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TRANSLATOR EDUCATION IN THE AGE OF GENERATIVE AI: LEARNER AGENCY, WRITING PROFICIENCY, AND PEDAGOGICAL GOVERNANCE IN MACAU

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Abstract

This study examines generative artificial intelligence (GenAI) in Chinese–Portuguese translator education in Macau through two non-equivalent cohorts (2024 and 2025). It combines questionnaires from 112 students, selected translation and writing artefacts from 56 students, and institutional documents and interviews. The analysis describes tool-use patterns, reported feedback preferences, and documented attempts to evaluate and revise automated output. It also identifies tensions between course-level GenAI rules and reported practices. Writing proficiency is considered alongside other translation resources, not independently measured as an outcome. The article proposes task-specific tool permissions, process-visible assessment, and shared pedagogical governance without claiming causal effects on learning or agency.

Keywords: Chinese–Portuguese translation education; Macau; GenAI; writing proficiency; learner agency

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1 Introduction

Generative AI (GenAI) is prompting translator education to reconsider how competence, decision-making authority, and professional responsibility are developed and assessed. The curricular challenge is therefore how to design tasks, feedback, assessment, and institutional rules for its situated use. This article approaches translator competence as a multidimensional construct encompassing linguistic and cultural, strategic, thematic, technological, and professional resources (PACTE, 2003; Prieto Ramos, 2024; European Commission, 2026). Within this configuration, target-language writing proficiency is an enabling component: it supports the production, evaluation, and revision of target texts, but does not by itself constitute translator competence or guarantee agency. Agency is understood here as students' situated exercise of decision-making authority when they evaluate, accept, reject, revise, and justify GenAI outputs and human feedback. Ethical reflection guides this exercise by requiring students to relate their decisions to the translation brief, the target audience, disclosure expectations, and institutional rules. Using Chinese–Portuguese translator education in Macau as its empirical setting, the article examines how a human-centred pedagogical approach may make students' translation decisions more available for reflection and assessment while preserving their responsibility for the target text.

GenAI, including the use of large language models (LLMs) for translation and multilingual text production (Pimienta, 2026), is expanding the range of automated resources available for language learning (Liu, Liu et al., 2026; Wang et al., 2025). At the same time, the growing availability of fluent machine-generated text raises pedagogical concerns about reliability, linguistic homogenization, overreliance on automated output, and the visibility of students' own translation decisions. Roe et al.'s (2025) metaphor of 'digital plastic' captures some of these concerns by drawing attention to the ease with which synthetic text can be produced, circulated, and normalized. From a pedagogical perspective, critical AI literacy therefore involves more than operational familiarity with AI tools: students engaging in translation, including those outside formal translator-education programmes, need opportunities to evaluate when automated assistance is appropriate, identify linguistic and pragmatic limitations in generated output, and justify revisions in relation to the translation brief, genre, and target audience. This emphasis extends a longstanding concern in translator education with learner autonomy and responsibility for translation decisions. In this article, bounded AI use and process-visible assessment are examined as pedagogical responses intended to support critical engagement with automated output while keeping students' decision-making and responsibility open to reflection and assessment.

These pedagogical questions are also institutional, because the growing use of AI systems can influence which linguistic forms and translation solutions become readily available and salient to learners. In Macau, where Portuguese

is used in educational and institutional settings alongside Chinese languages, repeated exposure to AI-generated suggestions may shape students' perceptions of acceptable lexical, stylistic, and genre choices (Amaro & Pires, 2024; Jatobá, 2026a). Such influence is better understood here as a potential language-policy effect than as evidence that AI itself constitutes a language-policy instrument. The implications for learner agency depend on how students engage with these suggestions: automated assistance may support decision-making when outputs are evaluated and revised, whereas uncritical reliance may narrow students' active role in selecting and justifying translation solutions. A related but distinct issue concerns process visibility. When AI-mediated decisions are not documented, teachers have less direct evidence of how students arrived at particular solutions; conversely, prohibition may displace some AI use into less observable settings (Jatobá, 2026b). The study therefore treats process visibility as a pedagogical and governance concern: documenting tool use and revision decisions can provide a basis for reflection, feedback, assessment, and discussion of responsibility.

Writing is one textual site where translational judgement becomes accountable target-language form. This focus is especially apposite in Macau's Chinese–Portuguese linguistic ecology. The local translation market is historically and institutionally specific, shaped by socio-institutional demand for bilingual Chinese–Portuguese professionals in public-sector contexts, and by political and geopolitical agendas transcending Macau's administrative boundaries—most notably the positioning of Portuguese within broader governance arrangements and Macau's role as an economic and cultural platform for China's relations with Lusophone countries (Han & Sun, 2025; Jatobá, 2024; Jatobá & Ho, 2020). Although translation as a foreign language learning method (*translation in teaching*) and formal translator education (*teaching translation*) have different educational objectives, graduate trajectories complicate any strict separation between them. Available evidence on recent graduate trajectories suggests that formal programme boundaries do not map neatly onto professional translation activity: graduates of Chinese–Portuguese translation programmes do not necessarily enter the translation industry, while some Portuguese Studies graduates move into translation-related work (Jatobá, 2026b). This article therefore addresses the following question: if translation is also learned and enacted outside formal translation programmes, what can translator pedagogy learn from the ways students in non-translation curricula engage in translation under AI-mediated conditions?

For this study, the term student-translator includes students enrolled in formal translation programmes as well as language majors undertaking translation-intensive coursework. Although these groups may have different educational objectives, both encounter challenges related to evaluating AI-generated texts. The study investigates how target-language writing proficiency, together with other linguistic and strategic resources, may contribute to their capacity to identify translation problems and justify revision decisions. Within this frame, certain interconnections need to be highlighted. First, the central

concern is to develop the capacity to ethically utilize GenAI in order to draft, verify, revise, and justify texts under genre, audience, and institutional constraints. In such an educational setting, understanding that 'translation is a text-based cognitive act deeply embedded in a social-cultural context' (Yang & Li, 2021, p. 134) is equally important to 'bilingual competence' (Jatobá, 2019) and supported by AI literacy, which here serves as a core skill linking sociocultural reasoning with technological competence. In the Macau evidence analysed here, fluent AI-generated drafts may mask rhetorical and pragmatic problems and thereby increase the demands placed on students' linguistic and strategic resources. Target-language writing proficiency can support the detection and revision of misrepresentation, pragmatic inconsistency, register mismatch, and culturally embedded meaning shifts, but it operates alongside source-text comprehension, domain knowledge, research competence, and strategic awareness. Writing is therefore treated as one important site through which students' decision-making authority and responsibility become visible in the target text. Writing proficiency thus functions as the hinge between *agency* (who controls meaning and wording across the workflow) and *quality* (what the target text achieves in its communicative situation), consistent with recent work emphasizing creativity, critical evaluation, human agency, and evolving competence requirements in AI-assisted writing and translation (Asimakoulas & Guerberof-Arenas, 2026; Massey, 2025; Prieto Ramos, 2024).

The study examines this agency–quality link through a mixed-methods design combining three strands of qualitative and quantitative evidence from Macau. First, it draws on classroom-based data from an upper-intermediate Portuguese as a Foreign Language (PFL) context in which translation functions as a learning and assessment device across two cohorts working under GenAI-prohibited (2024; MT permitted) and bounded-GenAI-permitted (2025; GenAI permitted under stage constraints). Second, it incorporates a governance dataset on AI policies and learner practices (2023–2025), showing how restrictive rules can displace tool use into less observable spaces. Third, it mobilizes artefact analysis of writing and translation outputs produced by the two cohorts. This writing-focused comparison examines how students attribute authority to different feedback sources and how they describe ownership, revision practices, and perceived voice. The triangulation of these sources permits a descriptive examination of how pedagogical arrangements structure opportunities for documented evaluation, revision, and justification across human and AI feedback.

The article contributes to discussions of human-centred AI in translator education by examining agency, translation resources, and pedagogical governance in Macau. It also proposes task-specific tool use, process-visible assessment, and shared acceptable-use arrangements as pedagogical implications. The study is guided by three research questions:

> **RQ1 (curriculum/workflows):** What patterns may be observed in MT/LLM tool usage among student-translators in Chinese-

Portuguese translation tasks?

RQ2 (agency/writing proficiency): How do students perceive and exercise decision-making authority when evaluating, revising, and justifying GenAI-generated translation suggestions?

RQ3 (ethics/governance): What tensions emerge between institutional AI policies and students' reported translation practices, and what pedagogical implications can be drawn from these tensions?

The article is organized into six sections. Following this introduction, Section 2 describes the sociolinguistic and educational context of Macau. Section 3 reviews relevant scholarship on AI-mediated translation, agency, and translator competence. Section 4 presents the research design and methods. Section 5 discusses the findings in relation to tool use, feedback, and institutional governance. Section 6 outlines the implications for translator education and identifies the study's limitations.

2 Macau case context

Macau's distinctive sociolinguistic and educational configuration is marked by asymmetries between the institutional status and everyday use of its languages. The 2021 census records Portuguese as the home language used most often by only a small proportion of the population, while Cantonese predominates (Table 1). However, home-language data measure reported language use in a specific domain and should not be taken as measures of proficiency or of the institutional relevance of a language. Portuguese may therefore have limited representation in home-language statistics while remaining institutionally salient in education, administration, and Chinese–Portuguese mediation (Liu, Hu et al., 2026). For many learners, this means that opportunities for sustained exposure to and use of Portuguese may be concentrated in educational and institutional settings rather than in everyday home communication. In this context, Portuguese target-language literacy may remain educationally and professionally consequential despite the language's limited representation in home-language statistics.

Table 1. Home language used 'most often/most of the time'

	Census 2021	
Language	**Percentage**	**Number**
Cantonese	78.9%	537,981
Other Chinese dialects	5.3%	36,032
Mandarin	4.6%	31,405
English	3.5%	23,635
Tagalog	2.8%	19,154
Portuguese	0.6%	3,949
Others	1.7%	11,626
N/A	2.6%	18,288
Total		**682,070**

Note. Language labels follow the categories reported in the 2021 Macao Census (DSEC, 2022); Cantonese and Mandarin are reported separately. Figures refer to reported home-language use, not language proficiency.

During the first century of Portuguese administration (1557–1657), Macau rapidly consolidated itself as a European gateway to China, with Jesuits such as Michele Ruggieri羅明堅 (1543–1607) and Matteo Ricci利瑪竇(1552–1610) using the translation of European science and technologies as a means of approaching Chinese elites (Cheung, 2014). Macau consequently became an important site of translation and intercultural mediation between China and Europe from the sixteenth century onwards (Jatobá, 2025; Zhu & Araujo, 2026). This longer history provides a background for, rather than a direct explanation of, the contemporary educational configuration. Formal Chinese–Portuguese translator training developed under different institutional conditions, particularly through the reconfiguration that followed the 1999 transfer of sovereignty and expanding demand for cross-border mediation. Macau's position as China's platform for developing economic and cultural relations with Portuguese-speaking countries has sustained public- and semi-public-sector needs for Chinese–Portuguese mediation, while higher education has diversified the curricular settings in which translation is taught and practised (Yan, 2017). Translation now features both in designated translation programmes and in Portuguese Studies and language-focused curricula, where it functions as a language-learning method, an assessment device, and a potential professional pathway (Han & Sun, 2025; Jatobá, 2024; Jatobá & Ho, 2020; Zhang & Wang, 2018). This layering helps explain why the category of student-translator in Macau extends across programme types and why AI-mediated translation practices cannot be examined solely within formal translation degrees.

While Portuguese has official status, it is often acquired relatively late and practised in narrower institutional or mediation-facing settings; consequently, opportunities for developing target-language proficiency are unevenly distributed across learner trajectories. Market-facing expectations further complicate training. For permanent-resident students, professional pathways in high-stakes

Chinese–Portuguese mediation are closely connected to public administration and government-facing initiatives such as Forum Macao[1] (Jatobá, 2024; Jatobá & Ho, 2020). Under the general public-service regime, permanent-resident status is a requirement for entry into public functions, including the public-service career pathways relevant to translation and interpreting (Macao SAR, 2025, Law No. 8/2025, art. 1, amending art. 10 of the Statute of Public Administration Workers). For students without permanent-resident status, professional prospects are more likely to depend on private-sector and cross-border opportunities than on access to public-service careers (Jatobá, 2024; Shang, 2021). Private-sector employment remains possible for non-residents, but employers must obtain prior administrative authorisation under a regime that gives priority to resident workers and considers local labour availability, the employer's recruitment efforts, labour-market needs, and the applicant's suitability for the post (Macao SAR, 2009, Law No. 21/2009, arts. 2 and 8). In pedagogical terms, these differentiated professional horizons help explain why programmes may select translation briefs drawn from both public-facing institutional genres and private-sector or cross-border communication, requiring students to address specific target audiences, terminological precision, genre conventions, and responsibility for translation decisions. These intersections between linguistic trajectories, professional expectations, and curricular design provide the context for the literature reviewed in the next section.

3 Literature review

Scholarship on translators and translation technology (Kenny, 2017; O'Brien, 2012; Olohan, 2011, to name but a few) and recent GenAI on translator education has examined students' and translators' perceptions of automated tools, changes in translation workflows, and the implications of AI-mediated practices for the development of translation competence (Amaro & Pires, 2024; Massey & Ehrensberger-Dow, 2026; Prieto Ramos, 2024; Wu et al., 2025; Zhang et al., 2025). Although these studies identify opportunities for linguistic support and workflow efficiency, they also raise questions about output verification, learner dependence, and responsibility for translation decisions. Perceived gains in efficiency and scaffolding coexist with concerns about verification, reliability, integrity, and governance (Kwok et al., 2025; Yao et al., 2025). In Macau, Amaro and Pires (2024) combine surveys, qualitative responses, classroom observations, and autoethnographic reflection to examine translation students' views of AI. Their findings juxtapose perceived efficiency with concerns about cultural nuance and human involvement. The present article develops this local discussion through selected translation episodes, teacher comments, and policy–practice tensions, distinguishing participants' evaluations from independently demonstrated learning outcomes.

3.1 Macau as a Chinese–Portuguese mediation ecology

This article treats Macau as a Chinese–Portuguese mediation ecology in which what becomes institutionally visible depends partly on how language use and technological practices are classified, documented, and assessed. It distinguishes three related but non-equivalent forms of visibility. Linguistic visibility concerns how institutional instruments represent language use. By asking respondents to identify the language used most often at home, for example, Macau's census records one domain of language use but does not represent the full range of multilingual practices across educational, institutional, and professional settings (Liu, Hu et al., 2026). Process visibility concerns the extent to which students' tool use, revisions, and translation decisions are documented and available for reflection and assessment. Policy visibility concerns the extent to which institutional AI rules can be compared with students' reported or documented practices, including points of correspondence or discrepancy. In this study, linguistic visibility provides contextual framing; process visibility is examined through student artefacts and process documentation; and policy visibility is examined through institutional documents, interviews, and reported practices. These three uses of visibility constitute an analytical thread rather than a single operationalised construct. Sections 3.3 and 3.4 develop their implications for human–technology interaction and for target-language writing proficiency as an enabling component of translation competence.

Macau's longstanding role as a nexus of Chinese–Portuguese linguistic mediation is well documented in Chinese scholarship on interpreting and translator training, which describes a gradual shift from language-focused instruction towards skill-oriented professional preparation grounded in practical training and theoretically informed reflection (Han & Sun, 2025; Han, 2022; Li, 2016). That longer arc situates the present AI moment: generative systems are reconfiguring the ways in which linguistic authority, revision labour, and accountability are distributed across human–machine arrangements. This trajectory highlights not the emergence of entirely new pedagogical requirements, but the need to make established practices of strategic decision-making, verification, and accountability more explicit within hybrid human–AI workflows.

Calvet's (1998) distinction between *in vivo* and *in vitro* language policy offers a useful heuristic for examining the relationship between everyday linguistic practices and institutional regulation. *In vivo* practices constitute multilingualism through everyday repertoires and routines, whereas *in vitro* policies institutionalise particular forms of language legitimacy through rules, classifications, and assessment. This distinction is analytically productive for the present study because it draws attention to how institutional regimes may recognize multilingualism while simultaneously narrowing what becomes pedagogically and professionally legible in evaluation contexts. By analogy, students' informal AI practices may diverge from the rules established by

educational institutions. This analogy invites closer examination of how official policies shape, constrain, or fail to capture reported or documented classroom practices. Such rules are not themselves language policies, although they may have language-policy consequences when they influence which linguistic practices, translation processes, and forms of tool use become institutionally recognized and assessable.

3.2 Values, market imaginaries, and AI-times in translator education

Recent work in translation and interpreting education situates AI integration within debates about professional roles, competence descriptions, and educational priorities (see Massey & Ehrensberger-Dow, 2026; Penet et al., 2026; Walker & Lambert, 2026a). In this article, these debates are interpreted as involving not only tools but also the values attached to labour, quality, authorship, responsibility, and employability. This matters for translator education because classroom tasks are sites where such professional expectations are introduced, negotiated, and sometimes resisted. Massey and Ehrensberger-Dow (2026) argue that current shifts do not displace established translation resources, including source-text comprehension, target-language writing and revision, domain and cultural knowledge, interpretation of the translation brief and target audience, research, and critical evaluation. Rather, they propose aligning these resources with transferable skills and human–machine/human–agent interaction (HMI/HAI) competence, including effective prompting and reprompting, iterative evaluation supported by supplementary research, recognition of priming effects, and the identification and mitigation of bias, additions, omissions, and hallucinations. Read through the present article's emphasis on agency as the situated exercise of decision-making authority, this account directs attention to empirically documentable actions: how students identify task constraints, evaluate automated outputs, revise proposed solutions, and justify their translation decisions.

The Macau case illustrates how the above-mentioned economic, social, ethical, and epistemic values take specific form in relation to scale and market regulation. From a language-policy perspective, Macau's small-territory context draws attention to the local salience and consequences of institutional choices (Moody, 2021). Translation-industry economics form part of the professional context to which translator education responds, but they do not determine pedagogical priorities. Professional sustainability, rate-setting, and employability conditions frame and may constrain the exercise of professional agency, while training institutions may address these pressures by prioritizing competence development, professional habits, critical judgement, and technological knowledge (Walker & Lambert, 2024, 2026a, 2026b). In Macau, the interaction between this small-scale regulatory context and translation-market pressures suggests that AI integration can redistribute incentives, labour, and decision-making authority across professional and educational settings.

This becomes particularly acute when 'AI-times' compress production timelines while expanding the verification burden. Evidence from post-editing process studies in the region suggests that GenAI redistributes effort in ways that complicate training. Using eye-tracking, key-logging, self-ratings, and retrospective interviews, Yao et al. (2025) show that AI-assisted post-editing may leave temporal effort unchanged while increasing technical effort, with mixed patterns for cognitive effort; moreover, the effects are strongly moderated by brief type, such as *full* vs. *light* post-editing. For translator education, 'AI-times' can expand the verification and coordination workload through tasks such as prompting, negotiating suggestions, cross-checking, and reconciling conflicts or lack of consistency in output. Accordingly, workflow design and brief-sensitive expectations become part of curriculum content, requiring pedagogical approaches that prepare students to adapt verification and revision strategies to changing task, tool, and professional demands.

Some industry narratives around automation foreground speed and output, potentially obscuring the socioeconomic conditions under which translators sustain quality, wellbeing, and ethical accountability (Walter & Agnetta, 2025). In Macau, these pressures enter the classroom when students encounter institutional genre requirements concerning terminology, register, target audience, and institutional voice, alongside reputational risk and time-intensive verification demands in market-facing and public-sector-adjacent mediation settings (Jatobá, 2026a). This article therefore frames AI-times as a problem facing curriculum developers and students: translator education should enable students to evaluate the trade-offs between efficiency, quality, and professional responsibility. Rather than treating faster production as inherently beneficial or detrimental, pedagogical activities should examine how different workflows affect the quality and justification of translation decisions.

3.3 Human-centered augmented translation as a pedagogical lens

Human-centered AI approaches emphasize that tools should remain aligned with human values and be implemented within governance and accountability structures (McGrath et al., 2025; Shneiderman, 2022). Within translation studies, O'Brien's (2024) account of human-centered augmented translation is especially productive because it explicitly argues against antagonistic dualisms and reframes translators as actors within hybrid socio-technical systems in which translators' wellbeing and scope for action, as well as the quality of translation processes and outputs, depend on the conditions of interaction. Olohan's (2011) 'dance of agency' complements this account by treating agency as situated and temporally emergent in the interplay between human action and technological performativity, without assuming symmetry between them. In this article, such situated agency is distinguished from decision-making authority—the capacity to make or approve translation decisions—and from professional and ethical responsibility for those decisions. From this perspective, translator education

must address what may be delegated to machine assistance, where human decision-making authority should be retained, and how professional and ethical responsibility is documented in real workflows.

Briva-Iglesias et al. (2023) offer a complementary analytic and methodological layer through the concept of Machine Translation User Experience (MTUX), which foregrounds users' perceptions and responses resulting from the actual or anticipated use of MT systems. Briva-Iglesias and O'Brien (2024) extend this line of research by reporting associations between professional translators' pre-task perceptions and translation quality and productivity in a legal post-editing workflow. In the present study, MTUX is used as a literature-based lens rather than measured through a dedicated MTUX instrument: users' expectations and perceptions are pedagogically relevant because they may shape subsequent interaction with MT/AI systems. This supports the article's agency claim by directing attention to how students evaluate automated suggestions and to possible patterns of over-reliance (substitution) or reported non-use (avoidance) in their reports and documented practices, without treating these patterns as direct measures of agency or professional judgement.

Recent China-affiliated process research sharpens this MTUX–agency link by moving beyond self-report and describing patterns of human–GenAI interaction. Based on screen-recorded translation tasks, Cai and Tian (2025) distinguish three interaction profiles: 'reflective deep engagers,' 'pragmatic global adjusters,' and 'minimalist result-seekers' (p. 40). Descriptive quality patterns associated reflective deep engagement with more stable performance and minimalist result-seeking with greater variability; however, differences in mean translation quality across the three clusters were not statistically significant, and the findings do not establish causal effects. Cai and Tian's typology therefore provides a useful basis for investigating students' strategic engagement with automated suggestions. The present study adopts a different but complementary classification: its MT-first, human-first, and GenAI-first categories describe the initial production strategy reported or documented in student workflows rather than stable interaction profiles or levels of translator competence. Together, these distinctions inform the analysis of agency as the situated exercise of decision-making authority, for which documented patterns of output evaluation, revision, and justification across the workflow can provide observable evidence.

Greater China research strengthens this framing by showing that AI literacy is foundational to responsible AI-mediated translation workflows. Zhang and Doherty's (2025) study of novice translation students documents widespread out-of-class AI tool use and, crucially, a gap between confidence in error detection and limited awareness of ethical issues. This supports integrating AI translation technology from the outset of translator education to cultivate informed, critical, ethical professionals. In Hong Kong, students also report that effective GenAI use requires prompting skills, sustained verification, and clear institutional guidance on academic integrity (Wu et al., 2025). The latter findings support treating AI

integration as an agency development problem: education must cultivate critical interaction, disciplined verification, and explicit norms of attribution.

3.4 Writing proficiency as component of translation competence in AI-mediated workflows

Building on this approach to human-centered augmented translation, this paper also recognizes writing proficiency as constitutive of translation competence. Translation is realized through source text comprehension, target-text production, revision, and justification, following the demands of a brief; writing is thus the practical site where translational judgement becomes accountable target-language form. This relationship becomes even more salient when using GenAI. AI systems can rapidly generate fluent target-language drafts, shifting the pedagogical emphasis towards rhetorical diagnosis and revision in relation to purpose, genre, and audience. Target-language writing proficiency constitutes an important component of translation competence, particularly in AI-mediated tasks requiring students to evaluate and revise fluent automated output. Nevertheless, the ability to identify translation problems also depends on source-text comprehension, domain knowledge, research competence, and strategic awareness. Writing proficiency should therefore be examined in relation to these complementary resources.

This argument is consistent with competence-oriented work in AI-era translation training. Prieto Ramos (2024) revisits translator competence under AI and foregrounds the need to rearticulate competence models for contexts where automation reshapes legal/institutional workflows and increases the verification burden. Lee and Kang (2024) examine MT-assisted L2 writing and subsequent unassisted performance; their findings concern writing development rather than independently assessed translation competence. More directly relevant to translator education, Asimakoulas and Guerberof-Arenas (2026) connect writing and translation through creativity-oriented teaching, drawing on postgraduate students' accounts, tutor interviews, and assignment feedback. Their study supports examining writing and translation as related educational practices without treating writing proficiency as a sufficient explanation of translation performance. For Macau's case, this implies that improvements in the linguistic quality of AI-assisted texts should not be interpreted as evidence of corresponding improvements in students' underlying translation competence.

Corpus-based research on the post-editing of GenAI-generated translations in the context of learner translation suggests that GenAI-assisted translation can mitigate lexical simplification while producing complex shifts in syntactic patterns (improving some dimensions while simplifying others); thus, critical revision literacy is an essential skill (Kwok et al., 2025). Classroom-facing feedback research similarly shows that AI feedback often differs from teacher feedback in directness, elaboration, and perceived reliability; students may accept 'authoritative' teacher feedback at higher rates, viewing AI feedback as impersonal

and variable in quality (Su et al., 2025). These patterns reinforce the relevance of target-language writing resources to the exercise of agency: Limited target-language proficiency may constrain students' ability to evaluate and revise AI-generated translations, particularly when the outputs are superficially fluent but semantically or pragmatically inappropriate. Accordingly, in Macau's Chinese–Portuguese training setting, target-language writing proficiency is treated as one resource that may support critical revision, alongside source-text comprehension, research competence, and strategic judgement (Jatobá, 2026b).

3.5 From context to method

The conceptual framework developed above motivates the present study's mixed-methods design that treats AI use as a set of interactional choices shaped by values, perceptions, and writing/revision capability. Therefore, the analysis focuses on: i) how students distribute labour across drafting, prompting, verification, and revision; ii) how they narrate responsibility and integrity under policy constraints; and iii) how human and AI feedback reconfigure perceived authority in the classroom. Methodologically, this orientation is compatible with recent Greater China process- and training-oriented studies that combine quantitative and qualitative evidence to examine effort, interaction, and uptake behaviours (Yao et al., 2025; Su et al., 2025). Table 2 maps each analytical focus onto its indicators, sources, and interpretive scope. MTUX is a literature-based lens; perceived control is self-reported; documented evaluation and revision inform the interpretation of decision-making authority. Writing proficiency was not independently assessed.

Table 2. Mapping of analytic focuses, observable evidence, and evidence sources

Analytic focus	Observable evidence	Evidence source or instrument	Interpretive scope
Tool-use and workflow patterns	Tool selection, sequencing, task stage, and stated rationale	Questionnaires; reports; drafts; available prompt logs; interviews/presentations	Tool use alone does not evidence agency or strategic competence
Revision and decision-making authority	Evaluation, acceptance, revision, or rejection of outputs; documented justification	Drafts/final texts; reports; rationales; available prompt logs; teacher feedback	Revision traces provide situated, not standardized, evidence of decision-making authority
Perceived control and feedback	Reported confidence, trust, and valuation of human and automated feedback	Questionnaires; interviews	Self-reported perception, not direct evidence of agency or competence
Target-language writing resources	Register, cohesion, accuracy, genre, and audience adaptation	Drafts/final texts; reports/rationales; available certification or self-report	Writing proficiency was not independently or uniformly assessed
Pedagogical governance	Task constraints, tool permissions, disclosure rules, and rule–practice discrepancies	Policies; syllabi; task/assessment materials; feedback; reports; interviews	Maps design and governance tensions, not learning effects or complete compliance

Note. The mapping identifies available evidence and its limits; it does not imply independent measurement or validation of every construct.

In sum, the literature review supports four working propositions that guide the analysis rather than constitute causal hypotheses tested by the study:

(1) Structured pedagogical guidance may influence how students integrate MT and GenAI into translation tasks
(2) Students' documented evaluation and revision practices may provide evidence of how they exercise and negotiate decision-making authority across AI-mediated workflows
(3) AI-mediated workflows may redistribute work among drafting, research, verification, and revision, making workflow design and brief-sensitive expectations pedagogically relevant
(4) Target-language writing proficiency may contribute to students' capacity to evaluate and revise automated translations, alongside source-text comprehension, research competence, domain knowledge, and strategic awareness

These propositions inform the selection and interpretation of evidence rather than predicting learning gains or causal effects. Section 4 details the participants, instruments, artefacts, and analytic procedures through which the corresponding relationships were examined.

4 Methods

GenAI use was examined in relation to task briefs, workflow constraints, and feedback ecologies. Survey findings provided cohort-level context, while the qualitative comparison focused on selected, traceable problem–response episodes in the available student artefacts. These episodes comprised a documented textual or pragmatic problem together with the student's reported or recorded response, such as consulting a resource, accepting or rejecting a suggestion, or revising a target-text solution. A single translation could therefore contribute several episodes—for example, concerning terminology, register, or audience adaptation—but the study did not exhaustively segment each translation into a fixed set of units. The episodes were used to compare how students drew on tools, peers, and teachers; questionnaire measures of perceived control were used for triangulation rather than as direct measures of agency.

The classroom evidence comes from Portuguese Studies coursework in Macau, encompassing translation-focused electives and writing-intensive PFL activities. The article compares two cohorts, enrolled in 2024 and 2025, and draws on a complementary governance dataset comprising institutional documents and interviews collected during 2023–2025. MT was permitted in both cohorts; GenAI was prohibited in the 2024 course conditions and permitted for specified activities in 2025. These arrangements are examined as contrasting educational conditions rather than as a controlled intervention. For the purposes of the analysis, MT denotes dedicated translation services such as Google Translate and DeepL, whereas GenAI denotes LLM-based text-generation and feedback tools or platforms, including DeepSeek and ChatGPT. This functional distinction does not imply that MT falls outside artificial intelligence.

Participants were predominantly Chinesespeaking (Cantonese and/or Putonghua as primary home languages), with English typically present as the first foreign language (Table 3). For most participants, Portuguese had been acquired later than Cantonese, Putonghua, and English and was reported as a less developed language for spontaneous production. During the third and fourth years of the programme, students are encouraged to take a Portuguese proficiency examination (CAPLE or CELPE-Bras). A minimum B2 level according to the Common European Framework of Reference for Languages (CEFR), corresponding to B2 in CAPLE or Intermediário-Superior in CELPE-Bras, is required only for students participating in the academic exchange programme during the third year. In the cohorts examined here, proficiency at B2 or above was established on the basis of CAPLE or CELPE-Bras certification, whereas proficiency below B2 was based on participants' self-reports. This linguistic profile

is important because the translation direction examined here requires sustained target-language drafting and revision under genre and institutional expectations.

Table 3. Informants' linguistic background

Cohort	Place of origin			L1			L2			L3			L4		
	Macao	Mainland China	Other	C	M	Other	C	M	Eng	M	Eng	Pt	Pt	Eng	-
2024 (N=56)	76.8%	21.4%	1.8%(P)	76.8%	21.4%	1.8%(Tg)	3.6%	75.0%	21.4%	3.6%	78.6%	17.9%	82.1%	0.0%	17.9%
2025 (N=56)	50.0%	46.4%	3.6%(Th, Jp)	46.4%	50.0%	3.6%(Th, Jp)	25.0%	46.4%	28.6%	3.6%	53.6%	42.9%	57.1%	10.7%	32.1%

Note. Values are percentages within each cohort (N = 56). C = Cantonese; Eng = English; Jp = Japan (place of origin) / Japanese; M = Mandarin; P = Philippines; Pt = Portuguese; Tg = Tagalog; Th = Thailand (place of origin) / Thai.

Coursework required written reports on translation choices and resource use, sometimes supplemented by oral presentations. The quantitative sample comprised 112 students, with 56 respondents per cohort. The focal qualitative sample comprised 56 students, with 28 per cohort, purposively selected through participation in translation-focused electives and the availability of documented artefacts. It was neither randomly selected nor matched across cohorts. Analysis concerned selected, traceable episodes rather than exhaustive coding of every submitted artefact.

Feedback came from teachers and peers in 2024, with GenAI added for specified activities in 2025. Students documented tool use through drafts, available prompt logs, and written rationales explaining acceptance, revision, or rejection of automated output. Tasks shared broad curricular aims but were regular coursework, not experimentally standardised or equated for difficulty; cross-cohort differences are therefore interpreted descriptively. Tool configurations, drafting sequences, and feedback arrangements also varied.

The source materials and task conditions were part of regular coursework rather than a controlled intervention, and the permitted technologies and feedback arrangements differed by cohort. Cross-cohort differences are interpreted descriptively and contextually rather than as controlled effects of GenAI policy. Tasks varied in terms of i) tool configurations; ii) the locus of control across workflow stages, including student-first, MT-first, and GenAI-first drafting; and iii) feedback ecology, with structured reflection incorporated across task sequences. One illustrative audience-retargeting task required students to translate a Chinese source text into two Portuguese versions: one for a general readership and another designed as a short, simple, and clear voice-over script for children aged 8–10. The reproduced brief specifies a one- to two-minute educational video for the children's version and print publication for the general-reader version; it does not explicitly prescribe a Portuguese variety. Students also submitted translation-analysis reports and presented selected excerpts orally. These artefacts provided complementary product evidence and participant-

reported or documented evidence of selected translation and revision decisions; they did not provide direct or continuous access to students' internal decision-making processes.

Questionnaire data provided descriptive cohort-level context for reported tool use, perceived control, and feedback preferences rather than direct measures of agency, translation competence, or writing proficiency. The study records 112 completed questionnaires, with 56 respondents in each cohort, administered at the end of the relevant semester. The questionnaire was administered in Chinese and Portuguese. Questions concerning human feedback and tool use were applicable across cohorts, whereas GenAI-specific feedback options applied only to the 2025 cohort; the 2024 questionnaire therefore did not provide a directly comparable evaluation of GenAI-generated feedback under the prohibited-use condition. The feedback section used separate rank-order items addressing two dimensions: the perceived effectiveness of feedback sources or modalities and students' preferred language for receiving feedback. The retained feedback documentation does not permit reconstruction of all item-level response counts and rank transformations. The feedback findings are therefore discussed as reported evaluations, without quantitative comparisons of feedback effectiveness across cohorts. No evidence of prior psychometric validation was recovered. The complete archived questionnaire form was not available for retrospective verification; consequently, the total item count and exact wording of all items are not reconstructed here. Quantitative findings are reported separately from qualitative evidence within each analytical stream to avoid double counting; governance and policy evidence derives from institutional documents and semi-structured interviews with two staff members and seven students.

Survey responses were analysed descriptively through recorded tool-use frequencies or percentages; feedback findings are reported as participant evaluations, not reconstructed rankings. Qualitative materials were analysed using a combination of theory-informed and data-driven coding. Initial categories were derived from the study's conceptual framework, while additional categories were developed through repeated examination of student reports and interview excerpts. The analysis focused on documented translation problems, the strategies students reported using, and the justifications accompanying their revisions. The interpretation of the qualitative findings is limited by incomplete documentation of coder allocation, coding-review procedures, and the systematic consideration of contradictory cases. The selected episodes are therefore presented as illustrative interpretations, without a claim of independently verified coding reliability. Integration proceeded by comparing selected, traceable problem–response episodes across the available qualitative sources for recurring problem types such as terminology, register, and audience adaptation, including how students reported or documented their responses across human- and AI-mediated drafts.

Ethical procedures included informed consent, restricted access to identifiable materials, and the anonymisation of data used in analysis and publication. Questionnaire responses were subject to the same restricted-access

and anonymisation procedures; the retained documentation does not establish that questionnaire submission itself was anonymous. Participants were informed that participation would not influence their course grades. Data were stored securely in accordance with the institution's research ethics and data protection requirements. The study was approved by the Ethics Committee of the host university (Approval ID: HE-1267-2026). All collected materials were designed and implemented by the instructors as part of the regular coursework, as outlined in the official course syllabi. Participants were informed that materials would only be submitted to the researcher after the end of the academic year and once final grades had been released. Unless explicitly authorised by participants in writing, only the researcher and the instructors involved in the study had access to raw data containing identifiable information. Data supporting the findings are available from the author upon reasonable request.

5 Analysis and discussion

5.1 Tool repertoires (RQ1)

Questionnaire responses—considered alongside patterns observed in student translation reports across both cohorts—indicate that learners used different tools at different stages of translation rather than relying on a single MT or GenAI system. Learners combined search engines, bilingual dictionaries and corpora, MT, and GenAI systems to address different problem types, including lexical selection and disambiguation, grammar and orthography, register, and style. These patterns describe tool selection and use rather than, by themselves, evidence of learner agency, since students' choices may also reflect factors such as tool availability, familiarity, and course-level restrictions. Google Translate was the most frequently selected first-choice tool for translating into Portuguese in the 2024 cohort, while DeepSeek emerged as one of the first-choice tools in 2025, indicating diversification alongside changes in tool availability and the conditions governing GenAI use (Table 4).

Table 4. First-choice tools by task purpose in translation and PFL writing (2024, N=56; 2025, N=56)

Purpose of use	Search engine				Machine translation				GenAI/LLM tools and platforms							
	Baidu		Google		GT*		DeepL		DeepSeek		POE		ChatGPT		Copilot	
	2024	2025	2024	2025	2024	2025	2024	2025	2024	2025	2024	2025	2024	2025	2024	2025
Translation (mother tongue → target text)	0%	0%	0%	0%	61%	25%	39%	21%	n/a	32%	0%	14%	0%	7%	0%	0%
Translation (source text → mother tongue)	0%	0%	0%	0%	54%	25%	46%	14%	n/a	54%	0%	4%	0%	4%	0%	0%
Microediting (target language)	0%	0%	36%	7%	64%	0%	0%	0%	n/a	21%	0%	25%	0%	46%	0%	0%
Develop writing plans and develop ideas	46%	4%	54%	11%	0%	0%	0%	0%	n/a	61%	0%	11%	0%	14%	0%	0%
Paraphrase (target language)	0%	0%	0%	0%	0%	0%	0%	0%	n/a	18%	0%	43%	0%	39%	0%	0%
Converting from old to new Portuguese spelling conventions and vice versa	0%	0%	54%	0%	46%	0%	0%	0%	n/a	18%	0%	18%	0%	54%	0%	11%
Adapt tone and style to the target text	0%	0%	0%	0%	0%	0%	0%	0%	n/a	18%	0%	21%	0%	61%	0%	0%
Find suggestion for readings/literature review	39%	11%	61%	14%	0%	0%	0%	0%	n/a	39%	0%	18%	0%	18%	0%	0%
Find statistical information/'direct quotation' to corroborate arguments	18%	21%	82%	29%	0%	0%	0%	0%	n/a	25%	0%	14%	0%	11%	0%	0%
Increase/decrease word count (target language)	0%	0%	0%	0%	0%	0%	0%	0%	n/a	14%	0%	29%	0%	57%	0%	0%

Note. Percentages use all respondents in each cohort (N = 56) and are rounded to whole numbers. Comparisons are descriptive, not estimates of policy effects. GT = Google Translate; n/a = not applicable.

Liang's (2025) findings corroborate the interviewed teachers' comments that the growing accessibility of DeepSeek may have contributed to normalising GenAI use among Chinese learners by removing VPN barriers and reducing the perception of engaging with a 'prohibited' or 'ethically ambiguous' tool. However, Liang's before-and-after comparison across Macau PFL courses suggests that the 'DeepSeek wave' heightened student anxiety about plagiarism, loss of authorial voice, and misrecognition of personal writing style, while accelerating the circulation of prompts in student WeChat groups intended to 'Sinicize' Portuguese AI-generated texts. Liang attributes some of these practices to attempts to avoid suspicion of unauthorised AI use. In our data, however, students' reported adaptation of AI-generated text cannot in itself be interpreted as concealment. Several students reported adapting AI outputs to better reflect their personal style or to align with instructors' perceived expectations of authenticity and awareness of learners' proficiency levels, particularly in assignments where AI use was restricted. Outside Macau, systematic reviews and institutional reports on GenAI use in higher education also document rapid AI adoption alongside uneven quality, accuracy risks, and integrity concerns, prompting higher education institutions to adapt assessment practices through measures such as invigilated writing and process-visible portfolios (Farazouli et al., 2024; McGrath et al., 2025; UNESCO, 2023, 2025)

An illustrative genre-oriented task required students to produce two Portuguese translations of the same Chinese source text for different audiences: a general readership and children listening to a narrated or voice-over version. This audience-retargeting task made students' revision decisions particularly relevant to the analysis because the two target versions required different rhetorical strategies. These included simplifying syntax, adjusting tone, and adapting cultural references for young audiences. The task therefore required students to consider audience and communicative purpose rather than surface-level fluency alone. Where GenAI-generated drafts were used, the submitted artefacts provided opportunities to examine how students evaluated and reshaped automated suggestions and how they documented their revision decisions. The task also made visible different degrees of student involvement across the workflow, including: i) guided tool use constrained by teacher-defined stages; ii) documented tool use accompanied by explicit revision and justification; and iii) substitutive workflows, in which GenAI/MT served as the primary drafter with minimal documented verification by the student-translator.

Within this continuum, three recurrent starting-point patterns were identified in the available data. These patterns describe the initial production strategy reported or documented by students rather than fixed profiles of translator competence:

> a) MTfirst: an initial MT-generated draft followed by student revision;
> b) Human-first: an initial draft produced by the student, followed by selective consultation of available tools;
> c) GenAI-first: an initial LLM-generated draft followed by student revision.

These patterns are not intended as an exhaustive classification of student workflows, which could vary across tasks and stages. These categories describe selected reported or documented episodes; no cohort-level prevalence is inferred from their occurrence in the available artefacts. Interview data from students and teachers also indicate that some learners in the 2024 cohort may have used GenAI tools discreetly during in-class writing sessions when digital devices were permitted, despite the course-level prohibition. Reported difficulties in monitoring such use contributed to the instructors' decision to adopt a bounded-use policy in 2025.

The selected reports illustrate students' attempts to evaluate meaning and form across human and automated suggestions. One student report (Figure 1) and the teacher's feedback (Figure 2) make these human–machine collaboration patterns visible at the level of microdecisions: running parallel tests with DeepSeek, ChatGPT, and DeepL, the report compares outputs for the title and selected passages and adjusts prompts to maintain control. After comparing the outputs, the student noted in the report that the more fluent DeepSeek and ChatGPT versions sometimes introduced unnecessary elaboration. The student

therefore added an explicit constraint to the prompt ('be faithful to the source; do not omit or add content') and subsequently post-edited the output for cohesion, tone, and audience adaptation. The restrictive prompt sought to limit unwarranted elaboration; it should not be understood as a general prohibition on adaptation. The children's version could legitimately require restructuring or explicitation, whose adequacy would need to be assessed against the intended audience and communicative purpose. This pattern is consistent with a more human-centered form of augmented translation, in which the student retains decision-making authority through evaluation and revision. Whilst the tool may generate language and teacher feedback may raise cultural and pragmatic awareness, the student's documented decisions suggest an attempt to evaluate automated suggestions against the requirements of the translation task through revision.

Figure 1. Micro-decision sequence in a student translation report (2025 cohort; original emphasis preserved)

翻译分析[Translation Analysis]

1. 译前准备[Pre-translation preparation]：

1) 词汇梳理：natureza, espontaneidade e harmonia, natural e artificial, harmonizar, não-ação [Terminology: *natureza* [nature], *espontaneidade e harmonia* [spontaneity and harmony], *natural* e *artificial*, *harmonizar* [to harmonise], *não-ação* [non-action]].
2) 背景知识：老子及道家思想，"道法自然","无为","人为","自然"的具体含义。[Background knowledge: Laozi and Daoist thought, and the specific meanings of "the Dao follows what is naturally so", "non-action/*wuwei*", "human action or contrivance", and "naturalness/spontaneity"].
3) 原文特点：有明显的中国文化元素，文中出现了很多文言文词汇。[Source-text features: The text contains clear Chinese cultural elements and many expressions from Classical Chinese].
4) 翻译的目的和功能：版本一要适用于大众读者和纸质书籍出版，语言需要正式，要将文章的意思更精确地表达出来;版本二适用于 8-10 岁的青少年，并且译文要用于 1-2 分钟的科普视频，所以需要将文章的内容以更加通俗易懂的语言表达出来。可以把"无为而无不为"，"道法自然"等文言文先翻译成白话文在翻译成葡语。[Purpose and function: Version 1 is intended for general readers and print publication, so the language must be formal and convey the text's meaning more precisely. Version 2 is intended for children aged 8–10 and for a 1–2-minute educational video voice-over, so the content must be expressed in more accessible language. Classical Chinese expressions such as "无为而无不为" and "道法自然" can first be paraphrased into modern Chinese and then translated into Portuguese].

2. AI 使用过程[AI-use process]：

1) 用到的 AI 有 DeepSeek，ChatGPT 和 DeepL，指令都是原文 + 两个版本的要求。[The AI systems used were DeepSeek, ChatGPT, and DeepL. Each prompt contained the source text and the requirements for the two versions].
2) 用三种 AI 单独翻译了文章标题"无为而无不为"，结果分别是[Three AI systems separately translated "无为而无不为" as follows:]
DeepSeek: "Através da não-ação, tudo é realizado", "Agir mediante a não-interveção[sic], e assim nada deixará de ser cumprido"[Through non-action, everything is accomplished", "Acting through non-intervention, so that nothing will remain unaccomplished]; ChatGPT: "A não-ação é a ação que tudo realiza"[Non-action is the action that accomplishes everything]; DeepL: "Nada arricado[sic], nada ganho"[Nothing risked, nothing gained].
3) DeepL 和另外两种 AI 相比没有那么智能，尤其是在单独翻译标题的时候，而且只能翻译一个版本；DeepSeek 和 ChatGPT 相比，两个版本的翻译都更复杂，增加了一些内容，我认为有一些是没必要的，所以对 DeepSeek 增加了一个指令，要求尽量忠于原文，不需要增加更多修饰。最终译文一较多参考了 DeepSeek 的第二个翻译和 ChatGPT 的翻译，译文二更多参考 ChatGPT。[Compared with the others, DeepL was less capable, especially when translating the title in isolation, and produce only one version. DeepSeek and ChatGPT produced more elaborate translations and added content, some of which I considered unnecessary. I therefore gave DeepSeek a further instruction to remain as faithful as possible to the source and not add embellishment. The final Version 1 drew more heavily on DeepSeek's second translation and on ChatGPT, whereas Version 2 drew more heavily on ChatGPT].

3. AI 翻译与最终译文对比分析 [Comparison of the AI translations and the final translation]

版本一 [Version 1]

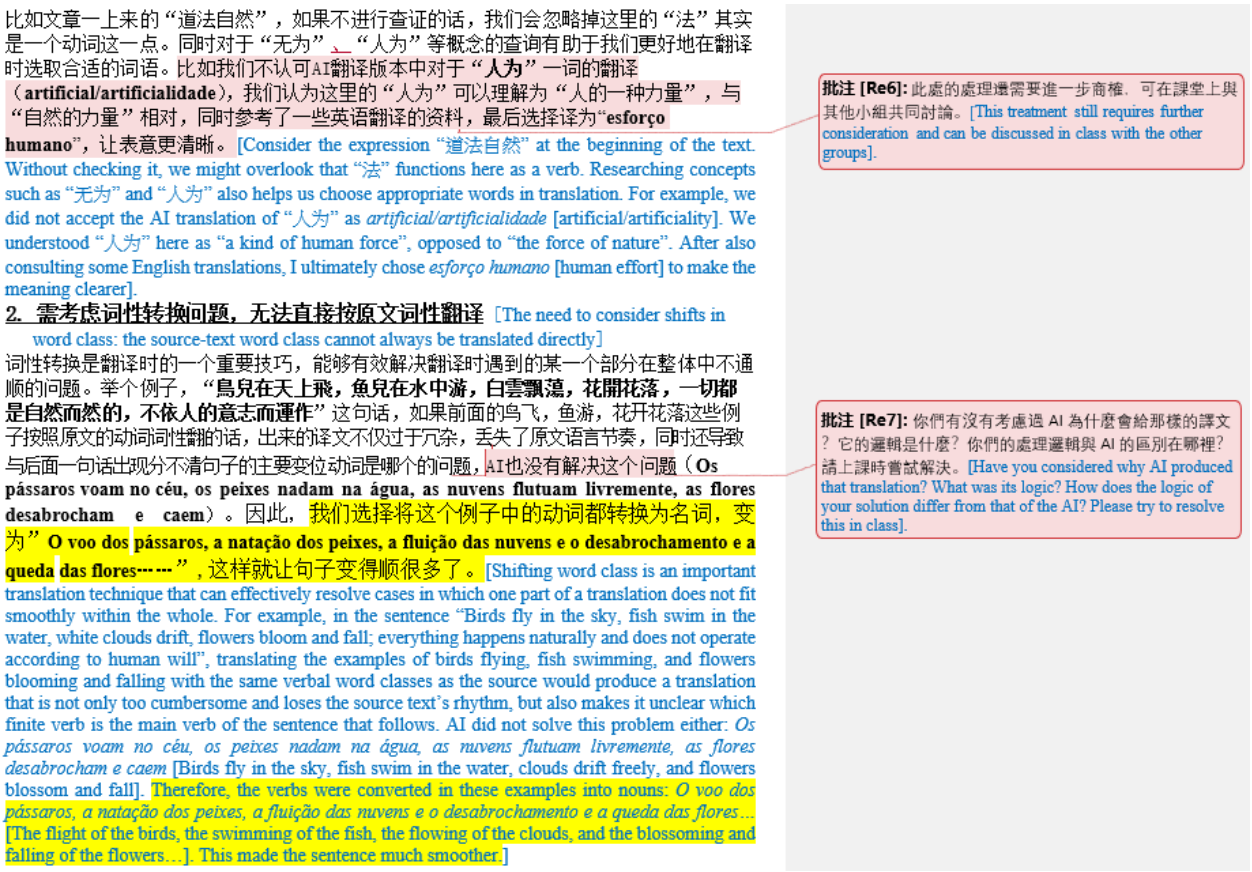
1) 标题: DeepSeek 给出的两个版本，Agir sem Agir 和 Agir sem ação 都更适合当标题，为了和后文的"无为"não-ação,形成呼应，并且突出"无为"这个概念，最终把标题翻译为 Agir através da não-ação [Title: DeepSeek's two versions, *Agir sem Agir* /*Agir sem ação* [Act without Action], were more suitable. To echo the later term "无为"*não-ação* and foreground the concept of non-action, I ultimately translated as *Agir através da não-ação* [Acting through Non-action]].
2) "独立而不改": "Existindo por si mesmos, imutáveis","independência inalterada","independente e não muda"无法到达原文简洁且对应的效果，所以改用两个形容词"independente e imutável"更合适 [*Existindo por si mesmos, imutáveis* [Existing by themselves, immutable], *independência inalterada* [unaltered independence], and *independente e não muda* [independent and does not change] did not reproduce the source text concision and parallelism. I therefore used the two adjectives *independente e imutável* [independent and immutable]].
3) "人为"是对自然的破坏，"人为"即是"伪"：AI 将这里的"人为"仍然翻译为"artificial",但我认为这里的"人为"可以理解为人的行为或者做的事，可以翻译为 a interferência humana 和 o que feito pelo homem[""人为' damages the natural; '人为' is '伪'": The AI still translated "人为" as *artificial*. I understood it here as human behaviour or something done by people, which could be translated as *a interferência humana* [human interference] or *o que feito pelo homem* [what is done by humans]].

版本二 [Version 2]：

1) 增加老子是 o fundador do Taoísmo 这一信息，便于理解"道"这个概念。[I added the information that Laozi was *o fundador do Taoísmo* [the founder of Daoism] to make the concept of the Dao easier to understand].
2) 根据 RPT 上的视频，可以把 AI 翻译的用词和句式进一步简化，如表格中黄色所示。[Following a video on RPT, the AI-generated vocabulary and sentence structures could be simplified further, as shown by the yellow highlighting].

Note. The figure reproduces excerpts from a student's translation-analysis report documenting the preparation of two Portuguese versions of a Chinese source text for different audiences. It illustrates the comparison of DeepSeek, ChatGPT, and DeepL outputs, the refinement of prompts to limit unwarranted additions, and the student's justification of lexical and stylistic choices. English translations provided by the author are shown in blue and enclosed in square brackets throughout the figure.

Figure 2. Student analysis and subsequent teacher feedback (2025 cohort; original emphasis preserved)



Note. The figure presents a student’s discussion of lexical interpretation and word-class shifts in Chinese–Portuguese translation, alongside subsequent teacher feedback. The annotations invite reconsideration of translation choices and comparison between human reasoning and automated output. The excerpt documents opportunities for critical reflection but does not establish feedback uptake or improved translation quality. English translations provided by the author are shown in blue and enclosed in square brackets throughout the figure.

In the episode highlighted in Figure 1, the student compared alternative automated renderings before introducing a more restrictive prompt. Figure 2 presents student analysis alongside subsequent teacher comments, documenting a further episode of revision and questioning rather than a complete before-and-after learning trajectory. For example, after the student reformulated an AI-generated sentence by converting a sequence of verbs into nouns (‘*O voo dos pássaros, a natação dos peixes, a fluição das nuvens e o desabrochamento e a queda das flores...*’), the teacher asked why the AI had produced its original rendering, what reasoning underlay it, and how the student’s own reasoning differed from that of the AI. The sequence is interpreted here as documented evidence of evaluation and revision across human and automated inputs, rather than as independent evidence of improved translation quality. These decisions also draw on established practices of source-text interpretation, audience adaptation, and justification; their presence should not be attributed exclusively to GenAI.

These workflow patterns show why writing proficiency is central to verification in AImediated Chinese–Portuguese translation: students must diagnose when fluent output drifts semantically, violates genre expectations, or introduces unwarranted additions, and then justify their revisions. Artefact evidence illustrates these verification-related microdecisions. The source passage contrasts 自然 with 人为 and explicitly characterises the latter as damaging what is natural and as inauthentic: "'人为"是对"自然"的破坏，"人为"即"伪"，是不真实的' ["'Human contrivance" damages what is "natural"; it is "artifice", something inauthentic']. Against this negative evaluation, 'a interferência humana' foregrounds intervention, whereas 'o que é feito pelo homem' and 'esforço humano' broaden the reference to human production or effort and may weaken the contrast. The reports therefore document reasoned challenges to automated wording, but do not establish that every proposed alternative is more adequate than 'artificial/artificialidade'. When presenting their choices to classmates, the students also document undertranslation and subsequent human correction during postediting, reinforcing the idea that GenAI augmentation depends on revision, editing, and postediting authority. These examples illustrate students' attempts to identify and resolve semantic and pragmatic difficulties in automated output. They also suggest that target-language resources may contribute to effective revision, although the relationship between writing proficiency and translation quality requires further investigation.

5.2 Feedback ecology and decision-making authority (RQ2)

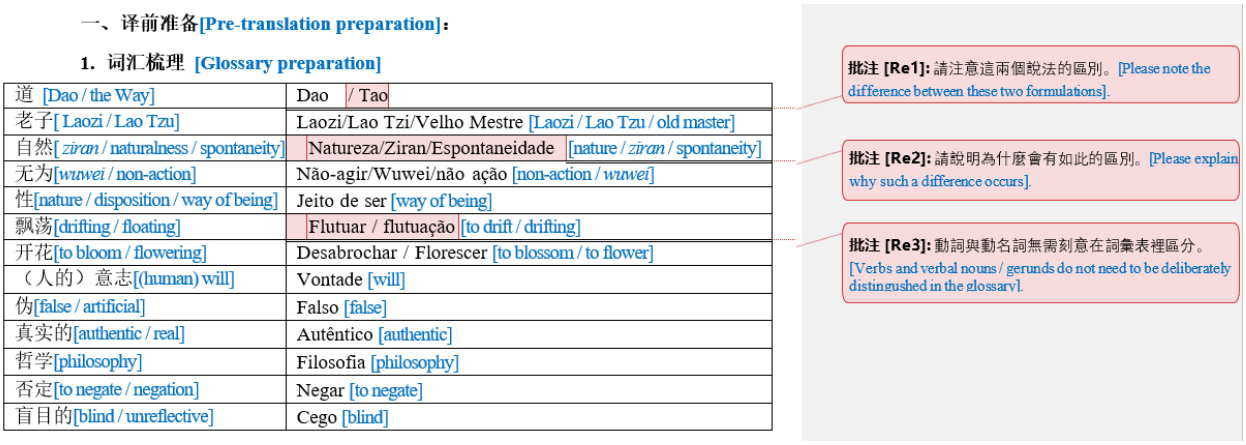
Questionnaire responses indicate that learners assigned different kinds of value to teacher, peer, and AI feedback. Because the available response options differed between cohorts, these results are interpreted descriptively within cohorts rather than as directly comparable changes across years. They indicate differentiated perceptions of feedback sources rather than changes in learner agency.

Questionnaire and interview data further indicate that feedback sources and languages served different functions within the translation process. Students reported Chinese as particularly useful in oral feedback for discussing complex rhetorical and pragmatic issues, whereas Portuguese was more commonly associated with written feedback and text-level revision. These patterns suggest a functional differentiation of feedback rather than a fixed division of roles between languages or feedback sources. Rather than restricting GenAI to grammar or orthographic correction, a human-centered feedback ecology can define its use according to task purpose and stage while requiring students to evaluate automated suggestions against the translation brief, target audience, and other available feedback. In this sense, bounded AI use preserves students' responsibility for evaluating, revising, and justifying translation decisions.

The teacher's comments (Figure 3) address the organisation and explanation of the pre-translation glossary. Re1 asks, 'Please note the difference between these

two formulations', and Re2 requests, 'Please explain why such a difference occurs'. Re3 concerns the glossary's distinction between verb and nominal forms. These comments invite clarification and reflection, but do not themselves demonstrate that students interrogated AI output. Because the figure does not document students' subsequent responses, it cannot establish feedback uptake or learning gains.

Figure 3. Teacher feedback on the student's pre-translation glossary (2025 cohort)



一、译前准备[Pre-translation preparation]：

1. 词汇梳理 [Glossary preparation]

道 [Dao / the Way]	Dao / Tao
老子[Laozi / Lao Tzu]	Laozi/Lao Tzi/Velho Mestre [Laozi / Lao Tzu / old master]
自然[*ziran* / naturalness / spontaneity]	Natureza/Ziran/Espontaneidade [nature / *ziran* / spontaneity]
无为[*wuwei* / non-action]	Não-agir/Wuwei/não ação [non-action / *wuwei*]
性[nature / disposition / way of being]	Jeito de ser [way of being]
飘荡[drifting / floating]	Flutuar / flutuação [to drift / drifting]
开花[to bloom / flowering]	Desabrochar / Florescer [to blossom / to flower]
（人的）意志[(human) will]	Vontade [will]
伪[false / artificial]	Falso [false]
真实的[authentic / real]	Autêntico [authentic]
哲学[philosophy]	Filosofia [philosophy]
否定[to negate / negation]	Negar [to negate]
盲目的[blind / unreflective]	Cego [blind]

批注 [Re1]: 請注意這兩個說法的區別。[Please note the difference between these two formulations].

批注 [Re2]: 請說明為什麼會有如此的區別。[Please explain why such a difference occurs].

批注 [Re3]: 動詞與動名詞無需刻意在詞彙表裡區分。[Verbs and verbal nouns / gerunds do not need to be deliberately distinguished in the glossary].

Note. The figure reproduces a Chinese–Portuguese pre-translation glossary with three teacher annotations addressing distinctions between lexical alternatives, the justification of translation choices, and the treatment of grammatical categories. The comments illustrate how teacher feedback can encourage metalinguistic reflection and revision. The student's subsequent responses are not documented. English translations provided by the author are shown in blue and enclosed in square brackets throughout the figure.

Questionnaire responses provide descriptive evidence of learners' perceptions of GenAI support rather than direct measures of agency. Students reported greater confidence when using GenAI tools for initial drafting, while expressing more limited trust in AI-generated feedback for meaning-level revisions. They also reported valuing human feedback—especially teacher comments—for decisions involving tone, register, and audience adaptation. These patterns suggest that while students valued the efficiency of AI tools, they remained cautious about delegating higher-order decisions, particularly in tasks involving rhetorical nuance or institutional voice.

Writing proficiency may support students' exercise of agency in AI-mediated translation: Some students reported greater willingness to accept automated suggestions for micro-level issues than for conceptual or culturally embedded meaning. This reported pattern is interpreted as a perception of task-specific reliability rather than as a measure of agency or linguistic control. In Macau's context, where Portuguese is both an official language and a minoritized one in everyday use, this revision authority becomes especially consequential. Because students often have fewer opportunities for sustained exposure to Portuguese outside the classroom, their ability to revise AI-generated texts critically—especially in terms of register, tone, and genre—may be supported

by stronger target-language writing resources. Without such resources, they risk over-relying on surface fluency and losing control over meaning. The reported differences in students' willingness to accept automated suggestions may reflect their perceptions of the relative reliability of AI support across linguistic and pragmatic tasks. Target-language writing proficiency is a plausible factor in such evaluations, but its contribution cannot be isolated from the available evidence.

5.3 Ethics and governance: policy–practice tensions (RQ3)

Although the institution established general categories governing GenAI use, implementation was delegated to individual instructors. This arrangement created opportunities for course-specific pedagogical decisions but may also have contributed to inconsistencies in students' understanding of permitted practices. The findings therefore point to tensions between institution-wide guidance and course-level implementation rather than a complete absence of AI governance. At the programme level, the university guidelines require instructors to define AI-related rules in their course syllabi. These guidelines outline three general levels of permission: 1) GenAI use is permitted within the course policy; 2) GenAI use is permitted only under specific conditions or with explicit instructor approval; and 3) GenAI use is prohibited. In practice, however, these categories are unevenly interpreted and implemented. This is a decentralised form of formal governance: instructors' syllabus rules remain institutional interventions, whereas students' informal responses may diverge from those rules.

Accordingly, the combined policy and interview evidence suggests that prohibition alone may not prevent unreported GenAI use. Questionnaire responses suggest that automated language technologies remained part of students' learning practices despite restrictions on GenAI. However, because MT use was permitted, the analysis must distinguish between authorized translation technology and practices that contravened the GenAI policy. Interviews indicating unreported GenAI use provide additional evidence of possible discrepancies between institutional rules and actual student behaviour.

A more transparent approach to AI governance would combine task-specific guidance, explicit disclosure expectations, and assessment procedures that encourage students to document and justify their decisions. Where students participate in discussing and refining these expectations, such arrangements may provide a foundation for shared pedagogical governance. For example, in 2025, students were required to include a brief disclosure in their translation reports specifying which tools they used at each stage (e.g., drafting, revision, verification) and to justify any GenAI-generated content they retained. Such measures align governance with pedagogy by preserving responsibility for meaning while acknowledging AI as part of real writing and translation environments. These disclosure requirements constitute formal pedagogical governance. Co-governance remains a proposed extension, contingent on students participating in the discussion and revision of acceptable-use arrangements.

6 Conclusion

This analysis suggests that GenAI-mediated workflows can redistribute judgement, verification labour, and textual authority in translator education, particularly in contexts where the target language has limited everyday use. The findings suggest that students' engagement with GenAI is closely associated with their perceptions of linguistic competence, feedback reliability, and responsibility for translation decisions. The analysis highlights the potential importance of target-language writing proficiency in evaluating automated output, particularly when translation tasks require attention to genre, register, and audience adaptation. However, the relationship between writing proficiency, translation quality, and learner agency requires further empirical investigation.

AI-use governance is therefore pedagogically crucial because it regulates visibility. The findings raise questions about the effectiveness of prohibition-oriented AI policies when students have access to automated language technologies outside formal assessment settings. Transparent, task-specific guidance may offer an alternative by making tool use more visible and encouraging students to account for their translation decisions, thereby addressing a key risk in AI-mediated translation: unchecked delegation disguised as competence. More broadly, the findings support further consideration of pedagogical approaches that preserve translator agency and place students' critical judgement, linguistic development, and ethical responsibilities at the centre of GenAI integration. In response to these structural tensions in translation training, and drawing on the empirical analysis and existing literature, the study proposes five principles for designing AI-mediated translation activities:

> 1) Bounded AI use: define permitted tool functions according to learning objectives, task stages, and translation briefs, while retaining student responsibility for evaluating and justifying consequential translation decisions
> 2) Process-visible assessment: require relevant drafts, prompts, revisions, and brief rationales that document how automated and human feedback was evaluated, verified, accepted, modified, or rejected
> 3) Feedback ecology: combine teacher, peer, and AI-mediated feedback while requiring students to evaluate each source critically. Teachers retain responsibility for academic assessment, while students retain responsibility for evaluating meaning, accuracy, genre, and communicative adequacy in their own translations; AI support remains subject to human verification rather than being treated as an inherently reliable verifier
> 4) Writing as competence: assess target-language writing resources, including register, cohesion, and audience adaptation, alongside source-text comprehension, research, and translation strategy

5) Co-governance: establish task-specific disclosure and acceptable-use arrangements that teachers and students can discuss and refine, making explicit what may be delegated, what must be documented, and what remains under human responsibility

The study compares cohorts from two different academic years who completed regular course assignments that were not experimentally standardised or equated for difficulty. Consequently, between-cohort differences are interpreted descriptively: they cannot isolate the effects of GenAI policy from differences in tasks, participants, or educational conditions, and they do not demonstrate learning gains. The cohorts were not randomly assigned, and the focal qualitative sample was purposively selected on the basis of participation in relevant translation courses and the availability of documented artefacts. In addition, aspects of perceived control and language proficiency were examined primarily through self-report and selected artefacts rather than through independent measures of competence or longitudinal learning gains. Prompt logs were available only in some cases, and the available reports and artefacts provide retrospective or documentary evidence of selected decisions rather than continuous records of students' translation processes. These limitations constrain causal interpretation but do not preclude the descriptive comparison of patterns of tool use, feedback evaluation, and documented translation and revision practices across the two cohorts.

DATA AVAILABILITY STATEMENT: Data supporting the findings are available from the author upon reasonable request.

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End notes

1. Forum Macao is the Forum for Economic and Trade Co-operation between China and Portuguese-speaking Countries (Macao), established in 2003 and organised by China's Ministry of Commerce with the Macao SAR Government as host. It supports Macao's role as a service platform for economic and trade relations between China and Portuguese-speaking countries.

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