

Artificial Intelligence in Interpreting Education Curriculum: A Delphi Study for Interpreter Competencies

Chunwen Yang¹, Jing Chen², Deyan Zou³

Abstract

This study explores essential competencies for interpreters in the age of artificial intelligence (AI) to ensure they are well-equipped to navigate an evolving professional landscape. Using the Delphi method, a panel of experts identified and ranked key competencies necessary for interpreting graduates, ultimately classifying these into six primary dimensions: Core Cognitive Abilities, Lifelong Learning and Professional Development, Communication and Interpersonal Skills, Specialized Domain Knowledge and Linguistic Expertise, Ethics and Professionalism, and Technology and Information Management. The Technological Pedagogical Content Knowledge (TPACK) framework underpins the study, providing a structured approach to understanding the intersection of AI and interpreter competencies, emphasizing the need for critical thinking, adaptability, and ethical judgment. Findings indicate that competencies such as adaptability and critical thinking are vital for future interpreters, with implications for both curriculum development and professional training in interpreting education. Despite limitations in the diversity of expert perspectives, this study contributes valuable insights to interpreting education, highlighting areas for future research in refining competency frameworks and adapting curricula to AI-driven demands in interpreting.

Keywords: *Artificial intelligence (AI), Delphi method, Education policy, Interpreter competency, Interpreter training.*

A. Introduction

The rise of artificial intelligence (AI) has brought about profound changes across a wide array of industries, fundamentally altering how professionals operate, and the skills required to remain competitive (Morandini et al., 2023). The interpretation industry, a key sector within the realm of language services, has seen significant disruption as AI-driven technologies such as machine translation and AI-based interpretation software increasingly offer services traditionally performed by human interpreters (Samantray et al., 2024). This trend poses both challenges and opportunities for the profession. On the one hand, AI tools threaten to reduce the demand for human interpreters in some scenarios; on the other hand, they offer a wealth of new resources that can complement human expertise, enabling interpreters to enhance the quality and efficiency of their work.

In light of these technological advancements, there is a growing need for interpreting graduates to be well-versed not only in traditional interpreting competencies but also in the use

¹School of Advanced Translation and Interpretation, Dalian University of Foreign Languages, Dalian 116044, Liaoning, China. Faculty of Education and Liberal Arts, INTI International University, Persiaran, Nilai, Negeri Sembilan, Malaysia

²School of Advanced Translation and Interpretation, Dalian University of Foreign Languages, Dalian 116044, Liaoning, China. 13970140705@139.com

³School of Advanced Translation and Interpretation, Dalian University of Foreign Languages, Dalian 116044, Liaoning, China

and understanding of AI technologies (ÖZKAYA MARANGOZ, 2023). AI technologies mediate and frame decisions in interpreting, impacting everything from terminology choices to real-time translation accuracy. As a result, interpreting students must be equipped to navigate the complex interplay between AI systems and their own sensory perceptions, cognitive processes, and decision-making skills (Kumar & Nagar, 2024). A comprehensive understanding of how AI impacts interpreting practice is vital for interpreters to remain relevant in a field that is becoming increasingly automated.

The interpretation profession in China serves as an illustrative example of this trend. Despite the rapid rise of AI tools, the number of students enrolling in programs like the Bachelor of Translation and Interpreting (BTI) and the Master of Translation and Interpreting (MTI) continues to grow (LI, & ZHANG, 2023). This paradox underscores the importance of adapting and interpreting education to meet the changing demands of the industry. While the supply of trained interpreters increases, so too must the scope of their training, ensuring they are prepared to engage with and leverage AI technologies to enhance their professional capabilities. The integration of AI into the interpreting curriculum is not just a luxury but a necessity to prepare future professionals for the challenges and opportunities presented by the AI revolution.

However, current research in the field of interpreting education, especially in China, reveals a significant gap. While interpreting as a practice has a long history, academic research into interpreting, particularly in the context of education, has lagged behind that of translation (Wang & Tang, 2020). Moreover, while AI is frequently discussed in the context of interpreting technology, there is little literature specifically addressing the competencies that interpreting graduates need to effectively incorporate AI into their work. Most existing research tends to focus on the practical aspects of interpreting, such as techniques and technologies in use, rather than the educational competencies required to navigate an AI-driven future.

This study seeks to address these gaps by exploring the competencies that interpreting graduates must acquire to be ready for AI technologies. By using the Delphi method—a structured communication technique designed to gather input from a panel of experts—this research will identify, rank, and evaluate the key competencies required to work alongside AI in interpreting. The Delphi method is particularly suited to this task because it facilitates consensus-building among experts, providing a reliable framework for determining which competencies are most critical to include in interpreting education (Yeung et al., 2021).

The outcomes of this study are expected to have significant implications for the development of interpreting curricula, helping educators and program administrators ensure that their graduates are fully prepared for the challenges of a rapidly evolving industry. Additionally, the study will contribute to the broader academic discourse on the impact of AI in language services, offering insights that can inform future research and policy-making in the field. By filling a critical gap in the literature, this research aims to bridge the divide between the technological advancements in AI and the competencies needed by future interpreters, ensuring that interpreting education remains relevant, dynamic, and forward-thinking.

This study on integrating AI competencies within interpreting education adopts the Technological Pedagogical Content Knowledge (TPACK) framework to explore essential interpreter competencies in an AI-driven era. Developed initially to guide technology integration in education, TPACK identifies and synthesizes three core knowledge domains—technology, pedagogy, and content—that together offer a balanced approach to preparing students for modern challenges (Tondeur et al., 2020).

Technological Knowledge (TK) in TPACK emphasizes interpreters' ability to use AI-driven tools, such as machine translation, speech recognition, and interpreting software, which are increasingly essential in today's interpreting landscape. Proficiency in these technologies equips interpreters with critical tools that enhance both the efficiency and quality of interpreting

services, helping them stay relevant in a field transformed by AI (Tian, 2024). Besides, Content Knowledge (CK), within the TPACK framework, underscores the need for interpreters to possess extensive expertise in specific domains such as law, medicine, or diplomacy. This competency is crucial for accurate interpretation and distinguishes human interpreters from AI by allowing them to handle specialized terminology and cultural differences (ÖZKAYA MARANGOZ, 2023). Last, Pedagogical Knowledge (PK) in TPACK focuses on effective teaching and learning strategies, particularly as they pertain to equipping interpreting students with the ability to integrate AI into their workflows effectively (Santos & Castro, 2021). It provides educators with strategies to blend AI competencies with traditional interpreting skills, ensuring that future interpreters receive a well-rounded education that meets the demands of a technologically evolving industry.

In summary, TPACK serves as a robust framework for understanding and developing the competencies required for interpreters in an AI-driven world. This framework enables interpreting educators to create a curriculum that balances traditional linguistic and cultural skills with modern technological proficiency, ensuring that interpreting graduates are prepared to navigate and leverage AI as a complementary asset in their professional roles.

B. Literature Review

1. Technological Competency

Technological competency has become an indispensable part of the interpreter's skill set in the 21st century (Wang & Li, 2022). The integration of artificial intelligence (AI) into interpreting practice has necessitated a shift from traditional interpreting to a technology-augmented approach. Studies by Moneus and Sahari (2024) emphasize that interpreters benefit from being adept at using Computer-Assisted Translation (CAT) tools, speech recognition software, and AI-based real-time interpreting platforms like Google Translate or Skype Translator. These technologies reduce the cognitive load on interpreters, allowing them to focus more on contextual nuances, but they also present challenges. For instance, AI systems often lack the cultural and emotional intelligence needed for nuanced interpreting, requiring interpreters to critically assess and adjust the output. Fan (2024) further highlights that technology brings about the risk of deskilling, where over-reliance on automated systems can erode interpreters' natural abilities.

Critically, technological competency extends beyond tool proficiency; it also involves understanding how to ethically engage with these systems. As Hutchins (2021) points out, interpreters must possess knowledge of data privacy issues, especially since AI-driven systems may process sensitive information during conference interpreting sessions (Horváth & Tryuk, 2021). Thus, a well-rounded technological competence encompasses not only the operational use of tools but also ethical and critical engagement with AI technologies.

2. Critical Thinking

Critical thinking is central to the interpreter's role, particularly when AI technologies are involved. AI tools can provide quick translations, but they often miss the subtleties embedded in human languages. As defined by Paul and Elder (1992), critical thinking involves analyzing, assessing, and reconstructing interpretation tasks to achieve accuracy and effectiveness. In interpreting, this skill is indispensable when dealing with ambiguities, where AI outputs may fail to capture contextual meanings. Interpreters are expected to evaluate the appropriateness of AI-generated content, particularly in domains such as law or healthcare, where misinterpretation can have serious consequences (Brandenberger et al., 2024).

Critical thinking involves more than error detection in AI outputs. According to Horváth (2022), interpreters must question AI's decision-making frameworks, often rooted in general algorithms that do not account for cultural or contextual specificities. This competency becomes essential in ensuring that AI tools complement rather than replace human judgment, requiring interpreters to balance technology with critical human insight.

3. Multilingual and Multicultural Competency

Multilingual and multicultural competence remains a core requirement for interpreters in an AI-driven world (Alharbi, 2024). Although AI tools like neural machine translation (NMT) can process vast amounts of language data, they often struggle with context-specific interpretations, especially involving cultural nuances and idiomatic expressions (Benmansour & Hdouch, 2023). Interpreters must, therefore, retain a high level of linguistic competence to fill the gaps left by AI. Multilingual proficiency allows interpreters to handle a wide range of languages, while multicultural competence ensures they understand and convey the social and cultural nuances embedded in speech.

Elmahdi and Mohammad (2024) emphasize the importance of this competency in AI-driven environments. AI can standardize translation processes, but this often leads to decontextualized and culturally insensitive interpretations. To mitigate this, interpreters must deploy their multilingual and multicultural competencies to adapt AI-generated outputs to align with the speaker's intent and cultural context. Additionally, as AI tools evolve, interpreters must remain vigilant to new challenges presented by language variation, dialects, and evolving cultural norms, ensuring their interpretations remain relevant and accurate (Moneus & Tagaddeen, 2023).

4. Ethical and Professional Competence

Ethical and professional competence has become a focal point in discussions around AI in interpreting. As AI systems increasingly handle sensitive information, issues related to data privacy and confidentiality have come to the forefront. According to Defrancq (2024), interpreters must be acutely aware of the ethical ramifications of using AI-driven tools that may inadvertently breach client confidentiality or store personal data. In response to these challenges, the literature calls for a deeper integration of ethical training into interpreter education, particularly around AI technologies.

Furthermore, the professional competence of interpreters is scrutinized in the context of AI replacing human labor. Howes (2023) suggests that interpreters must advocate for a more ethical integration of AI, ensuring that technology is seen as a supplement rather than a replacement. This view positions interpreters as ethical gatekeepers who are responsible for maintaining professional standards, even when working alongside AI (Horváth & Tryuk, 2021). The debate surrounding the deskilling of interpreters in favor of AI also touches on the professional identity of interpreters, raising questions about their role in an increasingly automated industry.

5. Adaptability and Lifelong Learning

In an industry characterized by rapid technological advancements, adaptability, and lifelong learning have emerged as critical competencies. AI technologies are evolving at an unprecedented pace, meaning that interpreters must continuously update their skills to remain competitive. According to Kolb's experiential learning theory, lifelong learning enables professionals to adapt to new technological paradigms by engaging in continuous reflection and skill acquisition (Kolb, 2014).

Research suggests that employees who remain static in their learning risk obsolescence in the face of AI-driven disruptions (Popov, 2023). Moreover, Pöchhacker (2022) argues that the demand for interpreters with specialized knowledge of AI tools will increase, necessitating a

shift in interpreter education toward more technology-focused curricula. Lifelong learning, in this context, involves not only the mastery of new tools but also the ability to foresee and adapt to industry trends, ensuring that interpreters remain relevant in the digital age.

6. Communication and Interpersonal Skills

Communication and interpersonal skills remain irreplaceable competencies in interpreting, even in the AI age (Dvorianchykova et al., 2022). While AI can assist with the mechanical aspects of language translation, it cannot replicate the nuanced communication and relationship-building required in professional interpreting. As Giustini (2021) explains, interpreters must be adept at managing human interactions, especially in emotionally charged or culturally complex settings.

AI tools, despite their advancements, lack the emotional intelligence required to navigate sensitive situations, such as diplomatic or medical interpreting. Therefore, interpreters must maintain a strong command of interpersonal communication skills, using empathy, negotiation, and conflict resolution techniques to ensure that interpreted messages resonate with their audiences. Therefore, communication skills are vital in ensuring that AI-generated outputs are appropriately contextualized, maintaining human connection in interactions mediated by technology (Creely, 2024).

7. Encyclopedia and Domain-Specific Knowledge

Domain-specific knowledge has always been a vital competency for interpreters, particularly in specialized fields such as law, medicine, or finance (Li, 2024). The advent of AI has not diminished this requirement; rather, it has heightened the need for interpreters to be experts in their respective fields. AI tools can provide generalized translations, but they often falter when dealing with specialized jargon, technical terminology, or highly context-dependent language (Naveen & Trojovský, 2024).

Interpreters with domain-specific knowledge are better equipped to verify and adjust AI-generated outputs to ensure accuracy and relevance. As noted by Taghian (2024), AI tools may provide literal translations that fail to capture the meaning behind specialized terms. Therefore, interpreters must retain an encyclopedic knowledge of their domain to ensure that technical accuracy is upheld in their translations. This is particularly important in high-stakes environments, where misinterpretation can lead to significant consequences.

C. Methods

1. Research Design

This study seeks to identify and rank the competencies required by interpreting graduates to be adequately prepared for the integration of artificial intelligence (AI) technologies in their professional practice. The Delphi method was selected for its ability to facilitate consensus among experts through structured rounds of surveys, making it particularly well-suited for this exploratory study (Skulmoski, Hartman, & Krahn, 2007).

This Delphi study will be conducted over two rounds to obtain expert insights and refine the list of competencies through consensus-building (Furtado et al., 2024). The experts will include professionals in interpreting education with extensive practical teaching experience. The first round will focus on collecting initial opinions about competencies required for AI integration, while the second round will allow experts to rank these competencies based on their perceived importance. This iterative process ensures that the identified competencies are robust, relevant, and reflective of interpreting graduates' current and future needs (McIntyre-Hite, 2016). The Delphi study process is summarized in Figure 1.

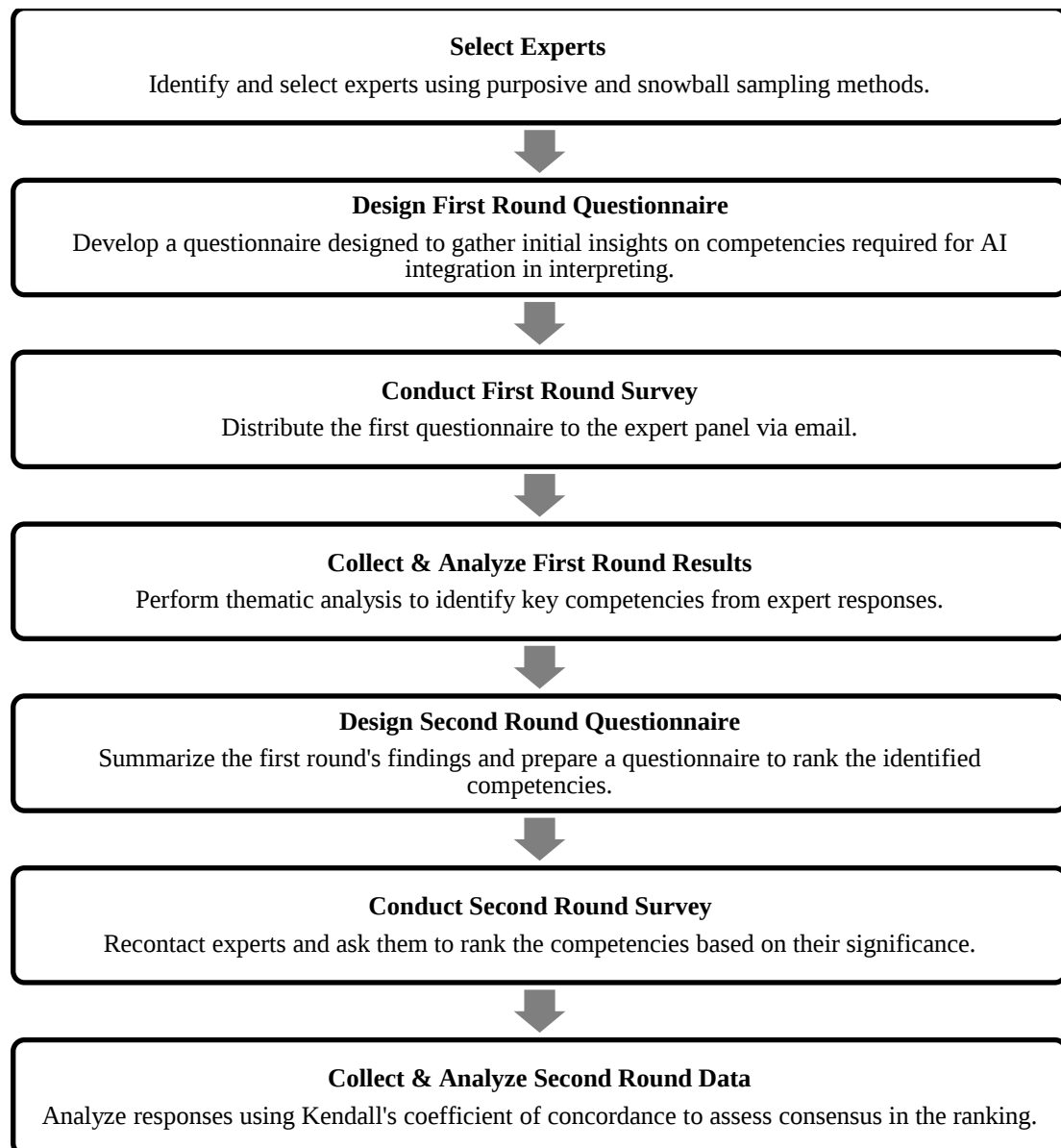


Figure 1. Delphi study process

2. Sampling Design and Data Collection

A purposive and snowball sampling approach was employed to gather a panel of experts in interpreting studies and education. Purposive sampling was used to select experts with significant experience and knowledge in these fields, ensuring a broad and insightful perspective on the competencies required. Snowball sampling further expanded the panel by recruiting additional experts recommended by the initial respondents. This technique was particularly effective in reaching highly specialized experts in interpreting education (Skulmoski, Hartman, & Krahn, 2007).

A total of 10 experts participated in this study, representing various areas of expertise in interpreting studies and education. Data collection was conducted over two rounds using email surveys. In the first round, experts were asked open-ended questions to elicit their views on the essential competencies for interpreting graduates in an AI-driven context. The responses were collected and thematically analyzed to identify a comprehensive list of key competencies. The second round focused on consensus building, where experts ranked the competencies identified in the first round according to their perceived importance (Ye et al., 2022). This process enabled

the refinement of the data and ensured a consensus-driven understanding of the most critical competencies.

3. Questionnaire

The development of the questionnaires was a crucial part of the Delphi study. In the first round, the questionnaire was designed with open-ended questions to encourage experts to share their perspectives on the necessary competencies for interpreting graduates in the age of AI. This approach allowed for the identification of a wide range of competencies, including those that may not have been considered in the preliminary stages of research design. The open-ended format enabled experts to introduce new competencies that reflected their specific professional experiences and insights (Çalışkan, Demir, & Karaca, 2022).

For the second round, a more structured questionnaire was developed based on the findings of the first round. Experts were presented with a synthesized list of the identified competencies and were asked to rank them in order of importance. Clear instructions were provided to guide experts through the ranking process, ensuring that each competency was given a distinct rank and that experts could make informed decisions based on the previous round's responses (Sällberg & Folino, 2024). This step was essential for achieving consensus on the most critical competencies for interpreting graduates to be prepared for AI technologies.

4. Ethical Consideration

This study received ethical approval from the Dalian University of Foreign Languages. All participants provided written informed consent prior to their involvement in the study, confirming their understanding of the research's purpose and the confidentiality of their responses. The study maintained strict ethical standards, ensuring that all expert responses were anonymized and used solely for the research's objectives. Experts were also reminded of their right to withdraw from the study at any time, ensuring their autonomy throughout the process.

5. Data Analysis

The data collected in the first round of the Delphi study were analyzed using thematic analysis to identify key patterns and insights related to the competencies required for interpreting graduates. Responses were reviewed, transcribed, and coded into thematic categories that reflected the most relevant competencies, ensuring a detailed and comprehensive understanding of the expert panel's opinions (Rahayu & Wulandari, 2022). This thematic analysis provided the foundation for the development of the second-round questionnaire.

For the second round, Kendall's coefficient of concordance (W) was used to assess the level of consensus among the expert panel regarding the ranking of the competencies. This statistical tool evaluates the agreement between ranked items, with a value close to 1 indicating strong consensus and a value closer to 0.5 suggesting moderate agreement. A significant Kendall's W value, accompanied by a low p-value (<0.05), would confirm that the experts had reached consensus on the most important competencies (Chen et al., 2023). If a low Kendall's W with a high p-value were observed, further rounds of the Delphi process could be considered to refine the results and improve agreement among the panel.

D. Findings and Discussion

The first round of the Delphi survey commenced on 09 October 2023. A total of 10 out of 32 experts responded to the questionnaire. The study surveyed experts from six Chinese public universities to gain diverse insights into the relevant interpreter competencies. The expert panel for this Delphi study consisted of ten interpreting educators from prestigious universities across

China, each contributing significant expertise to the field. Respondent E1, from Sun Yat-sen University, and E2, from Xian International Studies University, both hold senior academic titles as Associate Professor and Professor, with 10 and 16 years of experience, respectively. Respondents E3 through E7 represent Dalian University of Foreign Languages, with academic ranks of Associate Professor and Professor, and bring a collective teaching experience of 12 to 22 years. Respondent E8, from Beijing Foreign Studies University, E9, from Sichuan International Studies University, and E10, from Shanghai International Studies University, have extensive backgrounds in interpreting education, each with 14 to 22 years of experience and holding positions of Associate Professor. This diverse and highly experienced panel, with a strong presence of doctoral degrees, was selected to provide a range of perspectives on integrating AI competencies into interpreting education. Detailed responses from this diverse group of experts can be found in Table 1.

Table 1. Expert who participated in the Delphi study

No.	Interpreting Teaching Experience (Year)	Highest Academic Qualification	Academic Title	Affiliation
E1	10	Doctor	Associate Professor	Sun Yat-sen University
E2	16	Master	Professor	Xian International Studies University
E3	22	Doctor	Professor	Dalian University of Foreign Languages
E4	21	Master	Associate Professor	
E5	15	Doctor	Associate Professor	
E6	20	Doctor	Professor	
E7	12	Doctor	Associate Professor	
E8	15	Master	Associate Professor	Beijing Foreign Studies University
E9	22	Master	Associate Professor	Sichuan International Studies University
E10	14	Doctor	Associate Professor	Shanghai International Studies University

Following the completion of the first-round survey, the collected data were carefully examined, coded, and presented in a straightforward manner for easy understanding and analysis, highlighting the consistency of responses. The participating experts identified 19 key findings relevant to the research topic during the first round. These findings were then categorized into 6 dimensions, covering a broad range of interpreter competencies in the age of AI. A detailed breakdown of this classification is presented in Table 3. The six identified dimensions encompass essential competencies for interpreters in an AI-driven context: (1) Core Cognitive Abilities including critical thinking, adaptability, and cognitive flexibility), (2) Lifelong Learning and Professional Development including continuous learning, resilience, and personal growth, (3) Technology and Information Management including technological competency, information management, and AI integration, (4) Communication and Interpersonal Skills including multimodal communication, collaboration, and interpersonal skills, (5) Ethics and Professionalism including ethical competence, professional judgment, and confidentiality, and (6) Specialized Domain Knowledge and Linguistic Expertise including domain-specific knowledge, enhanced linguistic skills, and cultural sensitivity. Together, these dimensions address the competencies interpreters needed to master in order to survive in the age AI.

Table 2. Consolidation of round one Delphi findings

No.	Dimensions	Themes
1	Core Cognitive Abilities	● Critical Thinking ● Adaptability ● Cognitive Flexibility
2	Lifelong Learning and Professional Development	● Continuous Learning ● Resilience ● Personal Growth
3	Technology and Information Management	● Technological Competency ● Information Management ● AI Integration
4	Communication and Interpersonal Skills	● Multimodal Communication ● Collaboration ● Interpersonal Skills
5	Ethics and Professionalism	● Ethical Competence ● Professional Judgment ● Confidentiality
6	Specialized Domain Knowledge and Linguistic Expertise	● Domain-Specific Knowledge ● Enhanced Linguistic Skills ● Cultural Sensitivity

On 26 October 2024, the Delphi study's second phase began, with experts previously involved asked to rank interpreter competencies in the age of AI. They used a scale of 1 (most important) to 6 (least important), with instructions to assign unique values to each dimension for accurate analysis.

The mean and group rank for each factor in the second round of the Delphi method were calculated, as shown in Table 4. The data reveal that the mean rankings for the five dimensions range from 1.80 to 5.20. The order of importance of these dimensions is as follows: (1) Core cognitive abilities with a mean of 1.80, (2) Lifelong learning and professional development with a mean of 2.60, (3) Communication and interpersonal skills with a mean of 3.00, (4) Specialized domain knowledge and linguistic expertise with a mean of 3.30, (5) Ethics and professionalism with a mean of 5.10, (6) Technology and information management with a mean of 5.20. It is noteworthy that the consensus ranking, as determined through statistical analysis using Kendall's W, yielded a value of 0.539 and a p-value of 0.00. This outcome indicates a high degree of consistency in the rankings among the expert groups in the second round. Therefore, conducting a third round of the Delphi process is deemed unnecessary.

Table 3. Second round of Delphi survey

Expert s	Core Cogniti ve Abilities	Lifelong Learning and Professiona l Developme nt	Technology and Informatio n Manageme nt	Communicati on and Interpersonal Skills	Ethics and Professionalis m	Specialize d Domain Knowled ge and Linguisti c Expertise
E1	2	3	5	4	6	1
E2	3	5	6	4	2	1
E3	1	2	3	4	6	5
E4	1	2	6	3	4	5
E5	1	2	4	3	6	5
E6	2	1	6	4	5	3
E7	2	3	6	1	5	4

Expert s	Core Cogniti ve Abilities	Lifelong Learning and Professiona l Developme nt	Technology and Informati on Manageme nt	Communicati on and Interpersonal Skills	Ethics and Professionalis m	Specialize d Domain Knowled ge and Linguisti c Expertise
E8	1	3	5	2	6	4
E9	3	1	6	4	5	2
E10	2	4	5	1	6	3
Mean	1.80	2.60	5.20	3.00	5.10	3.30
Group Rank	1	2	6	3	5	4

1. Core Cognitive Abilities

In interpreting education, Core Cognitive Abilities such as critical thinking, adaptability, and cognitive flexibility form the bedrock of interpreter training, especially in the age of AI. Ranked as the most essential competency by the experts, these abilities align with TPACK's focus on blending content and technology knowledge. Critical thinking is paramount, as interpreters must evaluate the accuracy and context of AI-generated outputs in real-time. As one expert noted, "Interpreters not only need to quickly obtain information, but also must have the ability to analyze and evaluate information" (E1). This highlights that critical thinking enables interpreters to make informed decisions during interpretation, fostering accuracy in complex scenarios where AI alone may fall short.

Cognitive flexibility and adaptability are equally vital in a technology-driven environment where interpreters face constant changes in tools and settings. Experts emphasized adaptability, noting that interpreters must "adjust to new technologies and environments rapidly to remain competitive" (E1, E5). Research by Timarová & Salaets (2011) supports this, indicating that interpreters with strong adaptability can perform better in interpreting tasks, enhancing both their efficiency and resilience. The ability to navigate diverse tools and workflows, as stressed in TPACK's technological knowledge component, directly enhances performance and underscores why core cognitive abilities were prioritized by experts as essential for the modern interpreter.

2. Lifelong Learning and Professional Development

Ranked second, Lifelong Learning and Professional Development reflects the importance of continuous skill enhancement in response to technological advancements. TPACK's integration of pedagogical and technological knowledge supports the notion of ongoing learning, as interpreters need to keep pace with evolving AI tools and industry changes. Experts widely agreed on this, emphasizing that "the ability to continuously update knowledge and skills is critical to meeting AI-related challenges" (E1, E5). Lifelong learning cultivates resilience, with interpreters developing a proactive approach to skill enhancement, which is essential for long-term career growth and adaptability in a rapidly changing field.

Additionally, experts stressed that resilience and personal growth are central to maintaining relevance, with one respondent asserting, "Interpreters should view their professional development as an ongoing process, constantly adapting to new tools and methodologies" (E8). The ranking of this dimension highlights its supportive role, as lifelong learning ensures that interpreters can meet the challenges of AI integration without sacrificing their foundational skills. Research by George (2023) corroborates this, underscoring the need for continual learning to prevent obsolescence in a technology-driven profession, validating why experts considered this a high-priority competency.

3. Communication and Interpersonal Skills

Communication and Interpersonal Skills ranked third among critical competencies for interpreters, underscoring their importance in both AI-assisted and traditional interpreting contexts. This dimension, rooted in TPACK's pedagogical knowledge component, emphasizes effective communication strategies that bridge human interaction with AI-mediated processes. Experts underscored the significance of interpersonal skills, noting that "skills such as active listening and rapport-building are essential for effective client interaction, especially in remote or hybrid settings" (E10, E3). This focus aligns with findings from Çoban and Telci (2016), who argue that interpersonal skills remain indispensable, as AI tools lack the emotional intelligence necessary to navigate sensitive and complex interpreting contexts, such as diplomacy or healthcare. In such scenarios, human interpreters bring a level of empathy and understanding that AI cannot replicate, making interpersonal skills critical for message accuracy and contextual sensitivity.

The requirement for multimodal communication—where interpreters must work across audio, video, and text platforms—also reflects trends in the literature. Sandrelli and Jerez (2007) highlighted that interpreters in AI-augmented environments increasingly engage with diverse platforms, necessitating flexible communication skills that adapt to different modalities. Experts echoed this, noting that "future interpreters will need communication skills that span verbal, visual, and textual modes to cater to diverse client needs" (E5). Cho (2021) further supports this view, emphasizing that while AI can enhance interpreting efficiency, it is the interpreters' interpersonal and communication skills that ensure culturally sensitive and contextually appropriate exchanges. The alignment of these findings with the expert panel's ranking underscores Communication and Interpersonal Skills as essential for bridging AI functionality with meaningful human interaction, ensuring interpreters can adapt to both technological and human-centered demands effectively.

4. Specialized Domain Knowledge and Linguistic Expertise

While Specialized Domain Knowledge and Linguistic Expertise is vital for accuracy in specialized fields, experts ranked it fourth, reflecting its supportive rather than central role in general interpreter competencies. Within TPACK's content knowledge domain, this dimension acknowledges that interpreters must have a solid foundation in specialized terminology and cultural context, which AI may struggle to provide. Experts agreed that this competency "enables interpreters to manage highly specialized terminology and complex nuances that AI might overlook" (E8, E7). This aspect is particularly relevant in high-stakes fields such as legal and medical interpreting, where misinterpretations can have serious consequences.

However, compared to Core Cognitive Abilities, Specialized Domain Knowledge was ranked lower because it is not universally required across all interpreting scenarios. As one expert noted, "While specialized knowledge is essential in specific fields, core abilities like critical thinking and adaptability have broader applications in any interpreting context" (E3). Research by Wen & Dong (2019) further emphasized that while domain expertise enhances interpreter accuracy, it is secondary to the general cognitive skills that underpin effective interpreting, explaining the expert panel's decision to rank this dimension fourth.

5. Ethics and Professionalism

Ethics and Professionalism was ranked fifth, highlighting its essential role yet lesser priority compared to cognitive and interpersonal skills. In TPACK, this dimension relates to pedagogical approaches that guide interpreters in maintaining ethical standards while working with AI. Experts highlighted the growing need for ethical competence in AI-integrated interpreting, particularly in terms of "upholding confidentiality and making sound decisions about when to

rely on AI versus human expertise” (E10, E7). This competency is critical in fields like legal or military interpreting, where data privacy and ethical decision-making are paramount.

Nonetheless, the ranking suggests that Ethics and Professionalism, while necessary, is considered a secondary support skill compared to the more dynamic competencies required to handle AI’s cognitive and interpersonal demands. According to Wu, Duan, & Ni (2024), ethical training remains crucial for handling AI’s privacy implications; however, the expert panel’s lower ranking reflects that ethics primarily reinforces rather than directly enhances interpreting performance, explaining its place as the fifth priority.

6. Technology and Information Management

Ranked sixth, Technology and Information Management encompasses the practical technological skills essential for incorporating AI tools into interpreting workflows. Within TPACK, this dimension aligns with technological knowledge, focusing on interpreters’ proficiency in using AI-based resources, virtual platforms, and data management systems. Experts noted that “interpreters must be adept with virtual platforms, automated translation tools, and AI-integrated software to enhance both speed and accuracy” (E9, E4), highlighting the practical necessity of technology skills in a digital interpreting landscape.

However, this competency was ranked lower, reflecting its supportive rather than foundational role. As one expert observed, “While technological skills are crucial, they support rather than drive interpreting quality, as cognitive and interpersonal abilities have a more direct impact on performance” (E2). Thornhill-Miller et al. (2023) concur, noting that while technology proficiency is vital for efficiency, it does not substitute for critical cognitive and interpersonal skills. This ranking suggests that Technology and Information Management is viewed as an enabler, necessary for operational efficiency but secondary to the interpersonal and cognitive competencies that ensure quality in interpreting outcomes.

7. Implications of the study

Theoretically, the use of TPACK as the theoretical foundation in this study provides several theoretical implications for understanding the competencies critical to interpreters in the age of AI. TPACK, which categorizes knowledge into technological, pedagogical, and content domains, allows for a structured approach to analyzing the distinct yet interrelated competencies that interpreters need to navigate AI-enhanced environments. In applying TPACK, this study emphasizes that, in addition to core linguistic and cultural skills (content knowledge), interpreters must possess the cognitive and ethical judgment to interact with AI outputs critically (pedagogical knowledge), as well as the flexibility to integrate and adapt to emerging technologies (technological knowledge) (Tian, 2024).

By utilizing TPACK, the study extends interpreting education theory to highlight the competencies interpreters require, not solely as technical skills but as integrated capabilities that support effective decision-making in AI contexts. TPACK’s content domain supports the need for interpreters to maintain deep expertise in linguistic, cultural, and specialized domain knowledge, which remain crucial regardless of AI presence. Pedagogically, TPACK highlights the importance of teaching interpreters to use critical thinking when relying on AI for interpretation tasks, ensuring AI is used as a tool rather than as a substitute for human expertise. Thus, TPACK enables a theoretical perspective that acknowledges AI as a transformative factor in interpreting but emphasizes that content, critical evaluation, and adaptability remain core competencies essential for maintaining the quality and professionalism of interpreting work (Abulibdeh, Zaidan, & Abulibdeh, 2024).

Practically, this study suggests actionable steps for interpreter trainees and trainers to prioritize competencies relevant in an AI-enhanced interpreting landscape. For interpreter trainees, the study emphasizes the importance of competencies like critical thinking,

adaptability, and ethical judgment (Orlando, 2016). These competencies help interpreters interact with AI technologies effectively and critically, enabling them to assess AI outputs and make informed adjustments during interpretation. Trainees are encouraged to focus on developing a mindset of continuous learning and adaptability, recognizing that the interpreting profession is becoming more integrated with AI tools that can support, but not replace, human decision-making (Monzó Nebot, 2015). By focusing on these competencies, trainees can strengthen their ability to navigate AI-supported interpreting with the necessary cognitive flexibility and ethical awareness.

For interpreter trainers, these findings highlight the need to design curricula that address competencies vital for interpreting in AI contexts without solely focusing on technical skills. Trainers are encouraged to incorporate pedagogical approaches that foster critical thinking, ethical judgment, and adaptability, ensuring that interpreters understand how to work alongside AI tools while maintaining high standards of accuracy and professionalism (Cheng, 2022; Tipton, 2024). Additionally, trainers should emphasize the content knowledge domain, particularly linguistic, cultural, and specialized expertise, as essential skills that AI cannot replicate (Amato & Mack, 2022; Oraki & Tajvidi, 2020). By equipping students with these competencies, trainers help to prepare future interpreters who are not only skilled in the technical aspects of interpretation but also capable of critically and ethically engaging with AI in a way that enhances their professional contributions in the field.

E. Conclusion

This study has identified and ranked key competencies necessary for interpreters in the age of AI, highlighting core cognitive abilities, lifelong learning, communication skills, specialized knowledge, ethics, and technology management as essential areas. Using the TPACK framework, the study provides a structured approach to understanding how these competencies align with the demands of AI-integrated interpreting, emphasizing the importance of critical thinking, adaptability, and ethical judgment. By examining these competencies through expert consensus, the study contributes valuable insights for interpreting education, helping to ensure that future interpreters are equipped to navigate and utilize AI as a supportive tool.

However, this study has several limitations. First, the scope of expert participation was somewhat limited, potentially restricting the diversity of perspectives across different interpreting specializations and regions. Additionally, interpreting itself is a multifaceted field that involves varied types and languages, from conference interpreting to community interpreting, each with distinct demands that AI may influence differently. Finally, the Delphi method, while effective for consensus-building, is limited in its generalizability and could benefit from complementary quantitative approaches to enhance the robustness of findings.

Future research should aim to include a broader and more diverse range of experts across different interpreting types, languages, and regions to better capture the varied competency needs in AI-supported interpreting. Studies might also examine specific competencies within different interpreting contexts to better understand how AI impacts areas such as court, medical, or conference interpreting individually. Finally, mixed-method approaches combining Delphi with quantitative surveys or longitudinal studies could provide deeper insights, helping to validate and refine competency frameworks as AI technology continues to evolve in the interpreting profession.

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Disclosure statement

The authors report there are no competing interests to declare.

Notes on Contributors

Chunwen Yang is a master's student majoring interpreting in at Dalian University of Foreign Languages and also a master's student majoring in Education Management at INTI International University. He also serves as a teaching assistant at the School of Advanced Translation and Interpretation, Dalian University of Foreign Languages, China. His research interests encompass a broad spectrum, including education policy, second language acquisition, and translation and interpretation. His work focuses on integrating educational management practices with language acquisition theories and translation studies, contributing to advancements in these fields.

Jing Chen is an associate professor and master's supervisor in English interpreting at the School of Translation and Interpretation, Dalian University of Foreign Languages (DUFL). She holds a master's degree in Applied Linguistics from Dalian University of Foreign Languages. Her research focuses on applied linguistics and interpreting.

Deyan Zou is a professor and the Deputy Head of the School of Advanced Translation and Interpretation at the Dalian University of Foreign Languages.

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