. Translation teachers frequently face difficulties integrating these complex tools into curricula, partly due to steep learning curves and partly because many translation programs lack structured pedagogical frameworks for technology integration. Xu (2010) emphasizes the importance of integrating CAT tools with network technologies to foster collaborative, real-time translation practices and effective project management, reflecting the growing importance of cooperative translation practices in professional environments.

Corpus Tools in Translation Teaching

Corpus tools, such as WordSmith Tools, have evolved beyond mere terminology query tools to sophisticated analytical instruments capable of identifying translation universals, stylistic patterns, and optimizing the translation process (Wang & Huang, 2008). Corpus-based translation studies have demonstrated considerable benefits for translation pedagogy, as these tools offer students direct exposure to authentic language usage, improving their ability to make informed translation decisions and enhancing their overall linguistic and translational competence.

El-Farahaty (2025) note that bilingual parallel corpora and comparable corpora significantly enrich translation teaching by enabling students to intuitively analyze translation strategies, linguistic patterns, and stylistic choices. Corpus tools also facilitate self-reflective practices among translation students, allowing them to evaluate and adjust their translation strategies based on empirical linguistic evidence. Moreover, corpus-based methodologies support deeper analyses of translation phenomena, thereby enabling translation students to develop a more sophisticated and research-informed understanding of translation processes and practices.

Integration of CAT and Corpus Tools Under TPACK

Recent literature strongly advocates the synergistic integration of CAT and corpus tools within structured educational frameworks like TPACK to overcome existing pedagogical shortcomings (Su & Li, 2023; Zhang

& Vieira, 2021). Both tool sets complement each other effectively: CAT tools enhance productivity, consistency, and technical competence, while corpus tools promote deeper linguistic understanding, empirical analysis, and reflective translation practices.

Xu (2010) proposed that incorporating network tools alongside CAT and corpus tools can create a more engaging and collaborative learning setting for translation students. This teaching strategy reflects the core ideas of the TPACK framework, which values the thoughtful integration of technology and pedagogy. Through this combined approach, students improve both their translation abilities and key professional skills such as teamwork and project coordination.

However, integrating these tools under the TPACK framework is not without challenges. Translation teachers must carefully design curricula that balance technical proficiency, pedagogical objectives, and content knowledge, designing translation courses that naturally incorporate CAT and corpus tools. Furthermore, teachers must address issues related to tool complexity, learning difficulties, student resistance, and institutional support for technology-based teaching practices.

Although existing studies recognize the potential of using CAT and corpus tools in translation teaching, few have explored how to integrate these tools effectively within the TPACK framework. There is still a lack of detailed research on how such integration works in practice, what strategies are useful, and what impact it has on students' learning. This study addresses these gaps by proposing a structured way to bring CAT and corpus tools into translation teaching based on the TPACK model. Using a Chinese university translation course as a case, it aims to provide practical teaching strategies, improve classroom practice, and support the ongoing reform of translation education through better use of technology.

THEORETICAL FRAMEWORK

The TPACK framework, developed by Mishra and Koehler (2006), serves as a theoretical foundation for integrating technology effectively in educational settings. It emphasizes the interplay of three primary knowledge domains: TK, PK, and CK. Successful integration of technology in teaching relies on both individual domain knowledge and the interplay between them—namely, PCK, TPK, TCK, and ultimately the integrated domain of TPACK.

In translation teaching, CK involves language proficiency, knowledge of translation theories, and domain-specific knowledge such as law, medicine, or technology. PK includes teaching design, teaching strategies, and assessment techniques. TK encompasses familiarity with translation technologies, including CAT tools, corpus, and terminology management tools (Li et al., 2023).

The intersections of these knowledge areas are particularly vital when embedding technological tools into teaching (Chai et al., 2013). For instance, TPK involves knowing how to select and use CAT or corpus tools in ways that enhance pedagogy—such as structuring translation exercises that simulate real-world scenarios. TCK includes understanding which translation technologies are best suited for particular tasks, such as using alignment tools to compare legal documents or employing a monolingual corpus to determine stylistic consistency. When combined with PCK—such as understanding how students learn translation strategies—these dimensions culminate in a fully integrated TPACK model that facilitates meaningful technology-enhanced translation teaching .

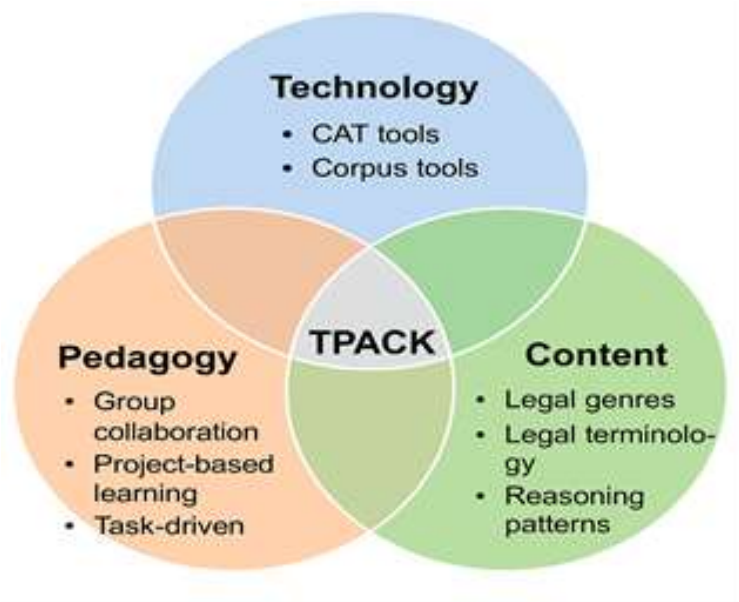
A TPACK-oriented framework ensures that these tools are not simply introduced as technical add-ons but are purposefully aligned with teaching goals (Jimoyiannis, 2015). Moreover, implementing TPACK in translation teaching requires attention to scaffolding and differentiated teaching strategies, as students often differ in their

familiarity with technological tools and translation proficiency. A TPACK model empowers teachers to adapt teaching dynamically—such as offering tiered translation tasks, providing screen-recorded tutorials, or allowing students to engage in peer-led tool demonstrations (Alqahtani, 2021).

In this course, CAT and corpus tools were purposefully embedded into weekly teaching tasks, aligned with the TPACK framework. The primary CAT tool adopted was Déjà Vu, which was used extensively in the translation of courtroom-related documents such as indictments and judgments. These tasks were organized as group projects that simulated real-world translation agency workflows. Each group was required to draft a translation project proposal, assign roles, perform machine-assisted pre-translation, conduct post-editing collaboratively, and manage final output along with associated language assets. This approach not only enhanced students' technical fluency with Déjà Vu's translation memory and termbase functions but also promoted project management and teamwork.

In parallel, WordSmith Tools was utilized for a variety of corpus-based tasks. These included intra-group and inter-group translation comparisons, as well as parallel corpus analyses for terminology verification and stylistic alignment. Students also applied corpus functions to build and maintain project-specific language assets, integrating corpus data into their translation memory systems. By incorporating these tools into authentic, task-based translation scenarios, the teacher ensured that technological knowledge was not taught in isolation but rather in close connection with pedagogical objectives and content knowledge, reflecting the core principles of the TPACK model, as shown in Fig 2.

Fig 2 Integration of CAT and Corpus Tools within TPACK Framework



To provide a clearer view of how CAT and corpus tools were integrated throughout the course, a week-by-week teaching plan is presented in Table 1. Weeks 5–8 focused on corpus-based analysis, while Weeks 10–18 implemented both CAT and corpus tools in simulated legal translation projects.

Table 1: Selected Weekly Schedule of the Course

Week	Chapter & Topic	Teaching Focus and Tools Used
05-Jun	Chapter 4: Lexical Comparison between Legal Languages: Constitution of PRC (English Version) vs. Constitution of USA	Comparative analysis using Wordsmith Tools 4.0 for terminology patterns

07-Aug	Chapter 5: Chinese–English Legal Language	Corpus-assisted analysis of legal terms, sentence templates, and legal syntax both in English and Chinese
18-Oct	Chapter 8: Practical Legal Translation	Group-based CAT translation project; project proposal, TM setup, parallel corpora comparison, and post-editing of machine output

“Legal Translation” Related to CAT and Corpus Tools

In summary, the theoretical framework of TPACK provides a comprehensive lens through which translation teachers can design, implement, and refine technologically mediated teaching. It shifts the pedagogical focus from isolated software training to purposeful, theory-informed integration that prepares students for the complexities of professional translation practice.

METHODOLOGY

This study employed a mixed-methods research design, combining both quantitative and qualitative methods to provide a comprehensive examination of students’ learning experiences, the teaching process, and the effectiveness of integrating CAT and corpus tools in a TPACK-guided translation course. The research was implemented over a 18-week academic semester in a third-year undergraduate legal translation course.

Data Collection

The participants were 38 third-year undergraduate students from the 2021 cohort majoring in translation at a provincial university in northwest China. Convenience sampling was adopted, given the researcher’s access to the course and the feasibility of administering classroom-based interventions (Etikan, 2016). All students had previously completed introductory courses in translation theory, legal English, and an initial introduction to CAT tools such as DéjàVu. Their baseline knowledge provided a suitable foundation for exploring more advanced technology-integrated pedagogies.

Questionnaire

Two identical structured questionnaires were administered at the beginning and end of the semester, from March to September, 2024. The instruments included 24 items measured on a 5-point Likert scale (1=strongly disagree, 5=strongly agree).

The questionnaire was developed with reference to the TPACK framework (Mishra & Koehler, 2006), and informed by translation pedagogy literature relevant to legal translation and technology integration in Chinese higher education contexts (Zhang, 2018; Wu & Yu, 2017; Wang, 2018). The structure of the instrument was guided by the core intersections of TPACK, including CK, TK, PK, and their overlaps, and adapted to reflect the competencies required in translation classrooms utilizing CAT and corpus tools. The reliability of the questionnaire was confirmed, with Cronbach’s alpha coefficients of 0.92 for the pre-survey and 0.94 for the post-survey, indicating high internal consistency.

The present instrument include six dimensions, each consisting of four items, corresponding to specific intersections within the TPACK framework. (1) TPACK-oriented cognitive integration ability: this dimension reflects students’ capacity to internalize and integrate domain-specific knowledge in legal translation. It aligns with CK and PCK, assessing their understanding of translation principles, legal discourse conventions, and interdisciplinary connections; (2) Translation content and contextual knowledge competence: focusing on

students' ability to produce accurate, stylistically appropriate translations, this dimension corresponds to CK and TCK. It emphasizes the role of CAT and corpus tools in mastering legal terminology, document structure, and translation strategies; (3) Technological application and integration ability: linked to TK and TPK, this dimension evaluates students' proficiency with tools such as Deja Vu and WordSmith Tools, including machine translation post-editing, terminology management, alignment, and corpus analysis; (4) Collaborative translation and communication competence: this component reflects the intersection of PK and integrated TPACK, emphasizing students' teamwork skills in simulated translation project settings. Activities include group planning, division of labor, tool-based collaboration, and peer revision; (5) TPACK-guided problem-solving competence: reflecting the comprehensive application of TCK, TPK, and TPACK, this dimension examines students' ability to identify and resolve translation problems using technological resources, translation theory, and project workflow management; (6) Civic literacy and legal awareness through translation: integrated with the ideological and political education dimension, this final component emphasizes students' awareness of China's legal system, institutional values, and translation's civic function. It resonates with CK and PCK, as well as the broader educational goals embedded in translation pedagogy (Baran & Uygun, 2016).

Interview

To gain a deeper understanding of students' experiences and perceptions regarding the integration of CAT and corpus tools, as well as to triangulate the questionnaire findings, semi-structured interviews were conducted at the end of the semester.

A total of 12 students were selected using purposive sampling to ensure diversity in performance levels, tool engagement, and gender representation (Etikan, 2016). The interview focused on four key areas: (1) students perceived benefits and drawbacks of CAT and corpus tools in legal translation tasks; (2) specific challenges encountered during tool operation and project collaboration; (3) application of CAT and corpus skills in real-world translation contexts; and (4) suggestions for improving teaching design and technical support (Zappatore, 2024; Kornachi, 2018; Nguyen et al., 2024).

To ensure representativeness and diversity among interview participants, students were purposively selected based on three criteria: performance level, tool engagement, and gender. Performance Level refers to students' overall academic performance in the legal translation course. This was determined by triangulating final course grades, project-based translation scores, group collaboration evaluations, and teacher observations (Mohammed, 2022). Students were categorized into three levels: high (30%), medium (40%) and low (30%). Tool Engagement indicates students' frequency, depth, and initiative in using CAT tools and corpus tools during weekly activities and group translation projects. Evaluation was based on classroom observations, technological platform usage records (e.g., "Rain Classroom" logs), and documentation produced during group tasks (e.g., alignment files, terminology databases, concordance analysis reports). Students were categorized into four levels: high, active, moderate and low.

This classification ensured that the 12 student participants reflected a balanced spectrum of translation proficiency and technological engagement, thereby enhancing the validity and depth of qualitative insights.

In addition, one course teacher was interviewed to provide contextual insights from the teaching perspective. Since the legal translation course was solely taught and coordinated by a single teacher throughout the semester, this individual was the only viable and relevant respondent for capturing pedagogical decision-making, tool integration strategies, and classroom-level observations. As the sole, this teacher was deeply involved in all aspects of planning, delivery, and assessment, making their perspective particularly valuable for understanding the teaching logic and pedagogical outcomes of the course regarding the application of the TPACK framework and the teaching use of CAT and corpus tools.

The teacher interview addressed: the pedagogical rationale for integrating Déjà Vu and WordSmith Tools; strategies used to scaffold students' tool use and translation task engagement; observed student difficulties in managing real-world translation workflows; and reflections on how the TPACK framework informed teaching planning and classroom decision-making (Debbagh & Jones, 2015).

These teacher perspectives complemented the student responses by explaining how technological tools were selected, adapted, and aligned with course objectives, particularly in the design of project-based translation assignments and the incorporation of ideological education components. The dual-source interview data provided richer qualitative evidence for analyzing the affordances and constraints of technology-enhanced legal translation teaching under the TPACK model (Nguyen et al., 2024). Participants information was shown in Table 2.

Table 2: Interview participant's table

ID	Role	Gender	Performance Level	Tool Engagement
S01	Student	Female	High	Active
S02	Student	Male	High	Moderate
S03	Student	Female	High	Active
S04	Student	Male	High	High
S05	Student	Female	Medium	Low
S06	Student	Male	Medium	Active
S07	Student	Male	Medium	Active
S08	Student	Female	Medium	Moderate
S09	Student	Male	Medium	Active
S10	Student	Female	Low	Low
S11	Student	Male	Low	Moderate
S12	Student	Female	Low	Low
T01	Teacher	Female	-	-

Data Analysis

Quantitative Analysis

Quantitative data from the pre- and post-course questionnaires were analyzed using SPSS 27. Descriptive statistics were first computed to summarize students' self-reported competencies across the six TPACK-informed dimensions. To examine whether the teaching integration of CAT and corpus tools significantly impacted students' perceived translation competence, technological fluency, and collaborative ability, paired-sample t-tests were conducted to compare pre- and post-survey scores for each dimension. Statistically significant improvements ($p < 0.05$) were observed across all six areas, with particularly notable gains in legal translation accuracy, tool application proficiency, and problem-solving strategies. These results corroborate the effectiveness of the TPACK-guided pedagogical approach.

Further analysis explored the influence of students' prior experience with CAT and corpus tools. Based on

self-reported familiarity at the beginning of the semester, participants were grouped into experienced users (n=21) and novices (n=17). An independent samples t-test and one-way ANOVA were conducted to assess whether prior experience led to significant differences in learning outcomes across the six TPACK-informed dimensions. A multiple regression analysis was also performed to examine whether initial technological literacy (independent variable) predicted post-course improvements in translation competence and collaborative performance (dependent variables). The model yielded significant predictive power ($p < 0.05$).

Results showed that while experienced users started with higher confidence, both groups achieved comparable gains across all dimensions, indicating that the instructional design effectively supported students with varying levels of prior knowledge—a pattern consistent with Van Riesen et al. (2019), who found that well-guided instructional design can mitigate the disadvantages of limited prior knowledge in complex learning tasks. The regression analysis further confirmed that initial technological literacy significantly influenced students' confidence in managing translation tasks and group collaboration, underscoring its role in maximizing the benefits of tool-supported learning (Arjang et al., 2024).

These quantitative findings confirm that the TPACK-based integration of technology, pedagogy, and content meaningfully enhanced students' legal translation competence, promoted active tool engagement, and fostered teamwork and civic awareness—all critical outcomes aligned with contemporary translation education goals.

Qualitative Analysis

Interview data were analyzed using Braun and Clarke's (2006) six-step thematic analysis approach, including familiarization, coding, theme development, and refinement. NVivo 12 was used to assist the coding process.

To ensure representativeness, twelve student participants were purposively selected to reflect variation in performance level, tool engagement, and gender. Specifically, the sample included four high-performing students (2 male, 2 female), five students at the medium level (3 male, 2 female), and three low-performing students (2 female, 1 male). In terms of tool engagement, the sample covered a wide range—from low to high—capturing diverse experiences with CAT and corpus tools. These classifications were based on course grades, project outcomes, tool usage logs (e.g., Rain Classroom logs), and teacher observations during group tasks. This stratified selection strategy ensured that the qualitative data captured a well-balanced cross-section of learner profiles, supporting richer and more credible thematic analysis. Initial coding focused on patterns related to students' perceived benefits and challenges in using CAT and corpus tools, their reflections on collaborative learning, and the transferability of tool-based skills to real-world translation contexts. Themes were iteratively refined through constant comparison.

In addition to student interviews, one course teacher was interviewed to provide contextual insights into teaching design and classroom implementation. As the only teacher throughout the course, they provided valuable insights into the rationale behind tool selection, the strategies used to support student engagement, and how these tools were aligned with the teaching goals informed by the TPACK framework. This combination of student and teacher perspectives offered a richer understanding of how technology-enhanced teaching shaped learning processes, complementing the quantitative findings and enhancing the overall validity of the study.

RESULTS AND FINDINGS

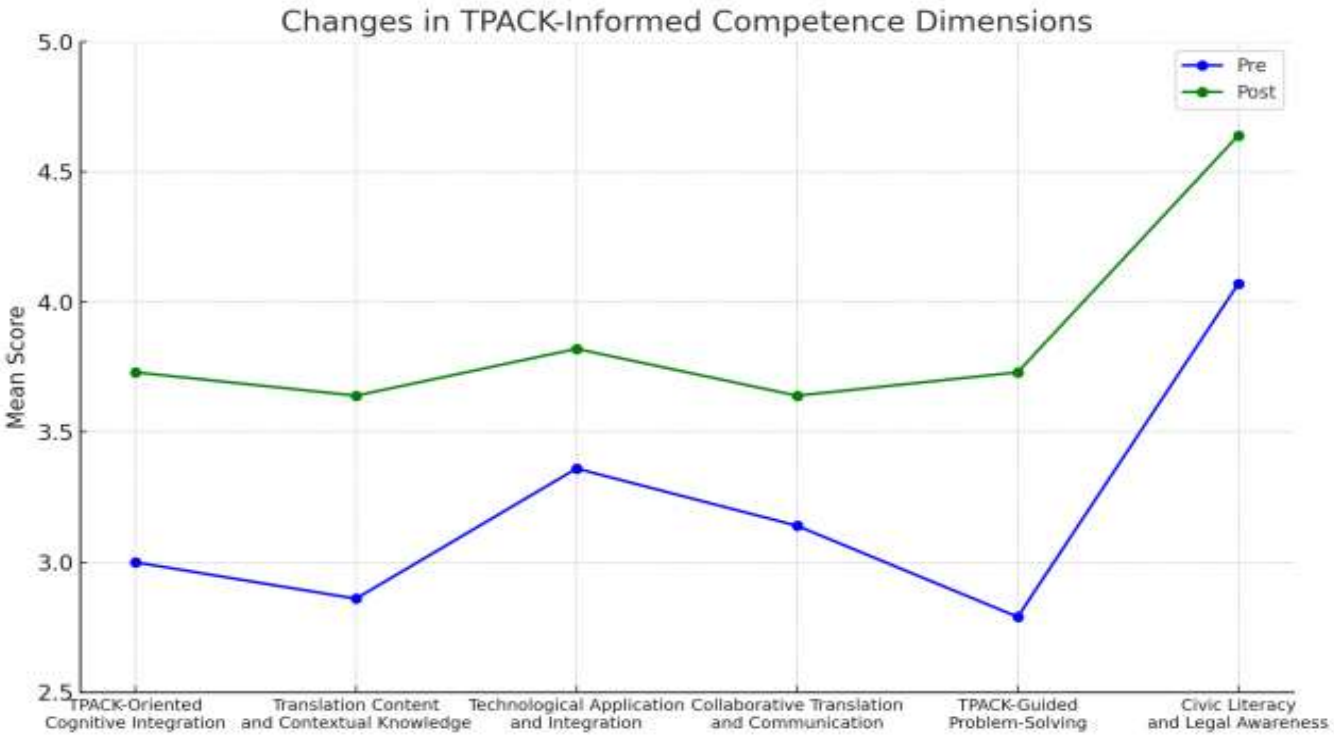
Results and Discussions

The comparison between the pre- and post-course survey results revealed meaningful improvements in students' self-reported competencies across all six TPACK-informed dimensions (as shown in Fig 3). These

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue VII July 2025

gains reflect not only statistical significance, but also pedagogical effectiveness in integrating technology, pedagogy, and legal content within the legal translation classroom. Paired-sample t-tests indicated that the differences between pre- and post-course scores across all six dimensions were statistically significant ($p < 0.05$), confirming that the observed improvements were not due to random variation..

Fig 3 Changes in TPACK-informed competence dimensions



TPACK-Oriented Cognitive Integration Ability (CK+PCK): At the start of the course, students' self-reported understanding of core legal translation concepts (e.g., legal terminology and genre-specific conventions) was relatively modest. For example, the item "I fully understand and internalize the three modules taught this semester" had a mean score of 3.00, and "I am fully able to understand and translate the legal terms taught this semester" scored 3.07. At the end of the semester, these scores rose to 3.73 and 3.64 respectively, reflecting a substantial improvement in students' internalization of legal content and translation frameworks. These gains indicate the effectiveness of pedagogical strategies that linked translation theory with legal content (Hamed & Alqurashi, 2025).

Translation Content and Contextual Knowledge Competence (CK+ TCK): Students' ability to handle authentic legal texts also improved. The mean score for the item "I can read and translate legal texts of the same level of difficulty as taught" increased from 2.86 to 3.64. Similarly, their confidence in producing accurate and properly formatted translations ("My translation is grammatically correct, terminologically accurate, and properly formatted") increased from 3.00 to 3.73. These results reflect the role of translation technologies—especially Deja Vu and WordSmith Tools—in improving students' legal language control and output accuracy, consistent with the TCK dimension of the framework.

Technological Application and Integration Ability (TK+TPK): The teaching design included hands-on tasks using CAT and corpus tools. By the end of the semester, the item "I am proficient in using corpus tools and CAT tools" improved from 3.36 to 3.82, and "I am well aware of the advantages and limitations of machine translation" increased from 3.71 to 4.09. These gains support the view that students enhanced their TK and were able to integrate these tools pedagogically in meaningful translation scenarios (TPK) (Lisa et al., 2021). The technology was not introduced in isolation but embedded within real-world translation projects that

required students to manage alignments, post-edit machine output, and reflect on corpus-based evidence.

Collaborative Translation and Communication Competence (PK+TPACK): Translation projects were conducted in simulated group environments mimicking professional workflows. Items related to collaboration showed notable growth: "I can communicate and collaborate well with classmates and content experts" rose from 3.14 to 3.64, and "I can communicate effectively in online and offline translation projects" improved from 3.07 to 3.82. These shifts suggest enhanced pedagogical knowledge for teamwork and coordination, further supported by TPACK-informed tasks that fostered real-time tool-based collaboration. The integrated teaching model also helped cultivate students' problem-solving abilities and professional awareness. Students learned to identify translation challenges and apply technology-based strategies to resolve them. This competence is essential in legal translation, where precision, efficiency, and justification are crucial (Xu, 2010).

TPACK-Guided Problem-Solving Competence (TCK+TPK+TPACK): Students reported better problem-solving ability using tools and project workflows. The score for "I can accurately and efficiently determine the best solutions to translation problems" increased from 2.79 to 3.73. Similarly, the item "I can efficiently use technical tools and online resources to solve legal translation problems" rose from 3.36 to 4.09. These improvements confirm that students learned not only how to operate tools, but how to strategically select and apply them to complex legal translation challenges—fulfilling the core vision of integrated TPACK use (Lee, 2023). These skills are directly transferable to professional translation contexts, where translators are expected to navigate complex workflows, apply technological resources critically, and deliver accurate legal texts under time constraints (Tian, 2024).

Civic Literacy and Legal Awareness through Translation (CK+PCK + Ideological Dimension): Scores in the civic literacy and legal awareness category were consistently high. The items such as "I believe this course has enhanced my legal knowledge" and "This course helped me establish a rational understanding of patriotism" had mean scores of 4.64 and 4.64 respectively in the post-survey, compared to 4.07 and 3.86 in the pre-survey, reflecting sustained values-oriented engagement. These results align with TPACK's broader pedagogical aims, supporting knowledge integration with ideological and ethical dimensions.

The quantitative findings provide clear support for RQ1, indicating that the structured integration of CAT and corpus tools under the TPACK framework led to statistically significant and educationally meaningful improvements in students' perceived translation competence, technological fluency, and collaborative ability. The positive shifts observed across all six dimensions—especially in legal content internalization, tool-based problem-solving, and teamwork—suggest that the teaching design successfully enhanced students' readiness for real-world legal translation tasks.

These results also reaffirm the value of the TPACK model in translation pedagogy. By aligning technological tools with discipline-specific content and collaborative learning practices, the model enables a more integrated and practice-oriented approach to translation training (Koehler et al., 2007). Rather than viewing CAT and corpus tools as isolated technical skills, this study positions them as essential elements of a coherent teaching system that supports both professional development and civic awareness. Such integration highlights how technology, when purposefully embedded, can enrich students' disciplinary understanding and foster deeper engagement with translation as both a linguistic and social practice.

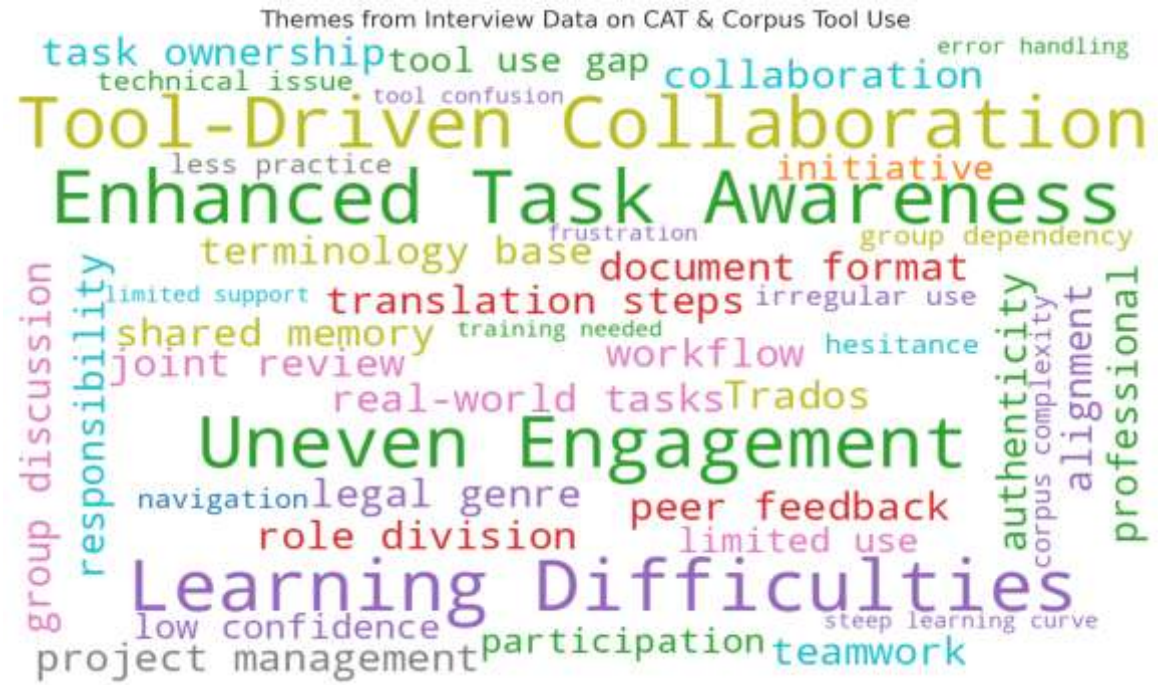
FINDINGS AND DISCUSSIONS

This section addresses RQ2 by exploring students' perceptions of the affordances and challenges associated with CAT and corpus tools in the context of legal translation learning. Drawing on thematic analysis of

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue VII July 2025

interview data, four key themes emerged: enhanced task awareness, tool-driven collaboration, uneven engagement and learning difficulties. These thematic insights are visually summarized in Fig 4, which presents a word cloud of high-frequency codes generated from the interview data.

Fig 4 Word cloud highlighting high-frequency codes under four interview themes: Enhanced Task Awareness, Tool-Driven Collaboration, Uneven Engagement, and Learning Difficulties.



Enhanced Task Awareness: Many students expressed that using Déjà Vu and WordSmith Tools helped them better understand how legal translation operates in practice. The tools made abstract legal concepts—such as terminology consistency, fixed structures, and formal register—more visible and actionable (El-Farahaty, 2025). As S03 shared: “I used to think legal translation was just about being accurate. But now I realize it’s also about being systematic—building term bases, checking past segments, formatting properly.” Students perceived that CAT tools facilitated organized workflows, while corpus tools helped confirm appropriate language use. These affordances were echoed in post-survey gains in legal content understanding and structured translation output.

Tool-driven Collaboration: Group translation projects provided opportunities to simulate real-world teamwork. Many students appreciated that tool-based tasks required negotiation and shared decision-making, such as resolving terminology conflicts or dividing file segments. These processes improved their collaborative mindset. S09 reflected: “We had to work together to make the termbase and agree on sentence patterns—it was like real work.” This perceived affordance aligns with TPACK-informed pedagogy that emphasizes technology-mediated collaboration (Mishra & Koehler, 2006; Chai et al., 2013). Teacher interview data confirmed that students became more comfortable managing translation tasks collectively by mid-semester.

Uneven Engagement: Despite general gains, interviews revealed gaps in tool familiarity and confidence. Some students, particularly those with lower performance levels, expressed difficulty understanding the purpose of certain tool functions or felt hesitant to explore features independently (Prensky, 2001; Arjang et al., 2024). S05 mentioned: “I was okay with the basic parts, but didn’t really know how to use the corpus tool unless someone showed me.” This highlights a common challenge: while tools provide affordances, their complexity can pose a barrier without adequate supporting (Van Riesen et al., 2019; Huang, 2024). Several students suggested that the learning process was “front-loaded”, meaning early sessions felt overwhelming.

Learning difficulties: Some students expressed that the 18-week semester did not allow enough time for full mastery of both CAT and corpus tools. The need to juggle content learning, group coordination, and tool operation sometimes led to frustration or surface-level use (Sweller, 1988). S11 noted: "We had so much to do in one project—sometimes I just copied what the others did without really learning the tool myself." This reflects a perceived cognitive load when integrating multiple tool functions with legal content. Teacher interview data supported this view and suggested that future iterations of the course could redistribute tool complexity more gradually (Mishra & Koehler, 2006).

When asked how the learning experience could be improved, students offered several constructive suggestions, including: providing a step-by-step video guide or in-class demos for each tool function; allowing more time in early weeks for hands-on exploration; pairing tool novices with more experienced peers for guided collaboration. These suggestions underline the importance of teaching design that matches tool complexity with learners' readiness—a core insight aligned with the TPACK model's emphasis on pedagogical adaptability (Topping, 2005).

Overall, students perceived CAT and corpus tools as valuable resources that enhanced legal translation learning by promoting accuracy, organization, and teamwork. At the same time, challenges related to tool complexity, uneven engagement, and teaching pacing suggest the need for more differentiated supporting and phased integration. These findings offer practical implications for refining technology-enhanced translation pedagogy, especially in legal contexts where both precision and collaboration are essential.

CONCLUSION

This study examined how the integration of CAT and corpus tools, guided by the TPACK framework, supported student learning in a legal translation course. Quantitative results showed clear gains in students' translation competence, tool operation skills, and collaboration, answering RQ1 (Mishra & Koehler, 2006). These improvements suggest that when technological tools are meaningfully embedded into content-based and task-oriented teaching, students can better connect legal knowledge with practical translation workflows.

The interview data further addressed RQ2, showing that students generally found CAT and corpus tools helpful for building legal language awareness and simulating professional translation processes. However, many also reported challenges, especially in the early stages of using complex tools like corpus software. Those difficulties were often overcome through peer support, teacher guidance, and repeated use in real translation tasks (Tian, 2024; Lee, 2023).

This research contributes to existing translation pedagogy by showing how a TPACK-informed approach can improve both skill acquisition and learner confidence (Jimoyiannis, 2015; Zappatore, 2024). It also highlights the value of step-by-step tool integration and the need to balance technical complexity with accessible teaching. Still, the study has its limitations. It was conducted in a single course context with a limited number of participants. While students reported positive outcomes, further studies could track actual translation quality or explore how these tools perform across different translation domains or institutions.

In sum, combining legal content with CAT and corpus tools in a structured and student-centered way not only supported translation learning but also gave students a clearer sense of how technology fits into real-world translation practice. The findings may also apply to other translation domains such as business, medical, or technical translation, where domain-specific content and technological tools play a critical role. Future research could adopt a longitudinal design to trace how students apply CAT and corpus competencies in internships, freelance work, or early-career professional contexts, providing deeper insights into sustained skill transfer and long-term pedagogical impact.

Ethical Declaration

Informed consent was obtained from all participants prior to data collection, and all responses were anonymized to protect participants' privacy. The study adhered to ethical standards for educational research.

ACKNOWLEDGEMENTS

This research was supported by the research projects titled "A Study on the Construction and Application of a Chinese-English Parallel Corpus for Machine Translation and Post-editing of Enterprises and Public Institutions in Yulin City (H2023060113)", and "Internationalization Education and Teaching Reform Research Project of Yulin University (GJJG2403)". The author gratefully acknowledges the funding and support provided by the two projects, which contributed significantly to the development and implementation of this study.

REFERENCES

1. Albrecht, S., Hill, C., & Smith, K. J. (2023). Pedagogical translation as a culturally sustaining pedagogy in bilingual language environments. English in Texas, 53(2), 42-49.
2. Alqahtani, M. (2021). A TPACK-in practice model for enhancing EFL students' readiness to teach with Ed-Tech apps. International Journal of Interactive Mobile Technologies (iJIM), 15(17), 156–170.
3. Arjang, A., Syahputra, M., Farhadi, A., & Silva, D. (2024). The effect of digital literacy, technological adoption, and collaborative learning on student engagement in business education. International Education Trend Issues, 2(2), 339-351.
4. Baran, E., & Uygun, E. (2016). Putting technological, pedagogical, and content knowledge (TPACK) in action: An integrated TPACK-design-based learning (DBL) approach. Australasian Journal of Educational Technology, 32(2).
5. Bowker, L. (2002). Computer-aided translation technology: A practical introduction. Ottawa: University of Ottawa Press.
6. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.
7. Chai, C. S., Koh, J. H. L., & Tsai, C.-C. (2013). A review of technological pedagogical content knowledge. Educational Technology & Society, 16(2), 31-51.
8. Chang, W. (2024). Computer-assisted translation software: Current problems and development trends in the context of artificial intelligence. International Journal of Advanced Academic Studies, 6(11), 84-90.
9. David, S. S., Pacheco, M. B., & Jiménez, R. T. (2019). Designing translingual pedagogies: Exploring pedagogical translation through a classroom teaching experiment. Cognition and Instruction, 37(2), 252–275.
10. Debbagh, M., & Jones, W. M. (2015). Using the TPACK framework to examine technology integration in English language teaching. SITE 2015 Society for Information Technology & Teacher Education International Conference, Las Vegas, NV, United States.
11. Directorate-General for Translation, European Commission. (2009). European Master's in Translation (EMT). Brussels.
12. Deng, L., & Wang, Q. L. (2022). A survey on the current TPACK level of physics pre-service teachers and strategies for improvement. Journal of Teacher Education, 9(3), 153-164.
13. El-Farahaty, H. (2025). Integrating corpora and AI tools in the teaching, learning, and assessing of

Arabic/English legal translation. International Journal for the Semiotics of Law. Advance online publication.

14. Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4.
15. Hamed, D. M., & Alqurashi, N. (2025). A corpus-driven study on legal translation challenges among Arab law students: Examining gender and academic level in applied legal linguistics. Humanities and Social Sciences Communications, 12, 1065.
16. Han, X. B., & Ge, W. S. (2018). A study on the information-based teaching competency of Chinese university teachers. China Higher Education Research, (7), 57–63.
17. Hu, K., & Gao, L. (2024). The development of foreign language disciplines in the context of large language models: Issues and prospects. Foreign Language World, (2).
18. Hu, K. B., & Li, X. Q. (2023). The development of translation research under the background of large language models: Issues and prospects. Chinese Translators Journal, (6).
19. Jimoyiannis, A. (2015). TPACK 2.0: Towards a framework guiding Web 2.0 integration in educational practice. In M. S. Khine (Ed.), New directions in technological pedagogical content knowledge research: Multiple perspectives (pp. 83–108). Charlotte, NC: Information Age Publishing. (Draft version)
20. Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy and technology. Computers & Education, 49(3), 740–762.
21. Kornacki, M. (2018). Computer-assisted translation (CAT) tools in the translator training process. Peter Lang.
22. Lee, C. (2023). Technological proficiency in modern translator education: Addressing current and future needs. Journal of Translation Studies, 42(2), 113–130.
23. Li, X., Gao, Z., & Liao, H. (2023). The effect of critical thinking on translation technology competence among college students: The chain mediating role of academic self-efficacy and cultural intelligence. Psychology Research and Behavior Management, 16, 1233–1256.
24. Lisa, A., Faridi, A., Bharati, D. A. L., & Saleh, M. (2021). A TPACK-in practice model for enhancing EFL students' readiness to teach with Ed-Tech apps. International Journal of Interactive Mobile Technologies (iJIM), 15(17), 156–170.
25. Liu, M. H., & Kleinsasser, R. C. (2015). Exploring EFL teachers' CALL knowledge and competencies: In-service program perspectives. Language Learning & Technology, 19(1), 119–138.
26. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017–1054.
27. Mohammed, T. A. S. (2022). Formative self, peer and teacher assessments in the translation classroom. Dirasat: Human and Social Sciences, 48(4), 466–481.
28. Nguyen, H., Mouw, J. M., Mali, A., Strijbos, J.-W., & Korpershoek, H. (2024). Developing a Technological Pedagogical and Content Knowledge (TPACK) survey for university teachers. Computers and Education Open, 7, 100202.
29. Niess, M. L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. Teaching and Teacher Education, 21(5), 509–523.
30. Prensky, M. (2001). Digital natives, digital immigrants: Part I. On the Horizon, 9(5), 1–6.
31. Ren, X., & Ren, F. (2015). A survey and analysis of the current status of TPACK among university teachers. Modern Educational Technology, 25(4), 38–44.
32. Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. Harvard

Educational Review, 57(1), 1–22.

33. State Council of the People's Republic of China. (2019). China's Education Modernization 2035. Retrieved from https://www.gov.cn/zhengce/2019-02/23/content_5367987.htm
34. Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. Cognitive Science, 12(2), 257-285.
35. Tian, X. (2024). Personalized translator training in the era of digital intelligence: Opportunities, challenges, and prospects. Heliyon, 1-13.
36. Topping, K. J. (2005). Trends in peer learning. Educational Psychology, 25(6), 631-645.
37. Van Riesen, N., Gijlers, H., Anjewierden, A., & De Jong, T. (2019). The influence of prior knowledge on the effectiveness of guided experiment design. Instructional Science, 47(1), 17–33.
38. Wang, H. L., & Zhang, Z. (2025). Transformation and ethical challenges of translation teaching driven by large language models. Language and Education Studies, 9(2).
39. Wang, Y., La, L., Zhang, Q., & Ning, C. (2025). Exploration of mechanical experiment teaching cases based on TPACK theory: Taking the experiment of measuring gravitational acceleration with a single pendulum as an example. Research and Exploration in Laboratory, 44(6).
40. Wu, P., & Yu, S. (2017). Developing pedagogical content knowledge (PCK) through module team collaboration: A case study of business English teachers in China. The Asia-Pacific Education Researcher, 26(1–2), 97–105.
41. Xu, B. (2010). Computer-assisted translation teaching and course offering. Shanghai Journal of Translators, (4), 45-49.
42. Zappatore, M. (2024). Incorporating collaborative and active learning strategies in the design and deployment of a master course on computer-assisted scientific translation. Tech Know Learn, 29, 253–308.
43. Zhang, F. L. (2018). Designing a training model for compound legal English talents: The systematic design of a compound legal English talent training model. Foreign Language Education, 39(3), 44–47.