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The Reconstruction of Translation Competence in the Digital Intelligence Era and Its Implications for the MTI Education in China

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Abstract

This paper examines the profound impact of the Digital Intelligence Era, marked by artificial intelligence and neural machine translation, on the foundational concept of translation competence. It argues that traditional models, while empirically robust, are premised on a paradigm of human-centric cognition with technology as an assistive tool. In response, the study proposes a comprehensive reconstruction towards a Human-Machine Collaborative Competence (HMCC) framework. This new model redefines the translator as a "Language Service Architect", whose core meta-competence is the strategic orchestration of human and artificial intelligence. The HMCC framework is elaborated across four integrated dimensions: Strategic Decision-Making, Technological & Data Literacy, Bilingual-Cultural Proficiency, and Domain & Project Management. We then propose a systemic transformation encompassing redefined program objectives, a restructured curriculum centered on a core technology cluster and "Translation of China" practice, and innovative pedagogy based on a "Classroom-Platform-Project" ecosystem. The analysis acknowledges significant implementation challenges, including techno-ethical dilemmas, faculty readiness, and lagging assessment systems. Ultimately, it posits that successfully cultivating the HMCC—with sophisticated post-editing and cultural finalization as its exemplar—is essential for building China's national translation capacity and ensuring its voice in global digital discourse.

Keywords: digital intelligence era; translation competence; Master of Translation and Interpreting (MTI); educational transformation; human-machine collaboration

Introduction

The advent of the Digital Intelligence Era, characterized by artificial intelligence, big data, and sophisticated language technologies, has fundamentally disrupted the traditional landscape of translation. Machine translation (MT) systems have evolved from simple word-for-word substitution to generating contextually aware, fluent outputs, challenging long-held assumptions about the exclusive human domain of translation. This technological shift necessitates a critical re-examination of the very core of the profession: translation competence. While established models have long defined the knowledge, skills, and aptitudes required of a professional translator, their adequacy in an age of human-AI collaboration is now in question. The digital intelligence era does not render human translation competence obsolete but rather demands its

fundamental reconstruction, integrating technological symbiosis and strategic mediation as new pillars. This reconstructed competence framework holds profound implications for translator education, particularly for China's Master of Translation and Interpreting (MTI) programs, which face the urgent task of modernizing their curricula to prepare graduates for a rapidly evolving market.

This reconstruction moves beyond merely adding "technology use" as a sub-competence. It involves a paradigm shift where the translator's role transforms from a sole text producer to a strategic post-editor, project manager, and quality controller within technologically mediated workflows. Core strategic and textual competencies must now encompass the ability to critically evaluate MT output, make informed decisions on when to use or bypass AI tools, and manage the ethical and practical complexities of human-AI collaboration. For MTI education in China, this evolution presents both a challenge and an opportunity. The current model, often critiqued for its lag in addressing technological integration, must undergo systemic reform. This paper will analyze the key dimensions of this reconstructed translation competence—focusing on technological, strategic, and ethical literacies—and propose concrete pathways for MTI curriculum innovation, pedagogical adaptation, and assessment redesign. The goal is to equip future Chinese translators not to compete with machines, but to master them, ensuring their indispensable role in the globalized, intelligent information economy of the future.

2. Literature Review and Theoretical Framework

2.1 A Critical Review of Classic Translation Competence Models

Research on translation competence has long aimed to define and deconstruct the multifaceted skills required of a professional translator. Among the most influential contributions are the models proposed by the PACTE group, the longitudinal TransComp project and the EMT framework, which have shifted the paradigm from prescriptive lists of skills to empirical, process-oriented investigations.

The PACTE（2003） (Process in the Acquisition of Translation Competence and Evaluation) model represents a cornerstone in empirical translation studies. It conceptualizes translation competence not as a static set of attributes but as a dynamic system of interdependent sub-competencies. The model's final version integrates five core sub-competencies—bilingual, extra-linguistic, instrumental, knowledge about translation, and strategic—alongside psycho-physiological components. The strategic sub-competence is paramount, acting as the control center that interconnects all others and manages the translation process as a problem-solving activity. The PACTE group's significance lies not only in this theoretical model but in its rigorous methodological blueprint for investigating it empirically.

Building on this empirical tradition but with a distinct longitudinal focus, the TransComp project, led by Susanne Göpferich (2009), pioneered the tracking of translation competence

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development over a three-year period. Its competence model synthesizes several sub-competences, with a pronounced emphasis on strategic competence, tools and research competence, and translation routine activation competence. TransComp's major contribution is its methodological innovation in process research. This approach yielded profound insights into the nature of expertise. This model particularly emphasizes the developmental stages of competence and introduces the concept of "translation routines," highlighting the professional translator's mastery of norms and conventions in specific fields.

To meet the needs of the professional market and higher education, the European Master's in Translation (EMT) network proposed a service-oriented competence framework. It summarizes translation competence into six domains: language and cultural competence, translation competence, technological competence, personal and interpersonal competence, and service provision competence (EMT, 2022). This framework emphasizes translators' professional qualities, such as client relationship management, project management, and ethical responsibility, reflecting the industry's comprehensive requirements for translators as "language service providers."

Together, those models established a robust empirical foundation. They affirm that translation competence is a specialized cognitive skill distinct from bilingualism, characterized by strategic problem-solving, instrumental proficiency, and a capacity for creative, adaptive decision-making. However, their models were largely formulated in a pre-AI era, primarily focusing on human cognition in a technology-assisted, rather than technology-integrated, environment. This historical context sets the stage for examining the transformative shifts prompted by the Digital Intelligence Era.

The conceptual model of Academic Translation Competence proposed by (Károly, 2023)is a key theoretical foundation. It highlights the essential macro-competencies required for academic translation, thus supporting the analysis and reconstruction of translation competence required in the digital intelligence era.

2.2 New Trends in Translation Studies in the Digital Intelligence Era

In the Digital Intelligence Era, Neural machine translation (NMT) and large language models (LLMs) are actively reshaping the boundaries and redefining the core questions of translation studies. The translator's role is being reconceived from a "text converter" to a "cross-language solution provider" or "language service architect".

Theoretically, the field is experiencing a multidisciplinary paradigm shift. Translation studies now actively integrates concepts from human-computer interaction, data science, and ethics.

2.3 "Human-Machine Collaboration" as the Core Research Paradigm

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Converging from these trends, "human-machine collaboration" (HMC) has emerged as the dominant paradigm for conceptualizing translation in the 21st century. This represents a significant evolution from earlier "human-in-the-loop" or basic post-editing models. The International Federation of Translators (FIT) (2025) articulates this shift as a move toward a deep "human-machine synergy" and advocates for a "human-at-the-core" philosophy. This paradigm asserts that while AI excels in handling large volumes of information and pattern recognition, the human professional remains irreplaceable for tasks demanding cultural sensitivity, legal precision, creative expression, and ethical judgement. For instance, literary translation's aesthetic and poetic dimensions are seen as uniquely human, and critical domains like legal or medical translation require ultimate human accountability due to risks like AI "hallucination".

The HMC paradigm reframes the components of translation competence. It introduces new critical skills such as prompt engineering for effective LLM interaction, AI literacy for selecting and critically evaluating different tools, and data security and ethics awareness. Strategic competence, as defined by PACTE, now centrally involves the meta-cognitive ability to design workflows, making optimal real-time decisions on task division between human and machine (e.g., when to translate from scratch, lightly post-edit, or heavily revise MT output). Furthermore, instrumental competence expands into managing not just dictionaries, but also customized NMT engines, terminology databases integrated with AI, and multimodal translation systems.

This new paradigm carries direct and profound implications for translator education, which forms the core concern of this thesis. It challenges MTI programs to move beyond teaching technology as a separate tool, and instead to embed HMC principles across the curriculum. It calls for nurturing a new generation of "language engineers" or "smart language engineers" who can architect language solutions. The theoretical framework established here—bridging the validated insights of classic competence models with the transformative demands of the HMC paradigm—will guide the subsequent analysis of how translation competence must be reconstructed and how MTI education in China must be reimagined accordingly.

3. Reconstructing Translation Competence in the Digital Intelligence Era

3.1 The Guiding Principle: From "Translator Competence" to "Human-Machine Collaborative Competence"

The foundational principle of this reconstruction is the shift from the human translator as the center of competence to a distributed, networked system where cognitive and analytical tasks are shared between human and artificial agents. This is not merely an addition of new technical skills but a reconfiguration of the translator's entire professional identity and cognitive role. The "Human-Machine Collaborative Competence" framework posits that the core unit of performance is no longer the individual but the human-machine team. The translator's paramount skill becomes the ability to orchestrate this collaboration effectively. This principle

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aligns with industry observations that future professionals will evolve into "language service architects" or "smart language engineers". The essence of competence, therefore, transforms from executing all tasks personally to excelling in meta-cognitive activities: designing optimal workflows, making strategic decisions about task allocation, and ensuring the final output meets the required standards of quality, ethics, and purpose. The human agent moves from being the primary producer of text to being the strategic manager, critical evaluator, and creative enhancer of AI-generated content.

3.2 Core Dimensions and Proposed Sub-Competence System

Based on this guiding principle, the reconstructed translation competence can be conceptualized across four interdependent core dimensions.

1. Strategic Decision-Making and Critical Thinking.
   This dimension constitutes the meta-competence governing the entire HMCC system. It encompasses:

Task Analysis and Workflow Design: The ability to deconstruct a translation brief, assess project parameters (purpose, audience, genre, quality requirements), and architect a tailored process that leverages human and machine strengths.

Human-Machine Task Division: The critical skill of deciding, in real-time, which text segments or tasks are best handled by machine translation (with subsequent post-editing), which require human translation from scratch, and which necessitate a hybrid approach. This requires a deep understanding of the current capabilities and limitations of NMT and LLMs for different text types and language pairs.

Post-Editing and Finalization Strategy: Moving beyond basic error correction to advanced strategic post-editing. This involves knowing when to perform light (rapid) post-editing for gist or internal use versus heavy (full) post-editing for publication, and applying nuanced revision strategies that enhance style, cohesion, and cultural appropriateness—areas where AI consistently falls short.

2. Technological Application and Data Literacy.
   This layer provides the essential toolkit for effective collaboration. It extends far beyond the "instrumental competence" of classic models to include:

Command of LLMs and Professional Tools: Proficiency in interacting with AI systems through effective prompt engineering to guide output quality, style, and terminology. It also involves mastering computer-assisted translation (CAT) tools, terminology management systems, and quality assurance software in an AI-augmented environment.

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Management of Multimodal Corpora and Data: The ability to curate, manage, and leverage diverse digital resources, including parallel corpora, monolingual reference corpora, and terminological databases. As translation expands beyond text to include audio, video, and interactive media, competence in managing and processing multimodal data becomes crucial.

3. Cross-Cultural Communication Proficiency.
   This dimension reaffirms and expands the enduring human-centric core of translation. In an era of highly fluent but often culturally neutral or skewed machine output, this layer is more critical than ever. It involves:

Creative Transposition Beyond "Equivalence": The ability to move beyond superficial lexical or syntactic equivalence to achieve pragmatic, cultural, and aesthetic equivalence. This includes solving untranslatability, managing humor, metaphor, and idiom, and preserving or adapting rhetorical devices—a domain where human creativity and sensibility are irreplaceable.

Service to International Communication: It requires deep cultural knowledge, political acuity, and the ability to craft messages that accurately convey concepts, policies, and cultural nuances to a global audience.

4. Domain Specialization and Project Management Acumen.

This dimension addresses the professional and contextual demands of the modern language industry.

Vertical Domain Knowledge: Deep subject-matter expertise in fields such as legal, medical, financial, or technical translation. This knowledge allows the translator to critically evaluate AI output for factual accuracy, conceptual precision, and adherence to domain-specific conventions, mitigating the risk of AI "hallucination."

Project Process Control: The ability to manage the full lifecycle of a translation project within a technology-saturated environment. This includes client communication, vendor management, timeline and budget coordination, quality control workflows, and familiarity with agile localization practices.

3.3 Comparative Analysis with Traditional Models

A comparative analysis with the PACTE model vividly illustrates the paradigm shift. In the PACTE framework, strategic competence served as the central control mechanism within the human translator's mind, managing other sub-competencies to solve problems. In the HMCC framework, strategic competence is exponentially enlarged; it now governs the external collaborative system of the human-machine team. The decision of "how to translate" is preceded by the more fundamental decision of "who or what should translate this segment" (human, machine, or both).

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Similarly, what PACTE termed instrumental competence (the ability to use documentation resources and basic technologies) has been radically transformed into the Technological Application and Data Literacy dimension. The tools are no longer passive resources (like dictionaries or concordancers) but active, intelligent agents (LLMs, adaptive MT engines) that require a new literacy to command and critique. Furthermore, classic models like PACTE or those derived from the TransComp (2005) project, while immensely valuable in mapping cognitive processes, implicitly treated technology as part of the background environment. The HMCC framework, by contrast, foregrounds human-machine interaction as the central cognitive activity. It integrates insights from Human-Computer Interaction (HCI) and distributed cognition theory, viewing the human and the AI as a coupled cognitive system.

The reconstruction from "translator competence" to "Human-Machine Collaborative Competence" is a necessary response to the technological and conceptual upheavals of the Digital Intelligence Era. It preserves the indispensable human elements of critical thinking, cultural intelligence, and creativity while seamlessly integrating the new literacies and strategic meta-skills required to partner effectively with artificial intelligence. This reconstructed framework provides the conceptual foundation for reimagining translator education, which will be explored in the following chapter.

4. Implications for China's MTI Education: Re-envisioning Curriculum and Pedagogy

The reconstruction of translation competence into the Human-Machine Collaborative Competence (HMCC) framework, as outlined in section 3, presents a fundamental challenge to the existing paradigms of translator education. Sánchez-Castany (2023) highlights key barriers to technology integration in translator training, notably insufficient educator training and curricular support. This underscores that for China's MTI education to reconstruct competence for the digital era, systemic measures—targeted trainer development and pedagogically driven curriculum design—are essential beyond mere tool adoption. For China's Master of Translation and Interpreting (MTI) programs, which were established to cultivate high-level, applied professionals, this is not a question of incremental adjustment but of a strategic realignment. To equip students for the realities of the digital intelligence era, MTI education must undergo a comprehensive transformation in its objectives, curriculum, pedagogy, and partnerships.

4.1 Re-envisioning Educational Objectives: From "Translator" to "Language Service Architect"

The primary implication of the HMCC framework is the need to redefine the very goal of MTI education. The traditional aim of producing a "competent translator"—a specialist in textual conversion—is no longer sufficient. The profession now demands professionals who can navigate a complex technological ecosystem, manage cross-linguistic projects, and deliver tailored language solutions. Consequently, the overarching educational objective must shift towards cultivating "Language Service Architects" or "Language Engineers."

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A “Language Service Architect” is a strategic designer. This professional does not merely execute translations but analyzes client needs, designs optimal human-machine workflows, selects and customizes appropriate technology stacks, and ensures the final deliverable achieves its communicative purpose across cultural and modal boundaries. They possess the meta-competence to oversee the entire language value chain. A “Language Engineer” emphasizes the technical orchestration aspect, focusing on the customization of machine translation engines, the development and management of sophisticated terminology databases and multilingual corpora, and the implementation of quality assurance protocols within automated pipelines. Both roles include the core skill of translation but elevate it through strategic and technical coordination. This redefinition aligns with the industry’s evolution and directly addresses the national strategic need for professionals who can effectively manage the international flow of information and “introducing China to the world” in a digitally mediated global landscape.

4.2 Reconstructing the Curriculum System

To achieve this new objective, an addition of courses alone is inadequate. A systematic, three-fold reconstruction of the MTI curriculum is required.

First, establishing a compulsory “Core Translation Technology” course cluster is paramount. This cluster must move beyond introductory software tutorials to provide deep, applied mastery. Key courses should include: 1) Advanced Post-Editing (PE), teaching strategic decision-making for light vs. full PE, critical evaluation of neural MT output, and techniques for resolving common AI errors like ambiguity and “hallucination”; 2) Localization Engineering, covering the fundamentals of software and website localization, internationalization principles, and the use of industry-standard management tools; 3) Data Literacy for Translators, introducing corpus linguistics for quality control, basics of scripting for automation (e.g., Python for text processing), and principles of managing multimodal translation projects (audio, video, games).

Second, the curriculum must deepen the integration of “Foreign Language + Domain Knowledge + Technology.” The old model of “language plus a translation course” is obsolete. MTI programs should develop structured micro-credentials or module streams in high-demand verticals such as legal-financial, medical-pharmaceutical, and technical-patent translation. Within these streams, courses would synergistically combine domain-specific knowledge (e.g., fundamentals of contract law), specialized linguistic conventions, and the particular technologies used in that sector (e.g., regulated content management systems in pharma). This moves students from being generalists to becoming valuable specialists who can critically evaluate AI output in context.

Third, strengthening the practical orientation is crucial. Firstly, courses should integrate more authentic, industry-specific projects, such as translating technical documents or localizing software. Secondly, fostering long-term partnerships with translation agencies and corporate language departments is crucial for providing sustained internship and practicum opportunities.

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Thirdly, the assessment system must shift from a focus on theoretical knowledge to evaluating practical translation competencies and problem-solving abilities in real-world scenarios. Finally, inviting experienced in-house translators and project managers as guest lecturers or adjunct faculty can bridge the gap between academia and industry, ensuring the curriculum remains aligned with market demands.

4.3 Innovating Teaching Methods and Tools

Pedagogical innovation is the engine that brings the new curriculum to life. Passive lecture-based instruction must give way to active, experiential, and technology-enhanced learning models. In a study on pre-service language teachers, findings show a positive attitude towards digital tools exists alongside a significant implementation gap between perception and actual classroom practice. (Lu et al., 2025)

A "Classroom-Platform-Project" three-dimensional teaching ecosystem should be widely adopted. The classroom becomes a workshop for foundational theory, strategy discussion, and collaborative problem-solving. The platform refers to a dedicated online smart learning environment that hosts simulated translation management systems, collaborative editing spaces, and access to cloud-based CAT tools and MT APIs for constant practice. The project axis integrates real or simulated client work, such as localizing a small open-source software project or managing a community website translation, allowing students to apply their skills in a realistic, end-to-end workflow.

Within this ecosystem, case-based and project-based learning (PBL) become the dominant methods. Instructors can use comparative case studies—for instance, analyzing different human and AI-generated translations of the same diplomatic speech—to foster critical thinking about strategy, quality, and ethics. PBL places students in teams to complete a defined translation/localization project over a semester, requiring them to handle client communication, workflow design, technology selection, quality assurance, and delivery, thereby holistically developing their HMCC.

Furthermore, leveraging smart teaching platforms enables immersive and precision teaching. Learning analytics can track individual student performance in areas like PE speed, error patterns, or terminology consistency, allowing instructors to provide personalized feedback. Virtual Reality (VR) scenarios could simulate high-pressure localization project reviews or client negotiations, building soft skills and situational awareness.

4.4 Strengthening Faculty Development and Industry-Academia Collaboration

The success of this transformation hinges on the faculty and the program's connection to the professional world. A significant gap often exists between academic research and industry practice, which must be bridged.

Implementing a robust "Dual-Tutor System" is essential. Every MTI student should be guided by both an academic supervisor (providing theoretical and methodological grounding) and an industry practitioner mentor (providing insights into current trends, tools, and professional standards). This system should be part of a broader "Government-Industry-University-Research-Application" collaborative education model. Universities should actively partner with leading language service providers (LSPs), tech companies (e.g., Alibaba, iFLYTEK, Transn), and government bodies involved in international communication to co-design curricula, contribute teaching modules, and define competency standards.

A critical outcome of this collaboration must be the co-creation of practical training bases and authentic project repositories. Universities and enterprises can jointly establish on-campus or virtual labs equipped with professional-grade translation management systems. More importantly, industry partners can provide a steady stream of sanitized real-world projects—such as user interface localization, subtitle PE, or technical documentation updates—into the MTI course pipeline. This gives students invaluable portfolio pieces and smooths their transition into the workforce, while giving companies a pipeline of job-ready talent.

5. Conclusion

The reconstruction of translation competence demands nothing less than a parallel reconstruction of MTI education in China. By holistically redefining its goals, restructuring its curriculum around technology and specialization, adopting immersive and project-driven pedagogies, and forging deep, structural bonds with the industry, MTI programs can fulfill their mission. They can become the incubators for the next generation of Language Service Architects: strategic, tech-savvy, culturally adept professionals who can lead, rather than merely follow, the ongoing transformation of the global language industry.

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