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The Role of AI in Translator Training: Assessing AI's Influence on Translation Education and Professional Training

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Abstract

The growing integration of Artificial Intelligence (AI) into translation workflows is reshaping the demands placed on translator education. Neural Machine Translation (NMT) systems such as DeepL and Google Translate offer increased efficiency but challenge conventional teaching practices by shifting emphasis from direct translation to post-editing, evaluation, and decision-making. Despite this evolution, translator training programs often lack structured guidance on integrating AI, leading to a potential gap in preparing students for contemporary professional environments. This qualitative case study explores the evolving role of AI in translator education by analyzing student preparedness and attitudes toward AI-assisted translation tasks at the King Fahd School of Translation (KFST), Morocco's only institution combining theoretical and practical translation approaches. The study involved 17 Master's students enrolled in the "PE: English & Arabic" core module, all of whom had prior experience using AI tools such as Google Translate, ChatGPT, DeepL, or Reverso. Data were gathered through a Google Forms questionnaire comprising 16 items, including multiple-choice, Likert-scale, and open-ended questions designed to elicit both quantitative and qualitative insights. The questionnaire remained open for two weeks and was distributed via institutional email and messaging platforms to ensure full participation. Responses were analyzed through descriptive statistics for closed-ended questions and thematic analysis (Braun & Clarke, 2006) for open-ended feedback, focusing on key themes such as AI familiarity, post-editing competence, curriculum reform, and ethical concerns. Thematic triangulation allowed for a nuanced understanding of student perceptions regarding the pedagogical integration of AI in translation education.Findings indicate that while this cohort widely uses AI tools for speed and efficiency, it expresses uncertainty about the reliability of machine outputs and reports a lack of formal training in post-editing and AI evaluation. All participants unanimously supported the introduction of dedicated modules on AI literacy and post-editing. The study concludes that AI integration can enhance translator training if supported by updated curricula emphasizing technological competence, critical engagement, and ethical awareness. It advocates for an andragogical paradigm that positions AI as a complementary tool, reinforcing human expertise and underscores the enduring value of human judgment in producing contextually nuanced translations.

1. INTRODUCTION

Recent advances in artificial intelligence (AI), especially Neural Machine Translation (NMT) systems like Google Translate and DeepL, are transforming the landscape of professional translation. This transformation has profound implications for translator education in higher institutions. Translation curricula worldwide are grappling with how to incorporate AI tools in training to keep pace

with industry demands. This literature review examines scholarly research from the past decade on the andragogical integration of AI/NMT into translator training programs. It focuses on five key areas: (1) how AI tools have reshaped translator competencies; (2) the current state of AI integration in translation curricula across different regions; (3) andragogical challenges and gaps in preparing students for AI-assisted workflows; (4) proposed curriculum reforms and andragogical approaches for AI literacy; and (5) student and educator attitudes towards AI in translation education. The goal is to synthesize applicable insights for redesigning translation programs and teaching methodologies in an era of AI-assisted translation.

The literature reveals a complex interplay between AI tools and translator education, highlighting the opportunities and challenges arising from their implementation. In a systematic review, Ha Woo and Choi (2021) explore the impact of AI tools, such as Google Translate and DeepL, on translator education, focusing on student familiarity and attitudes toward AI-assisted translation. Their qualitative case study underscores the need for a nuanced understanding of how these tools affect post-editing skills and perceptions of current training practices.

Building upon this foundation, Urlaub and Dessein (2022) identify key research clusters related to machine translation (MT) in foreign language education. They emphasize the dichotomy in perceptions between students and instructors, noting that while students generally embrace MT tools, many educators express skepticism regarding their efficacy and potential to undermine critical cognitive engagement. This tension highlights the necessity for educational frameworks that can reconcile these differing viewpoints.

In a similar vein, Mustafa, Arbab, and El Sayed (2022) examine the challenges faced by undergraduate students in Oman when writing academic texts in English as a second or foreign language. Their findings reveal that while students generally value English for academic success and global mobility, they often struggle with grammar, coherence, and vocabulary use. These difficulties are attributed to limited language exposure, weak foundational instruction, and a lack of writing practice. The study underscores the need for more focused pedagogical strategies and tailored instructional support in higher education settings where English is used as a medium of instruction.

Recent advancements in AI applications in education are further examined by Shaik et al. (2023), who discuss the transformative potential of AI in personalizing learning experiences. Their analysis highlights the role of natural language processing (NLP) in interpreting user feedback, which can inform the development of adaptive learning environments. This perspective is critical for understanding how AI can enhance translator training by tailoring educational approaches to individual student needs.

Mallik and Gangopadhyay (2023) reiterate the significance of AI in education, emphasizing the necessity for proactive engagement with AI methods. Their review underscores the importance of integrating AI tools into educational practices to foster a more effective learning environment. By assessing student familiarity and attitudes toward AI-assisted translation, this study aligns with the overarching theme of understanding the implications of AI in translator education.

Tian et al. (2024) further contribute to this discourse by exploring the use of computer-assisted textual analysis to derive insights from educational artifacts. Their findings indicate that AI can enhance instructional quality, thereby reinforcing the argument for its integration into translator training programs. This aligns with Ghimire et al. (2024), who reveal educators' mixed sentiments toward AI technologies, highlighting the need for transparency and training to alleviate concerns about AI's role in the classroom.

Finally, World English Journal & Mohammed Ahmed Mudawy (2024) and AlTwijri and Musaed Alghizzi (2024) both emphasize the importance of adequate training for educators and students in effectively utilizing AI tools. Their studies affirm that a positive perception of AI's role in enhancing the research writing process and learner engagement is contingent upon the provision of sufficient support and ethical considerations in its application.

This paper seeks to answer the following research questions:

1. How have AI and NMT tools transformed the core competencies required of translation students in higher education?
2. To what extent have AI-assisted tools been successfully integrated into translator training curricula across various regions?
3. What instructional strategies and curriculum reforms have been proposed to build AI literacy and post-editing competence?
4. How do students perceive the role and impact of AI in translation training environments?

2. LITERATURE REVIEW

2.1.Reshaping Translator Competencies with AI Tools

The rise of artificial intelligence (AI) in translation is redefining what it means to be a competent translator. Traditional translation skills such as linguistic accuracy, cultural sensitivity, and stylistic adaptation remain vital, yet new competencies related to neural machine translation (NMT) and post-editing have emerged and are now central to translator education (Ehrensberger-Dow, Delorme Benites, & Lehr, 2023; Tavares, Tallone, Oliveira, & Ribeiro, 2023). Scholars argue that AI has transformed the translator's role from being a text producer to a language-technology mediator who collaborates with machines while maintaining human oversight (Yang & Mustafa, 2022; O'Brien, 2022).

2.2.Post-Editing Competence

Among the emerging skills, machine translation post-editing (MTPE) stands out as the most prominent. Translators must now learn to efficiently revise and correct NMT outputs to achieve publishable quality standards. Yang and Mustafa (2022) demonstrated that undergraduate students in China responded positively to structured post-editing workflows, recognizing their relevance for professional translation practice. Similar findings were reported by Munková, Munk, Benko, and Hájek (2021), who observed that post-editing tasks enhance linguistic awareness and technical adaptability. European frameworks have also institutionalized this shift: the European Master's in Translation (EMT) competence model explicitly identifies MTPE as a key sub-competence for 21st-century translators (European Commission, 2022). These developments indicate that post-editing skills are now

indispensable in translator education, as they allow students to bridge automated output with human refinement, ensuring precision, coherence, and ethical responsibility.

2.3.Technological and MT Literacy

Beyond linguistic expertise, translators require technological literacy that encompasses both operational proficiency with computer-assisted translation (CAT) tools and conceptual understanding of AI systems. Ehrensberger-Dow et al. (2023) introduced the term "machine translation literacy (MT literacy)", referring to translators' capacity to evaluate MT quality, recognize its affordances and limitations, and apply it judiciously. Leena (2023) and Guerberof Arenas (2023) further define MT literacy as a multidimensional competence involving knowledge of how MT works, awareness of biases in datasets, and skills for assessing output reliability. These abilities are increasingly necessary as AI systems evolve into decision-support tools rather than simple productivity aids (Pym & Gambier, 2021). An MT-literate translator can therefore select appropriate tools, anticipate machine errors, and integrate post-editing workflows without compromising textual fidelity or cultural nuance.

2.4.Consulting and Advisory Skills

With the ubiquity of AI-based translation tools, translators are no longer merely language mediators but also consultants and advisors in technological decision-making processes. Ehrensberger-Dow et al. (2023) propose training translators as "MT literacy consultants" capable of guiding clients in determining the viability of MT for specific projects, assessing data privacy implications, and evaluating cost-benefit scenarios. Similarly, Doherty and Kenny (2014) and Cadwell (2021) emphasize that future translators must possess communicative competence to advise non-experts on AI output quality, localization strategies, and ethical use. This expanded professional role requires pedagogical frameworks that prepare students to interpret AI performance metrics, explain technical limitations in accessible terms, and make context-driven recommendations. Translator education, therefore, must move beyond operational training to foster critical consultancy and advisory expertise aligned with industry expectations (Federici & O'Brien, 2020).

2.5.Data and Customization Competence

AI integration has also created the need for translators to acquire data-handling and customization competence. Bulut (2019) argues for a reconceptualization of "human translator competence", extending it to include collaboration with AI systems through the preparation of training datasets, tuning of MT engines, and participation in system evaluation. Recent studies confirm that familiarity with data management and basic computational principles significantly enhances translators' efficiency and adaptability in AI-assisted environments (Jiménez-Crespo, 2022; Moorkens & Rossi, 2023). Translators who can adjust MT parameters, preprocess corpora, and interpret algorithmic behavior are better positioned to ensure consistent terminology and contextual accuracy (Koponen & Salmi, 2021). These skills transform translators into active co-designers of translation workflows rather than passive users of technology, aligning with broader trends in human–computer collaboration across the language industry.

2.6.Ethical and Critical Reasoning

Finally, AI tools introduce complex ethical and critical reasoning challenges that are integral to professional translation competence. The increasing reliance on NMT raises concerns about confidentiality, intellectual property, and authorship of machine-generated text (Marczak & Mikołajewska, 2023; Zetzsche, 2022). Translators must be trained to make informed decisions about when and how to use MT responsibly, to disclose AI involvement transparently, and to identify algorithmic bias or cultural distortion in outputs. Trojszczak (2022) emphasizes the "added value of human responsibility," underscoring that translators must ensure contextual and ethical integrity in post-edited texts. Likewise, Kenny and Way (2023) warn that fluency illusions in MT can mask serious semantic or ideological errors. These findings align with research by Liu, Kwok, and Cheung (2022), who observed that while AI tools improve efficiency, they cannot replace human cognitive and cultural judgment. Consequently, translator education must cultivate a reflective mindset that balances technological reliance with ethical stewardship and critical discernment.

Collectively, these emerging competencies do not replace core translation skills but rather augment them, producing a hybrid professional profile that integrates linguistic, technological, and ethical expertise. Studies consistently demonstrate that NMT systems still struggle with culture-specific, idiomatic, and pragmatic nuances (Castilho et al., 2023; Jiménez-Crespo, 2022). Therefore, translator training must cultivate graduates who not only translate proficiently but also strategically employ and supervise AI tools to enhance productivity without compromising interpretive depth or ethical accountability. This hybridization of skills defines the translator of the AI era: a critical thinker, ethical mediator, and technologically literate language professional.

2.7.Integration of AI in Translation Curricula: Global Perspectives

Over the past decade, translation programmes worldwide have increasingly integrated artificial intelligence (AI) tools and machine-translation (MT) workflows into their curricula, though the pace and depth of implementation vary widely. Comparative reviews reveal substantial regional differences influenced by institutional priorities, infrastructure, and professional market expectations (Ehrensberger-Dow, Delorme Benites, & Lehr, 2023; O'Brien, 2022; Tavares, Tallone, Oliveira, & Ribeiro, 2023):

- **Europe:** European universities have taken a leading role in embedding MT and computer-assisted translation (CAT) technologies into translator-training curricula. The European Master's in Translation (EMT) competence framework (European Commission, 2017) explicitly designates *technological competence* as a core requirement, defining it as the ability to employ CAT and MT tools "in a professional and sustainable manner." Subsequent updates reaffirmed this orientation, stressing AI literacy, data management, and post-editing as critical professional sub-competences (European Commission, 2022). Empirical research confirms broad but uneven adoption. Munková, Munk, Benko, and Hájek (2021) observed that most EMT-affiliated master's programmes include formal training in translation technology, yet the degree of practical MT post-editing varies. Ehrensberger-Dow et al. (2023) likewise report that although European institutions have embraced NMT for pedagogical purposes, attitudes toward its classroom use range from cautious supervision to complete integration. Krause (2023)

further notes a persistent "diversity of attitudes toward technology in translation teaching," with some instructors banning MT use while others promote critical, guided engagement. Overall, the European trajectory points toward full curricular integration of AI tools while maintaining "from-scratch" human translation practice to safeguard linguistic accuracy and creativity.

- **Asia:** Integration across Asia, particularly in China, has accelerated since 2020, driven by national education reforms and market demand for MT-competent graduates. In a mixed-methods study of an undergraduate translation programme in northwest China, Yang and Mustafa (2022) found that students who completed a translation-technology course responded positively to structured MT post-editing workshops and recognised post-editing as a bridge between academic study and industry practice. However, their participants also reported uncertainty about editing standards and engine selection, indicating a need for clearer curricular frameworks.

  Other regional studies echo these findings. Liu, Kwok, Liu, and Cheung (2022) surveyed Hong Kong translation students and instructors, revealing strong agreement on the necessity of MT training to meet labour-market expectations. Despite this recognition, the extent of hands-on practice differs: some Asian universities offer optional MT workshops, whereas others, such as large Chinese institutions, have established mandatory MT-post-editing modules (Yang & Mustafa, 2022). Collectively, the literature depicts Asian translator-training as rapidly evolving toward formal MT literacy, albeit with heterogeneous depth and pedagogical approaches.

- **Middle East and North Africa:** In the Arab world, curriculum modernisation has lagged behind technological change. Al-Batineh (2023) and Sir Al Khatim (2022) observe that many MENA translation programmes remain limited to basic CAT instruction and seldom include localisation, MT post-editing, or AI ethics components. This curricular gap leaves graduates underprepared for an industry increasingly reliant on NMT, localisation platforms, and audiovisual translation. Al-Batineh (2023) argues that most regional institutions still treat technology as an ancillary skill rather than a central translator competence, resulting in what he terms a "misalignment between pedagogical provision and market need." Encouragingly, a gradual increase in technology-oriented courses has been reported in Gulf and Maghreb universities, reflecting an emerging recognition of AI literacy as essential to translator employability (Mudawy, 2024).

- **Americas and Other Regions:** Research on MT and AI integration in North and South America remains comparatively scarce, yet existing evidence points to parallel trends. O'Brien (2022) and Cadwell (2021) note that many North American postgraduate programmes now include modules on CAT tools and introduce MT through elective courses or workshops rather than as a core component. In South America and sub-Saharan Africa, infrastructural constraints often limit formal integration; nevertheless, freely available NMT engines such as Google Translate and DeepL have become ubiquitous, prompting instructors to address their use ethically and pedagogically within existing courses (Castilho, Moorkens, Gaspari, & Way,

2023). Studies from African translator-training contexts similarly indicate that even where institutional support is limited, informal student use of MT has catalysed curricular discussion on AI literacy and post-editing strategies (Gambier & Pym, 2021).

2.8.Andragogical Challenges and Gaps in AI-Assisted Training

Integrating artificial intelligence (AI) into translator education presents multiple andragogical and institutional challenges. Scholars emphasize that while AI tools such as neural machine translation (NMT) and large language models can enhance efficiency, their pedagogical integration requires careful planning to prevent skill erosion, ensure ethical literacy, and maintain translation quality (Ehrensberger-Dow, Delorme Benites, & Lehr, 2023; O'Brien, 2022; Tavares et al., 2023; Mahdy et al., 2020; Mohammed, 2023).). The following challenges represent the most critical gaps identified in current research on AI-assisted translator training:

- **Curriculum Lag vs. Industry Needs:** A primary challenge is the misalignment between the rapid technological evolution of the translation industry and the slower pace of academic curriculum reform. The professional market has quickly adopted cloud-based translation management systems, adaptive NMT, and localization platforms, yet many university programmes have not adjusted their syllabi to include post-editing, AI evaluation, or data-handling practices (Castilho, Moorkens, Gaspari, & Way, 2023; Kenny & Way, 2023). This lag results in a gap between graduate competence and employer expectations. Al-Batineh (2023) and Sir Al Khatim (2022) both report that translation programmes in the Arab world exhibit a "misalignment" between the skills taught and those required by the market, particularly regarding MT and AI technologies. Similar concerns are raised in European contexts, where Ehrensberger-Dow et al. (2023) note that curricula often remain focused on traditional translation techniques despite the growing need for AI literacy. Keeping translator education aligned with the industry's evolving practices remains a continuous and urgent pedagogical challenge.

- **Instructor Expertise and Training:** The successful integration of AI into translator training depends heavily on instructors' technological competence. Historically, many translation teachers received little formal training in MT or CAT tools, leading to uncertainty or avoidance when introducing such technologies (Mellinger & Shreve, 2022). The European Master's in Translation (EMT) 2017 and 2022 competence frameworks report incremental improvements, showing that more instructors now possess experience in teaching translation technology, yet knowledge gaps persist (European Commission, 2022). Without systematic professional development, instructors risk superficial implementation, either ignoring MT altogether or using it in limited ways that fail to cultivate student autonomy or critical engagement (Ehrensberger-Dow et al., 2023; O'Brien, 2022). Continuous pedagogical and technical training for translator educators is therefore essential to sustain confident and meaningful integration of NMT tools.

- **Assessment Difficulties:** The widespread student use of MT introduces new assessment challenges in determining authentic translation competence. Tavares et al. (2023) observe that

the availability of MT tools "makes it considerably more challenging to assess a student's level of translation competence" (p. 4). When students post-edit machine-generated drafts, it becomes difficult to distinguish between genuine linguistic proficiency and reliance on AI output. Cadwell (2021) similarly warns that traditional grading methods, such as evaluating final target texts, no longer adequately reflect learning outcomes in AI-assisted environments. Educators are therefore experimenting with process-based assessments, reflective commentaries, and comparative error analysis to measure post-editing skill development and maintain academic integrity. Nonetheless, consensus on standardized assessment frameworks remains elusive (Jiménez-Crespo, 2022).

- **Overreliance and Skill Erosion:** A recurring pedagogical concern is the risk of student overreliance on MT tools, which may hinder the acquisition of foundational translation competencies. Research in Hong Kong by Liu, Kwok, and Cheung (2022) found that students' habitual use of Google Translate or DeepL often led to a decline in problem-solving effort and independent term research. Instructors reported that uncritical MT use could "negatively impact language learning or even the overall academic experience" (p. 8). This mirrors findings by O'Brien (2022), who cautions that over-dependence on NMT may impede critical reasoning and stylistic sensitivity. Educators must thus find a pedagogical balance: encouraging informed, strategic MT use while reinforcing manual translation and revision skills through task-based and comparative activities (Ehrensberger-Dow et al., 2023). The goal is to treat AI as a cognitive partner rather than a linguistic substitute.

- **Quality and Error Considerations:** Despite remarkable progress in fluency and accuracy, NMT output continues to exhibit errors, particularly in idiomatic usage, register, and pragmatics. Students may develop a false sense of confidence in fluent but semantically imprecise machine output, leading to the risk of undetected lexical or grammatical inaccuracies (Castilho et al., 2023). Tavares et al. (2023) emphasize that targeted post-editing exercises, where students identify and correct systematic MT errors, are crucial for cultivating error detection skills. Similarly, Koponen and Salmi (2021) demonstrate that guided post-editing training significantly improves students' ability to distinguish between surface-level fluency and deep semantic accuracy. Without explicit instruction in post-editing strategies, graduates may deliver substandard work by overlooking subtle translation errors that NMT tends to reproduce.

- **Ethical and Academic Integrity Issues:** The use of AI in coursework raises critical ethical questions about authorship, transparency, and fairness. While some educators prohibit MT use to preserve traditional translation practice, others advocate for regulated inclusion with explicit disclosure and reflection (Kenny & Way, 2023). Research from Hong Kong (Liu et al., 2022) reveals that most students recognize a distinction between legitimate assistance and academic dishonesty: over 60% considered unedited MT submission unethical, even if the tool was used to generate drafts. Trojszczak (2022) and Marczak and Mikołajewska (2023) highlight the

importance of developing students' ethical reasoning to navigate issues such as confidentiality, copyright, and algorithmic bias. Ethical literacy, therefore, must become an explicit learning outcome in AI-integrated translation curricula.

- **Resource Gaps:** Finally, infrastructural and resource limitations hinder consistent AI integration. Not all universities have access to professional MT engines, paid CAT licenses, or adequate server capacities to support large-scale data processing (Al-Batineh, 2023). Many rely on public platforms like Google Translate, which raise confidentiality and data protection concerns (Marczak & Mikołajewska, 2023). Moreover, there remains a shortage of textbooks and training corpora tailored to MT post-editing pedagogy (Jiménez-Crespo, 2022). Instructors often resort to creating in-house case studies or compiling error datasets for classroom use, which increases workload and may reduce standardization (Castilho et al., 2023). Addressing these gaps requires institutional investment in AI infrastructure, collaborative material development, and open-access pedagogical resources.

2.9.Curriculum Reforms and Andragogical Strategies for AI Literacy

To address the challenges outlined above and effectively integrate artificial intelligence (AI) tools into translator education, researchers have proposed various curriculum reforms and teaching approaches. A central theme in recent scholarship is the development of AI literacy or machine translation (MT) literacy through andragogically grounded methods that make learning practical, relevant, and empowering for adult students (Ehrensberger-Dow, Delorme Benites, & Lehr, 2023; O'Brien, 2022; Tavares, Tallone, Oliveira, & Ribeiro, 2023). The literature consistently emphasizes the need for translators to be technologically competent, ethically aware, and critically autonomous, rather than passive users of AI. Key recommendations include:

- **Integrate AI Early and Continuously:** Researchers advocate integrating AI throughout the translation curriculum rather than treating it as an optional or end-stage topic. Bulut (2019) argues that introducing MT concepts as early as possible allows students to develop a realistic professional self-concept as human translators working in technologically rich environments. Early exposure demystifies AI and normalizes its presence in translation practice. It also reinforces the idea that the translator's role is to collaborate with technology, not compete against it. This can involve small introductory exercises in first-year courses, such as comparing human and machine translations of the same text, followed by progressively complex activities in advanced modules. Such sequencing aligns with adult-learning principles emphasizing iterative exposure and immediate application (Knowles, Holton, & Swanson, 2020). Embedding AI learning moments across the curriculum promotes cumulative understanding and helps students see technology as a consistent, integral component of professional translation practice.

- **Dedicated MT/Post-Editing Training Modules:** A widely endorsed reform is the inclusion of formal modules dedicated to MT and post-editing. Early implementations such as the one at Dublin City University demonstrated the pedagogical feasibility and industry relevance of such courses (Doherty & Kenny, 2014). More recent examples across European and Asian

universities show the effectiveness of structured post-editing workflows and hands-on projects (Yang & Mustafa, 2022; Tavares et al., 2023). Typical course content includes an introduction to neural MT principles, best practices in post-editing, distinctions between light and full post-editing, and exposure to industry standards and evaluation metrics (Jiménez-Crespo, 2022). Some programs encourage students to pursue post-editing certifications or capstone projects that simulate real industry tasks, thereby increasing employability (Ehrensberger-Dow et al., 2023). Continuous syllabus updates are essential to ensure alignment with emerging technologies, including large language model (LLM)-based translation systems that increasingly blur the lines between MT and generative AI.

- **Problem-Based and Indirect Learning Tasks:** To minimize overreliance on MT and foster genuine skill development, several scholars recommend problem-based and indirect learning tasks. Tavares et al. (2023) describe innovative "indirect exercises" such as paraphrasing, back-translation, and blind error-detection activities that train students to internalize translation strategies rather than rely on raw MT outputs. These tasks encourage learners to analyze meaning, identify patterns, and correct errors without full dependence on the source text, thereby promoting deeper cognitive engagement. Such designs also give instructors alternative assessment opportunities to evaluate comprehension, creativity, and critical awareness. By diversifying exercises beyond simple translation assignments, educators ensure that students retain essential translation competence while developing reflective and analytical skills (Cadwell, 2021).

- **Emphasize Human Added-Value:** A major pedagogical priority is reinforcing the enduring relevance of human translators in AI-assisted workflows. Trojszczak (2022) highlights that students should explicitly compare NMT outputs with human translations to identify where human judgment, creativity, and contextual understanding still outperform machines. Reflection-based classroom activities, such as textual comparison and group discussion, help students recognize the cognitive and ethical dimensions of translation beyond raw efficiency. This approach also mitigates motivational issues that arise when students perceive the machine as replacing their work (Kenny & Way, 2023). By seeing themselves as quality guarantors and contextual mediators, learners internalize the concept of *human added value* in translation, which enhances their professional identity and confidence.

- **Scenario-Based Learning and Consulting Skills:** Ehrensberger-Dow et al. (2023) propose the use of scenario-based learning to develop translators' consulting and advisory skills. In such scenarios, students are presented with realistic professional dilemmas, such as advising a client on whether to use MT for a sensitive document, and are tasked with evaluating its feasibility, risks, and ethical implications. These exercises mirror authentic decision-making contexts and teach learners how to articulate AI's benefits and limitations in professional language (Federici & O'Brien, 2020). Scenario-based learning embodies adult-learning theory by treating students as self-directed professionals capable of analyzing complex, real-world problems. It also

cultivates teamwork, negotiation, and technological reasoning skills essential for managing AI-integrated translation projects.

- **Ethics and AI Literacy Discussions:** Another recurring recommendation is the systematic inclusion of ethics within AI and MT training. Liu, Kwok, and Cheung (2022) stress that discussions about the sustainability and ethical implications of MT use help students critically evaluate when AI assistance is appropriate. These discussions may involve case studies examining confidentiality risks, authorship, or data bias in AI systems (Marczak & Mikołajewska, 2023). Debate-style seminars and reflective essays encourage students to reconcile their informal experiences with professional ethical standards. Educators can also introduce professional codes of conduct, prompting students to identify ethical boundaries between legitimate post-editing and unethical reliance on unedited MT outputs. Such reflective learning aligns with andragogical principles that value open dialogue, self-assessment, and experiential reflection (Knowles et al., 2020).

- **Cultivate Lifelong Learning Attitudes:** Because AI technologies evolve rapidly, translator education must instill a mindset of continuous learning rather than static mastery. Bulut (2019) emphasizes the importance of teaching students *how to learn*, encouraging them to explore new tools independently and adapt to ongoing technological innovation. This may involve self-learning assignments, tool experimentation projects, or reflective portfolios documenting individual progress (Mellinger & Shreve, 2022). Programs that incorporate such reflective practices help students develop autonomy and adaptability, key attributes for sustained employability in the digital translation landscape. Fostering lifelong learning aligns with the andragogical principle that adult learners are self-motivated and seek to control their professional development trajectories (Knowles et al., 2020).

- **Collaboration and Peer Learning:** Finally, peer learning is a valuable andragogical strategy for promoting AI literacy. Group-based projects, where students alternate between translator and post-editor roles, simulate authentic industry workflows (O'Brien, 2022). Collaborative experiments with different MT engines enable knowledge sharing and collective troubleshooting. Such activities mirror professional translation teamwork, reduce technological anxiety, and foster a classroom "community of practice" (Ehrensberger-Dow et al., 2023). By leveraging the varied technological backgrounds of adult learners, peer learning enhances engagement, confidence, and shared responsibility in mastering AI tools.

2.10. Attitudes of Students and Educators toward AI in Translation Education

Understanding the attitudes of the main stakeholders, namely students and instructors, is essential because their perceptions shape how artificial intelligence (AI) tools are adopted in practice. Research over the past decade reveals a wide range of attitudes, though a gradual convergence is emerging as experience with neural machine translation (NMT) grows (Ehrensberger-Dow, Delorme Benites, & Lehr, 2023; Liu, Kwok, & Cheung, 2022; O'Brien, 2022):

- **Student Attitudes:** Overall, translation students today tend to be open and positive toward AI tools. Most have grown up using online translation applications and perceive machine translation (MT) as a natural support rather than a disruptive innovation (Liu et al., 2022; Tavares, Tallone, Oliveira, & Ribeiro, 2023). Surveys consistently report high usage of MT among translation learners for academic, professional, and personal purposes. In Liu et al.'s (2022) study of Hong Kong university students, participants found MT particularly useful for speeding up translation and finding quick lexical equivalents. Students described MT as effective for generating first drafts, which they would later refine through post-editing. This aligns with European findings where students tend to "focus their work on post-editing tasks" when MT systems are available (Ehrensberger-Dow et al., 2023, p. 398). Importantly, most students express a desire for formal training in MT and post-editing, emphasizing that they want to learn correct and ethical use rather than being told to avoid such tools (Jiménez-Crespo, 2022). They recognize the risks of overreliance and acknowledge that excessive dependence can hinder the development of independent translation competence. In the Hong Kong context, students admitted that uncritical reliance on MT "impeded their growth as autonomous translators" (Liu et al., 2022, p. 6402). Consequently, students appreciate a balanced pedagogical approach that integrates technology training while maintaining the focus on human decision-making and linguistic awareness.

- **Educator Attitudes:** Translator educators initially held mixed or even skeptical attitudes toward MT, particularly when online tools first became widely available. Some instructors feared that MT use would compromise learning outcomes or facilitate academic dishonesty (Cadwell, 2021; Mellinger & Shreve, 2022). Early reports documented that several universities prohibited MT use in assignments to ensure students produced fully manual translations. However, these extreme prohibitions have largely faded.

- Recent surveys and qualitative studies show that most instructors now acknowledge MT's pedagogical relevance, even if their personal enthusiasm varies (Ehrensberger-Dow et al., 2023; O'Brien, 2022). Educators increasingly recognize that ignoring MT is unrealistic, as students use it independently regardless of institutional policy. Instead, teachers see their role as guiding students to apply MT critically and ethically. Ehrensberger-Dow et al. (2023) report that experienced educators stress the importance of teaching post-editing as an integral competence rather than treating MT as an external threat. As they note, "it would be naïve to think that MT can be relied upon without post-editing," which positions instructors as mediators of technological literacy (p. 405).

  Nonetheless, many educators remain cautious. Concerns persist about maintaining linguistic depth and preventing skill erosion (Kenny & Way, 2023). In the Hong Kong study, instructors voiced apprehension that frequent MT use could harm students' language accuracy and translation problem-solving abilities (Liu et al., 2022). Moreover, veteran translators transitioning into academia sometimes express emotional attachment to traditional translation

practices and ambivalence about machine involvement. Yet a growing number of younger or tech-oriented instructors embrace AI tools enthusiastically, often leading curriculum reform and sharing best practices at professional workshops (Tavares et al., 2023). These educators observe that when properly integrated, MT enhances metalinguistic awareness by exposing students to the systematic errors that machines still make, thereby deepening understanding of linguistic complexity.

- **Evolution of Attitudes:** Both students and educators have undergone a marked shift in perceptions as exposure to AI technologies increases. Early anxieties that MT might "mark the end of translator training" have given way to more balanced views that regard MT as one of many tools that enhance human productivity and insight (Ehrensberger-Dow et al., 2023; O'Brien, 2022). Students often begin courses with polarized opinions—seeing MT as either flawless or unreliable—but progressively develop a nuanced understanding of its limitations and strengths. Liu et al. (2022) found that after structured instruction, students recognized that MT could not adequately capture cultural or contextual nuances, which reinforced their appreciation for human interpretive skills. Educators, in parallel, have moved from defensive resistance toward proactive engagement. Many now view MT integration as an opportunity to enhance pedagogy, introducing reflective assignments where students analyze the differences between human and machine outputs. This iterative exposure fosters more mature, critical attitudes toward technology use in translation studies (Jiménez-Crespo, 2022; Trojszczak, 2022).

- **Common Ground:** Despite differences in initial perspectives, there is now broad consensus between students and educators that AI should be explicitly addressed within translator education. Students seek guidance and structured instruction, while instructors recognize the necessity of preparing graduates for technology-mediated workflows (Ehrensberger-Dow et al., 2023; Cadwell, 2021). Both groups also emphasize the ethical dimension of AI use. In Hong Kong, none of the instructors surveyed argued for banning MT, but most stressed the importance of transparency, proper modification, and attribution (Liu et al., 2022). This shared understanding reflects an emerging professional ethos: the focus of translator education should not be on whether to use AI tools but on how to use them critically, responsibly, and creatively.

3. THEORETICAL FRAMEWORK

The accelerating integration of artificial intelligence (AI) into professional translation practices has transformed the conceptual and pedagogical foundations of translator education. The widespread use of neural machine translation (NMT) systems such as Google Translate and DeepL has compelled scholars to rethink not only the acquisition of technological skills but also the epistemological assumptions underlying translation competence, ethics, and learner agency (Castilho, Sheila et al., 2023; Ehrensberger-Dow, Delorme Benites, & Lehr, 2023; O'Brien, 2022). This transformation requires a multidimensional theoretical grounding that captures both the pedagogical and philosophical implications of AI-assisted translation.

Accordingly, the present study is anchored in an interdisciplinary theoretical framework that brings together Translation Competence Theory (TCT), the Technological Pedagogical Content Knowledge (TPACK) framework, Andragogical Learning Theory, and Posthumanist Translation Studies. These four strands collectively enable an analysis of how translator education is adapting to AI. Each contributes a unique analytical perspective: TCT redefines competence in technologically mediated environments; TPACK explains how educators integrate technology into pedagogy; Andragogy addresses the needs and motivations of adult learners; and Posthumanism offers a philosophical critique of human–machine collaboration in translation.

3.1.Translation Competence Theory

Translation Competence Theory forms the cornerstone of translator training. The European Master's in Translation (EMT) Competence Framework (2017) defines translation competence as a dynamic interaction among linguistic, cultural, technical, and interpersonal sub-competences, establishing a benchmark for curricula across Europe. However, the emergence of NMT requires an expansion of this model. Ehrensberger-Dow et al. (2023) argue that MT literacy should now be considered an essential sub-competence, encompassing critical evaluation of MT output, ethical decision-making, and effective post-editing.

Similarly, Bulut (2019) introduces the notion of *Human Translator Competence*, which extends traditional frameworks to include the ability to co-function with AI tools in reflective and context-sensitive ways. Translators are therefore not merely linguistic mediators but strategic collaborators who interpret, supervise, and optimize machine output (Jiménez-Crespo, 2022). This redefinition situates the translator as a decision-maker who exercises judgment in selecting, customizing, and refining AI-generated content. The current study adopts this broadened concept of competence to examine how students are prepared for professional contexts where machine translation is integral rather than peripheral.

3.2.Technological Pedagogical Content Knowledge (TPACK)

The pedagogical challenges posed by AI integration can be examined through the TPACK framework developed by Mishra and Koehler (2006). TPACK explains how effective teaching arises from the intersection of content knowledge, pedagogical knowledge, and technological knowledge. In translation education, this intersection involves understanding not only translation theories and methods but also how to teach and critique technological tools that shape professional practice (O'Brien, 2022).

Research demonstrates that the rapid evolution of translation technologies has outpaced the adaptation of curricula and teacher training. Tavares et al. (2023) and Woo and Choi (2021) highlight that many educators feel insufficiently equipped to teach post-editing or AI literacy due to limited technological confidence or institutional support. Applying the TPACK framework enables this study to analyze the readiness of translator educators, the degree of technological integration in teaching practices, and the alignment between academic instruction and professional market demands. The framework also provides a basis for evaluating how teacher education must evolve to sustain pedagogical quality in AI-enhanced learning environments.

3.3.Andragogical Learning Theory

Given that most students in professional translator programs are adults or near-adults, Andragogical Learning Theory, as developed by Knowles (1980, 1984) and later expanded by Knowles, Holton, and Swanson (2020), is highly pertinent. Andragogy emphasizes the autonomy, self-direction, and goal orientation of adult learners, who are motivated by the practical applicability of knowledge. Unlike pedagogy, which is content-centered, andragogy prioritizes experiential learning, problem-solving, and learner participation in shaping the learning process.

Applying an andragogical approach to AI-enhanced translation education involves designing activities that are relevant, authentic, and cognitively engaging. Tasks such as MT post-editing projects or consulting simulations, where students must evaluate whether MT is appropriate for a client's text, exemplify this approach (Ehrensberger-Dow et al., 2023; Trojszczak, 2022). Such learning designs foster critical reflection and decision-making, allowing students to engage with AI as professionals rather than passive users. Scenario-based and problem-based learning ensure that students acquire transferable skills that reflect the complex realities of professional translation in the digital era.

3.4.Posthumanist Translation Studies

The fourth theoretical strand derives from Posthumanist Translation Studies, which rethinks the translator's identity within an increasingly hybrid human–machine ecosystem. Cronin (2013) and Braidotti (2019) conceptualize posthumanism as a framework that decentralizes the human subject, viewing knowledge and action as distributed across networks involving humans, technologies, and environments. Within translation, this means recognizing that human and non-human agents collaborate in meaning production.

Trojszczak (2022) argues that translation pedagogy should move beyond the dichotomy of acceptance or resistance to technology and instead embrace *mediated collaboration* with AI systems. This perspective positions the translator as a co-agent who contributes cultural sensitivity, ethical oversight, and contextual judgment that machines lack (Kenny & Way, 2023). Posthumanist thinking thus complements the other frameworks by introducing an ontological shift: it acknowledges that translation competence now operates within an assemblage of human expertise and algorithmic intelligence. This orientation urges educators to cultivate reflective, ethically aware translators who understand their roles within broader sociotechnical systems.

3.5.Synthesis and Application

The integration of these four theoretical perspectives—Translation Competence Theory, TPACK, Andragogy, and Posthumanism—creates a comprehensive framework for analyzing the pedagogical and philosophical implications of AI in translator education.

- **Translation Competence Theory** delineates the evolving sub-competences, particularly those related to MT literacy and ethical decision-making.
- **TPACK** offers a pedagogical model for assessing how educators integrate technology with translation instruction.

- **Andragogy** ensures that educational strategies respect learner autonomy and the immediate relevance of learning to professional practice.
- **Posthumanism** situates translation education within a broader reflection on human–machine interdependence and ethical responsibility.

Together, these frameworks provide the conceptual grounding for this study's analysis of AI-assisted translator training. Rather than perceiving AI as a threat to traditional translation education, this integrated approach envisions a future-ready model that is technologically adaptive, ethically grounded, and centered on reflective human agency.

4. METHODOLOGY

4.1. Research Design and Approach

This study employs a quantitative descriptive design, supported by qualitative insights from short-answer items. Although the questionnaire contains both Likert scale statements and open-ended responses, the methodological core is quantitative, not mixed methods nor exploratory. The qualitative data serve a complementary interpretative function. Its purpose is to investigate student perceptions, usage patterns, and attitudes regarding AI tools in the context of translator education at the King Fahd School of Translation (KFST). As Creswell (2014) emphasizes, case studies offer a robust framework for analyzing specific bounded systems, n this case, a single cohort of MA students, by triangulating data sources to draw context-sensitive conclusions.

Given the growing emphasis on student-centered and data-informed curriculum reform (Tavares et al., 2023), this research combines descriptive statistical analysis of structured survey responses with qualitative thematic analysis of open-ended feedback. This approach enables a nuanced exploration of both quantified responses and the qualitative dimensions of learner experience.

4.2. Participants and Sampling Criteria

The participants in this study were 17 Master's students enrolled in the "PE: English & Arabic" core module at KFST. A purposive sampling strategy was employed to ensure all respondents had direct exposure to AI-assisted translation tasks, aligning with the study's objective of evaluating AI literacy and pedagogical gaps. The criteria for selection included:

- Active enrollment in a translator training program;
- Familiarity with or informal use of AI translation tools (e.g., Google Translate, ChatGPT, DeepL);
- Willingness to participate anonymously in the survey.

This sample was considered appropriate for an exploratory study focused on attitudes and perceptions rather than statistical generalization, and due to time constraints, we were satisfied with the above-mentioned number of participants.

4.3.Data Collection Procedures

Data for this study were collected using a Google Forms questionnaire. This questionnaire comprised 16 items designed to capture various aspects of the subject matter:

- Demographics (age, academic level)
- Familiarity with AI tools
- Purposes and frequency of use
- Perceptions of reliability and usefulness
- Training experience in MT/post-editing
- Support for curriculum reform
- Perceived roles of human translators in an AI-enhanced future

The items were carefully structured to elicit detailed responses from participants, enabling a comprehensive analysis of the data collected.

- Multiple-choice questions (e.g., tools used);
- Likert-scale evaluations (e.g., perceived usefulness of AI);
- Open-ended prompts (e.g., suggestions for curriculum reform).

The questionnaire remained open for two weeks and was distributed digitally via institutional email and messaging platforms. All data were collected anonymously.

4.4.Data Analysis

Closed-ended responses were analyzed and processed using basic descriptive statistics (frequency and percentage distribution), facilitating the identification of major patterns in student behavior and preferences. Open-ended responses were coded and categorized through Braun and Clarke's (2006) thematic analysis framework, focusing on themes such as curriculum relevance, AI as aid versus crutch, and post-editing preparedness.

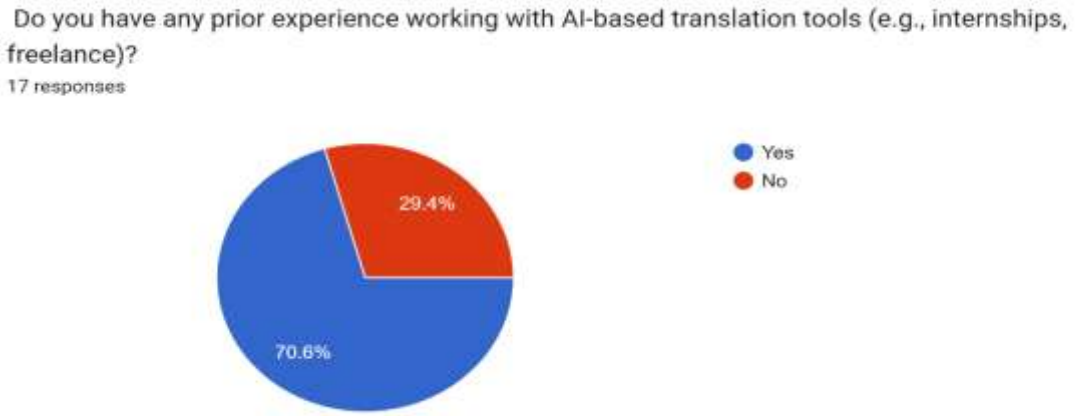
5. FINDINGS

This section presents and analyzes the key findings of the student questionnaire, accompanied by visual placeholders and interpretative commentary.

5.1. Use of AI Tools in Translation

Figure 1

Familiarity with AI-Based Translation Tools Among Students (N = 17).



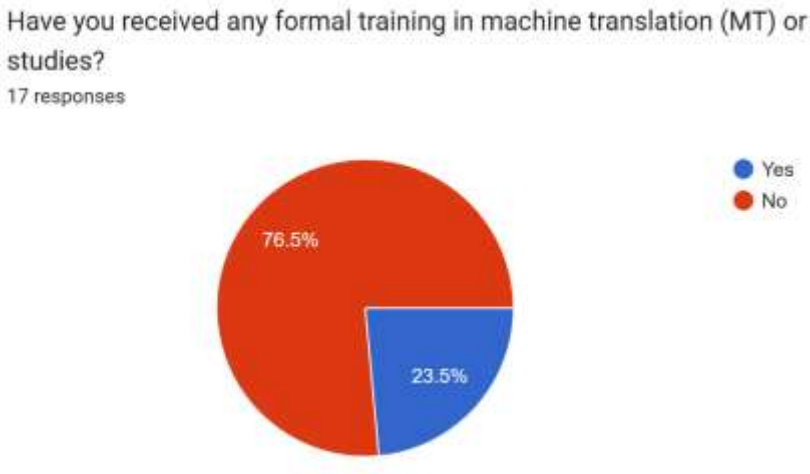
The data reveal that students engage deeply with AI translation tools, particularly Google Translate, ChatGPT, Reverso, and DeepL. Their widespread use of such tools reflects not only accessibility but also a shift in how translation learning is conceptualized. Instead of treating machine translation (MT) as a supplementary aid, many students have normalized it as part of their daily workflow.

However, this extensive engagement raises pedagogical concerns. While students described these tools as "time-saving" and "helpful for understanding difficult texts," such reliance may indicate the emergence of surface-level functional competence rather than deeper critical literacy (Ehrensberger-Dow, Delorme Benites, & Lehr, 2023). For instance, one student noted: *"AI helps me save time on basic terms, but I always need to check context."* This remark shows awareness of MT's limits but also exposes a tension between efficiency and analytical depth.

From a critical standpoint, this pattern suggests that AI integration in learning currently occurs informally and intuitively, not pedagogically. Students appear to be self-training through repetitive use, compensating for gaps in formal instruction. This phenomenon exemplifies what Bulut (2019) terms the transformation of *human translator competence*, in which the translator becomes a pragmatic negotiator between automation and interpretation. Rather than simple evidence of technological enthusiasm, the data underscore an emerging dependency that calls for guided AI literacy to transform convenience into competence.

5.2. Training and Competence Gaps

Figure 2
Student Responses on Formal Training in Machine Translation and Post-Editing.



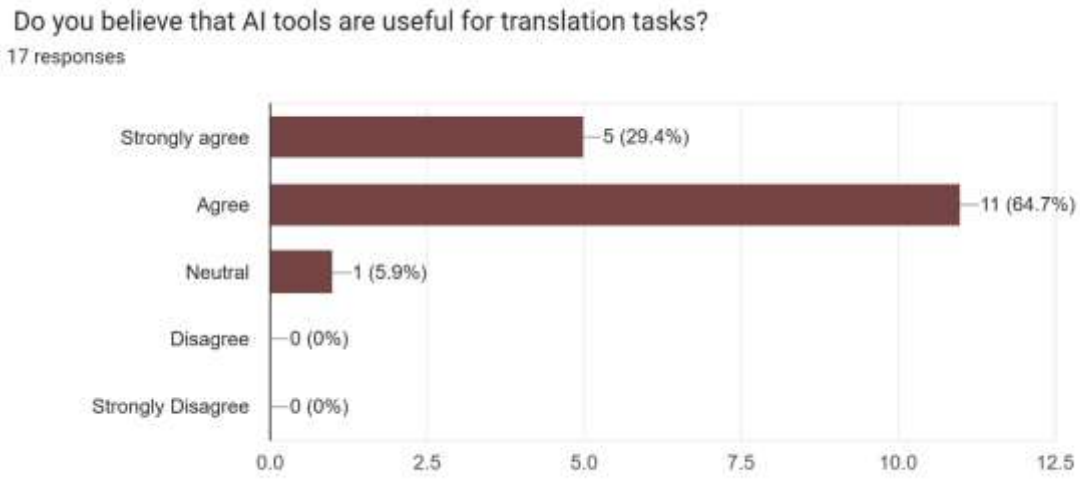
An overwhelming 94% of participants reported receiving no formal instruction in MT or post-editing. This absence is not merely a curricular oversight; it reflects a systemic lag between academic programs and professional realities. Students' requests for structured courses on post-editing, AI evaluation, and consulting practices suggest that they recognize the limitations of self-taught technological engagement.

One participant remarked: *"There should be a course at KFST that teaches us how to properly post-edit AI translations."* This statement conveys agency and frustration, revealing that students are aware of their partial literacy but lack institutional scaffolding to develop it. The finding implies that translation education is inadvertently reproducing a skill divide between technologically fluent learners and those who rely on intuition.

Critically, this gap reinforces what Tavares, Tallone, Oliveira, and Ribeiro (2023) identify as a central challenge in translator training: when MT use outpaces educational guidance, learners risk developing instrumental competence without reflective judgment. The issue, therefore, is not resistance to AI, but the absence of pedagogical mediation that transforms usage into informed practice. These results expose an urgent need for curriculum reform rooted in technological pedagogy rather than spontaneous adaptation.

5.3. Perceptions of AI Usefulness

Figure 3
Perceptions of the Usefulness of AI Tools in Translation Tasks.



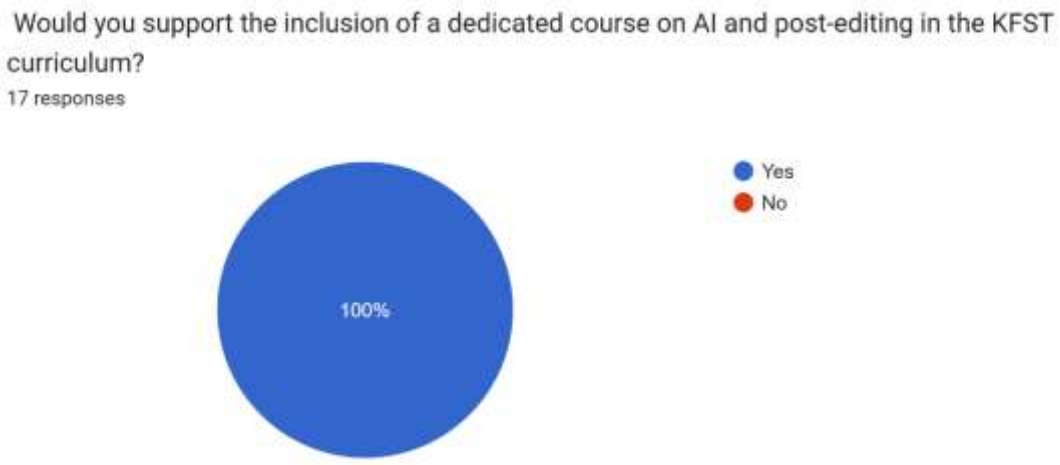
Most students perceived AI tools as useful for improving speed, productivity, and preliminary drafts. Yet their ambivalence about reliability, especially in technical and specialized contexts, reveals a nuanced awareness of both the utility and the epistemic instability of AI translation. One participant explained: *"I use AI for the first draft, but it still makes mistakes in terminology."* This comment illustrates how learners perceive AI as a facilitator but not a substitute for human expertise.

Rather than demonstrating simple acceptance or rejection, the responses suggest adaptive skepticism. Students appreciate MT's convenience but also discern its conceptual blind spots, particularly in contexts requiring cultural and pragmatic precision. This reflects a developing form of critical technological literacy, where users understand the strengths and biases of digital tools (Liu, Kwok, & Cheung, 2022).

Urlaub and Dessein (2022) argue that such ambivalence is pedagogically productive: it positions learners to engage in dialogic reflection between automation and human judgment. However, the current data also indicate that this critical stance arises *in spite of*, rather than *because of*, formal training. Without institutional frameworks for guided evaluation, students' discernment remains fragmented. Thus, the findings highlight both a promising awareness and a missed educational opportunity to deepen it through reflective pedagogy.

5.4.Curriculum Reform and Post-Editing Education

Figure 4
Support for Including a Dedicated Course on AI and Post-Editing in the KFST Curriculum.



All participants (100%) endorsed the inclusion of a dedicated course on AI and post-editing. While unanimity might suggest simple enthusiasm, its critical significance lies elsewhere: it signals a collective recognition that translation curricula have failed to evolve in tandem with professional transformation. Students are not merely asking for new content but are implicitly demanding a redefinition of what counts as *translation expertise*.

One student stated: *"We should be taught how to use and correct AI outputs, not just ignore them."* This plea demonstrates that learners do not view technology as a threat to their role but as a professional inevitability requiring mastery. The finding thus foregrounds a form of learner-led reform consciousness, where students act as catalysts for curricular modernization.

Critically, this consensus exposes a contradiction within existing pedagogical paradigms: while the TPACK model (Mishra & Koehler, 2006) advocates for the integration of technology, pedagogy, and content, institutional practice often isolates them. Similarly, from an andragogical perspective (Knowles, 1980; Knowles, Holton, & Swanson, 2020), the current curriculum disregards adult learners' expectations for relevant, practice-oriented training. The evidence therefore points to a structural inertia within translator education—an inertia that students themselves are now actively challenging.

5.5.Ethical and Professional Concerns

While participants were generally receptive to the integration of AI tools into translator training, several expressed critical concerns about the ethical implications and professional standards surrounding their use. One of the most prominent issues raised was the lack of transparency in MT-assisted coursework. Participants noted that AI-generated content is often submitted without proper disclosure, raising questions about authorship, originality, and academic integrity. This concern reflects a broader ethical dilemma in higher education, where the boundaries between human production and machine assistance remain inadequately defined. Without clear institutional guidelines on the use of AI in assignments, students are left navigating a grey area that risks compromising both learning outcomes and ethical standards.

Another recurring concern was the risk of overreliance on AI tools, especially in situations where students may substitute critical thinking and linguistic reasoning with quick machine-generated

output. While AI can offer lexical or syntactic suggestions, it does not adequately account for cultural nuance, pragmatic context, or rhetorical subtleties. Several respondents reported using tools like Google Translate or ChatGPT as a starting point but emphasized the importance of human revision. This tendency to treat AI output as authoritative, particularly when time-constrained or under academic pressure, can inadvertently weaken the student's own development of translation competence. As Ehrensberger-Dow et al. (2023) argue, developing MT literacy must include the ability to *critically interrogate* AI suggestions rather than passively accept them.

A third area of concern centered on quality control in specialized or high-stakes domains such as legal, medical, or technical translation. Students expressed skepticism regarding AI's reliability in these contexts, citing examples of inaccurate terminology, loss of precision, and contextual misalignment. This aligns with Trojszczak's (2022) assertion that machine translation, while improving, still lacks the contextual and ethical reasoning required in sensitive domains. The danger lies not only in mistranslation but also in the illusion of fluency that advanced MT systems generate, which may mask deep semantic errors. This phenomenon places the human translator in a critical evaluative role, serving as a quality gatekeeper rather than merely a passive post-editor.

6. DISCUSSION

The present study set out to examine how Master's-level translation students at the King Fahd School of Translation engage with artificial intelligence tools, how they perceive their usefulness, and to what extent current training prepares them for AI-assisted translation practices. The findings collectively reveal a paradoxical situation: while students demonstrate high levels of familiarity and frequent use of AI-based translation tools, their engagement remains largely informal, unguided, and weakly anchored in pedagogical frameworks. This discussion interprets these results in light of the study's theoretical framework, highlighting implications for translator competence development, curriculum design, and ethical training.

6.1.AI Use as an Informal Competence-Building Practice

The widespread use of tools such as Google Translate, ChatGPT, DeepL, and Reverso confirms that AI has become an integral part of students' translation workflows. This finding aligns with previous research indicating that machine translation is no longer perceived as optional or supplementary but as a normalized component of translation practice (Ehrensberger-Dow et al., 2023; Liu et al., 2022). From the perspective of Translation Competence Theory, this normalization signals a shift in how competence is constructed. Students are not merely acquiring linguistic knowledge; they are engaging in hybrid human–machine translation processes that redefine professional practice.

However, the largely intuitive and self-directed nature of this engagement suggests that competence development is occurring in an unstructured manner. While students recognize the

efficiency gains offered by AI, their reliance on these tools risks producing what can be described as instrumental competence rather than reflective competence. Bulut's (2019) concept of Human Translator Competence is particularly relevant here. According to this view, translators must not only use AI tools but also critically supervise, evaluate, and contextualize their output. The findings indicate that students are already positioned as negotiators between automation and interpretation, but without systematic training, this negotiation remains implicit rather than critically informed.

This gap reflects a broader pedagogical issue: AI integration is happening despite the curriculum rather than through it. As a result, students develop operational habits without a clear conceptual framework for understanding AI limitations, biases, or ethical implications. Without pedagogical mediation, frequent AI use risks reinforcing surface-level fluency illusions, where outputs appear acceptable but lack semantic precision or contextual adequacy.

6.2.Training Gaps and the Fragmentation of Translation Competence

The absence of formal training in machine translation and post-editing, reported by the vast majority of participants, represents one of the most critical findings of the study. This lack of institutional scaffolding undermines the systematic development of translation competence as conceptualized in the EMT framework and related models. Translation competence is not a spontaneous outcome of tool exposure; it requires guided instruction, feedback, and reflective practice.

From a TPACK perspective, this gap reflects a misalignment between technological availability and pedagogical integration. While students possess access to powerful AI tools, these tools are not meaningfully embedded within instructional design. The technological component exists in isolation, disconnected from pedagogical strategies and content objectives. This fragmentation limits the educational value of AI and shifts responsibility for competence development entirely onto students.

Moreover, the reported frustration among students indicates a high degree of learner awareness. Students recognize that informal use is insufficient for professional readiness and actively request structured training. This finding resonates strongly with andragogical learning theory, which emphasizes that adult learners are goal-oriented and motivated by relevance to professional practice (Knowles et al., 2020). The absence of AI-focused instruction thus contradicts fundamental andragogical principles by ignoring learners' expressed needs and real-world constraints.

In this sense, the findings suggest that current training practices risk reproducing inequality in competence development. Students with stronger technological intuition may advance independently, while others rely on trial-and-error strategies. Without formal instruction, translation education inadvertently shifts from guided learning to informal apprenticeship with technology, without quality control or ethical oversight.

6.3.Ambivalent Perceptions and Emerging Critical Awareness

Students' perceptions of AI usefulness reveal a nuanced and balanced stance rather than uncritical acceptance. While AI is widely valued for speed, productivity, and draft generation, students consistently express skepticism regarding reliability, especially in specialized or high-stakes domains. This ambivalence is pedagogically significant. As Urlaub and Dessein (2022) argue, such tension between trust and doubt creates productive conditions for critical reflection.

From the standpoint of MT literacy, this emerging skepticism reflects early stages of evaluative competence. Students demonstrate awareness that AI output requires verification, contextual adaptation, and terminological control. However, the absence of structured training means that this awareness remains fragmented and inconsistently applied. Students know that AI makes mistakes, but they lack standardized criteria or strategies for detecting and correcting them.

This situation illustrates a missed opportunity within translator education. Without guided post-editing tasks, comparative analysis, and explicit evaluation frameworks, students' critical awareness remains intuitive rather than systematic. The findings therefore support calls for curriculum reform that moves beyond tool exposure toward structured AI literacy, where students learn not only when to use AI but how to interrogate its output critically.

6.4.Learner-Led Demand for Curriculum Reform

The unanimous support for introducing a dedicated course on AI and post-editing constitutes one of the strongest indicators of pedagogical misalignment. This finding suggests that students do not perceive AI as a threat to their professional identity but rather as an unavoidable reality requiring mastery. Their demands reflect a learner-led reform impulse, where students articulate expectations traditionally defined by institutions.

This result can be interpreted through both the TPACK and andragogical frameworks. From a TPACK perspective, it highlights the failure to integrate technology, pedagogy, and content in a coherent manner. From an andragogical perspective, it underscores a disconnect between adult learners' expectations and curricular offerings. Adult learners expect education

to reflect professional realities, yet the current curriculum appears anchored in pre-AI paradigms of translation training.

Furthermore, this demand challenges persistent assumptions that AI undermines translation education. Instead, students position AI training as essential to preserving the relevance and legitimacy of their future professional role. This aligns with posthumanist perspectives on translation, which conceptualize translation as a distributed activity involving human and non-human agents. Rather than resisting AI, students seek to redefine their role as evaluators, editors, and ethical decision-makers within AI-assisted workflows.

6.5.Ethical Concerns and the Reassertion of Human Responsibility

Ethical concerns raised by students further reinforce the need for structured AI integration. Issues related to authorship, transparency, overreliance, and quality control point to the inadequacy of existing ethical guidelines within translation education. Students are aware that uncritical AI use can compromise academic integrity and professional standards, yet they lack institutional guidance on responsible use.

From a posthumanist translation studies perspective, these concerns highlight the enduring necessity of human responsibility within human–machine assemblages. While AI systems can generate fluent output, they lack ethical reasoning, contextual judgment, and accountability. Students' skepticism toward AI reliability in legal, medical, and technical contexts underscores the continued relevance of human oversight.

These findings support Trojszczak's (2022) argument that translators must be trained not merely as post-editors but as quality gatekeepers. Ethical training, therefore, should not be treated as an auxiliary topic but as a core component of AI literacy. Without explicit instruction on disclosure, responsibility, and risk management, students are left navigating ethical grey zones independently.

6.6.Synthesis and Implications

Taken together, the findings suggest that translator education is currently situated at a critical transitional moment. AI tools are already embedded in student practice, but pedagogical frameworks have not yet caught up. Theoretical models such as Translation Competence Theory, TPACK, Andragogy, and Posthumanist Translation Studies collectively illuminate this gap. They point toward the need for curricula that integrate AI as a central, critically mediated component of translator training.

The discussion highlights that the central challenge is not whether AI should be included in translator education, but rather how it should be effectively taught. Without structured instruction, AI risks reinforcing superficial competence, ethical ambiguity, and uneven skill development. With proper pedagogical integration, however, AI can become a powerful tool for developing reflective, ethical, and professionally relevant translation competence.

7. LIMITATIONS

Despite the valuable insights generated by this study, several limitations must be acknowledged to properly contextualize its scope and interpretive boundaries. The most significant limitation concerns the small sample size of 17 participants drawn exclusively from a single cohort at the King Fahd School of Translation, which restricts the generalizability of the results beyond this institutional context. While the findings offer meaningful reflections on students' engagement with artificial intelligence (AI) in translator training, larger and more diverse samples across multiple universities would provide a more representative understanding of how AI integration unfolds across educational settings. Additionally, the reliance on self-reported survey data introduces the possibility of response bias, as participants may have overstated their familiarity with AI tools or understated their dependence on machine translation to align with perceived academic expectations. Another limitation lies in the absence of objective skill assessments, since the study measured attitudes and perceptions rather than actual post-editing or AI evaluation competence. Without practical performance data, it is difficult to determine whether students' confidence corresponds to demonstrable proficiency. The study also reflects a single-perspective scope, focusing solely on student feedback without incorporating insights from instructors, administrators, or curriculum designers whose perspectives are critical for understanding institutional readiness and pedagogical strategy. Finally, the cross-sectional nature of the research provides only a temporal snapshot of attitudes toward AI, even though such perceptions are likely to evolve rapidly as technology advances. Future studies adopting longitudinal, multi-stakeholder, and mixed-method designs could thus offer a more comprehensive, evidence-based understanding of how AI continues to transform translator education.

8. CONCLUSION

This case study provides critical insights into how translation students at the King Fahd School of Translation (KFST) perceive, interact with, and evaluate AI tools within their academic training. The findings resonate with broader trends observed in recent scholarship: while students demonstrate increasing comfort with AI tools such as Google Translate, ChatGPT, and DeepL, they often feel ill-equipped to engage with these technologies at a professional or critical level. The gap between tool familiarity and andragogical preparedness highlights a potential tension in contemporary translator education. Students are not resistant to AI integration; on the contrary, they express a strong desire for structured instruction in post-editing, AI evaluation, and the ethical implications of machine translation use.

These findings reinforce calls for systemic curriculum reform grounded in robust theoretical frameworks. Specifically, Translation Competence Theory emphasizes the development of technical, evaluative, and ethical sub-competencies; TPACK underscores the need for thoughtful integration of technology with content and pedagogy; Andragogy encourages problem-based, relevant instruction aligned with adult learners' needs; and Posthumanist Translation Studies redefines the translator's role as a collaborative agent in human–machine translation ecosystems. When woven together, these frameworks support a vision of translator education that is responsive, reflective, and future-oriented.

In line with global recommendations (Bulut, 2019; Liu et al., 2022; Ehrensberger-Dow et al., 2023), this study advocates for the inclusion of dedicated modules on machine translation, scenario-based post-editing training, and opportunities for students to engage in critical dialogue about AI ethics and tool limitations. By embedding these elements into formal training, institutions can better prepare graduates to navigate an industry that increasingly values AI literacy alongside traditional linguistic competence.

Ultimately, as AI technologies continue to evolve, so too must the academic programs that prepare professionals to engage with them. This study contributes to that ongoing transformation by centering student voices and underscoring the pedagogical and ethical imperatives of AI integration. Translator education must move beyond tool introduction toward fostering critical, ethical, and strategic users of AI, equipping students not only to adapt but to lead within the rapidly evolving language services sector.

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