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Conceptualizing AI Literacy in the Digital Applied Linguistics Era

Mark Feng Teng*

The Hang Seng University of Hong Kong, Hong Kong SAR, China

Marie Alina Yeo
SEAMEO RELC, Singapore

Junjie Gavin Wu
Macao Polytechnic University, Macao SAR, China

Abstract

Generative artificial intelligence (GenAI) can now assist with academic essays, test design, data analyses, and research articles. Most existing AI literacy frameworks (e.g., Long & Magerko, 2020; Ng et al., 2021; UNESCO, 2024a) focus mainly on what users should know about AI and do with it, paying less attention to the evidential, developmental, and sociocultural demands of language learning and teaching. Drawing on four theoretical traditions (literacy as social practice, sociocultural mediation, epistemic cognition, and metacognition) and on insights from our edited volume, this position paper conceptualizes AI literacy for language learners, teachers, and researchers. We present a layered model in which five dimensions (functional, evidential, metacognitive, relational-creative, and critical-ethical) rest on a foundation of human agency. We propose four propositions: AI literacy is a practice, not only a skill; GenAI should scaffold rather than substitute for learning; fluency is not evidence; and principled GenAI use sometimes means not using it. We conclude with theoretical implications and directions for future research.

Keywords: AI literacy; generative AI; applied linguistics; human agency; metacognition

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The authors

(corresponding author: markfteng@gmail.com)

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Introduction

Generative artificial intelligence (GenAI) has quickly become part of how languages are taught, learned, assessed, and researched, yet our understanding of what it means to use it well has not kept pace. In this position article, we critically examine existing conceptualizations of AI literacy and consider how they might be extended to address the distinctive epistemic, pedagogical, and sociocultural contexts of applied linguistics. Drawing on four theoretical traditions, we reconceptualize AI literacy as accountable, situated judgement that encompasses five interrelated dimensions underpinned by human agency. We draw on insights and examples from the twelve chapters of our forthcoming edited book, *Fostering AI Literacy in the Digital Applied Linguistics Era* (Teng et al., 2027), to provide further theoretical grounding for this reconceptualization. Our guiding question is: what should AI literacy mean for applied linguistics?

The question matters because our field is unusually affected by GenAI. Applied linguistics studies language as people actually use it, and large language models (LLMs) are, above all, machines that produce language. When a student submits a fluent essay, a teacher can no longer be sure whether it shows the student's own writing ability or the work of a GenAI tool; a learner asking GenAI how a word is used may receive a confident example no real speaker would ever give. The link between language, evidence, and the person behind the language has been loosened. GenAI is therefore not just another tool for applied linguists; it changes what our usual forms of evidence can tell us (Teng et al., 2027).

Students and teachers are already living with this change. Studies of EFL writers show students using GenAI in real time while they compose, moving between their own ideas and machine suggestions (Khanh-Quynh & Ngo, 2026). Scholars are asking how much GenAI revision is "too much" before a text stops being the author's own (Watson Todd, 2026). GenAI support can shape learners' emotions and engagement in L2 writing (Xu, 2026), yet the same tools raise concerns about autonomy and over-reliance (Li & Mizumoto, 2026).

Before proceeding, a note on terminology and scope is needed. *AI literacy* is the broadest term, covering knowledge about and use of AI systems in general (Long & Magerko, 2020; Ng et al., 2021). *GenAI literacy* refers to the competencies needed to work with generative tools such as large language model (LLM) chatbots (Annapureddy et al., 2024). *Critical AI literacy* foregrounds power, bias, and representation (Pérez-Paredes et al., 2025; Tacelosky et al., 2025). We use *GenAI* for the generative tools themselves and keep *AI literacy* as the umbrella construct. Our focus is the literacy that GenAI demands in language-related practices, and we treat the critical perspective as one of its dimensions. This literacy concerns both language learners and language teachers, whose agency in integrating GenAI varies across contexts (Wu, 2026), as well as researchers.

Existing definitions of AI literacy differ in whom they address, but they share a common logic. For learners, Long and Magerko (2020) defined AI literacy as the competencies that enable people to evaluate AI critically, communicate and collaborate with it, and use it as a tool, and Ng et al. (2021) proposed four dimensions: knowing and understanding, using and applying, evaluating and creating, and ethics. Later work separates *AI literacy*, the knowledge a person has, from AI *competency*, its confident and reflective application (Chiu et al., 2024), and identifies GenAI-specific components such as needs analysis, prompt and language skills, autonomous learning, and critical thinking (Gümüş & Kara, 2025). In L2 writing, L. Xu et al. (2025) validated a domain-specific scale of student AI literacy, yet its four dimensions (understanding, use, evaluation, and ethics) closely mirror the general models. For teachers,

UNESCO (2024b) adds AI pedagogy and professional learning to its student framework (UNESCO, 2024a), and studies of language teachers have proposed constructs such as ChatGPT literacy (Ma et al., 2024) and GenAI competence, comprising awareness and willingness, knowledge and application, and social responsibility (H. Wu et al., 2025; see also J. G. Wu et al., 2025). A recent systematic review concludes that language teachers' AI literacy is still framed mainly through competency-based, multidimensional models, with critical and domain-specific dimensions underdeveloped (Deng et al., 2026). In Street's (1984) terms, these frameworks reflect an *autonomous* model of literacy, which treats literacy as a neutral, transferable skill, rather than an ideological model, which sees literacy as embedded in particular social practices, purposes, and relations of power. This autonomous view explains why three gaps appear when these frameworks are applied to language learning and teaching.

First, they are mainly *operational*. They tell us what users should know and do, but say little about what counts as evidence of language learning when GenAI output looks just like the language that learners are expected to produce, or the data that applied linguists study. Second, they are mainly *product-focused*. They assume that skilled GenAI use leads to better products, but in language learning the process of struggling, noticing, and revising is often the point. Third, they are often positioned as universal. They treat AI literacy as the same everywhere, overlooking the fact that GenAI works better in some languages than others and carries particular cultural assumptions (Fang & Liao, 2027). What is missing is a theory of AI literacy built from applied linguistics' own concerns: discourse, texts, corpora, learners, tasks, assessment, and research.

This position article aims to fill that gap. Following Jaakkola (2020), we adopt a *theory adaptation* approach, which revises an existing concept (here, AI literacy) by viewing it through other theories. We first bring together four theoretical traditions that help explain AI literacy in language-related practices. Then, in line with Jaakkola's *model* approach, we integrate these ideas into a layered model and discuss its theoretical implications.

Conceptual Framework: Four Theoretical Lenses

Lens 1: Literacy as social practice

Our starting point is a familiar idea in literacy studies: literacy is not a single, neutral skill but a set of social practices that take different forms in different settings (Street, 1984). The multiliteracies tradition added that meaning is made through many modes and media, and that learners need to design meaning, not only decode it (New London Group, 1996). Seen this way, AI literacy is not one universal skill, such as writing good prompts. It is a family of practices that look different in a writing class, a corpus project, an EMI lecture, or a journal submission. Niu and Wu (2027) illustrate this clearly. In interviews with 14 EAP teachers, they found that teachers' AI literacy is not a static technical skill, but a context-sensitive form of professional judgement.

Lens 2: Mediation: Scaffold or substitute?

Sociocultural theory holds that human thinking is mediated by tools and signs, and that learners develop by working with support just beyond what they can do alone (Vygotsky, 1978). GenAI is a powerful new mediating tool. Unlike most earlier tools, however, it can do the whole task *for* learners.

This creates a key distinction for teachers and students: GenAI can scaffold learning, or it can substitute for it. When a student asks a chatbot to explain a confusing concept and then writes

their *own* paragraph, GenAI is a scaffold. When a student asks the chatbot to write the paragraph, the very thinking that the task was designed to develop may be skipped. Task-based language teaching makes the point sharper. A genuine task requires learners to draw on their own linguistic resources to close a communicative gap and reach an outcome (Bui, 2026b). If GenAI supplies the language, the activity may still look like a task but no longer works as one. Chang and Hung (2027) build this distinction into their LTPACK framework for EMI. In the *access layer*, GenAI helps students understand difficult disciplinary content in English. In the *judgement layer*, students must test, question, and justify how GenAI output becomes real disciplinary knowledge. Bui (2027) makes a similar point for TBLT: GenAI can support every phase of a task, but only if learners act as active partners who prompt, evaluate, and negotiate, rather than passive consumers. Lim and Tan (2027) remind us that the human teacher remains central. Students in their study engaged more with a teacher than with a Socratic chatbot, and teachers now act as designers of learning in which GenAI plays a supporting role. Our second proposition is therefore that AI literacy means using GenAI to scaffold, not substitute for, human learning.

Lens 3: Epistemic cognition: Fluency is not evidence

The third lens concerns knowledge and evidence, or what philosophers call epistemology. An LLM does not look up facts in a database. It predicts likely next words based on patterns learned during training. Its answers can therefore sound authoritative while being inaccurate, unrepresentative, or simply invented.

For applied linguistics, this matters deeply, because language is our evidence. Mizumoto (2027) explains the difference simply: a corpus contains real language whose sources we can inspect, whereas an LLM generates plausible language whose sources we cannot trace. Phoocharoensil and Yaemtui (2027) therefore recommend a hybrid approach to DDL, in which corpora provide the evidence and LLMs help learners interpret it. In research, Alamer (2027) shows that GenAI can write SEM code that runs perfectly while hiding questionable assumptions, and can produce a well-written results paragraph that overstates the findings.

The response across these chapters is to build checking into the process itself. Mizumoto offers TRACE, a five-stage cycle for validating GenAI use in corpus research and teaching. Alamer offers a human-governed framework with a dedicated verification domain, summed up in a memorable rule: *delegate tasks, not responsibility*. Our third proposition is that fluency is not evidence; AI literacy includes the habit of asking "How do we know?"

Lens 4: Metacognition: The engine of AI literacy

Knowing that GenAI can be wrong is not the same as actually checking it. This gap between knowing and doing is where metacognition, our knowledge and regulation of our own thinking (Flavell, 1979), becomes central in language research (Zhang, 2026). Teng (2027) argues that metacognition is the *executive function* of AI literacy: it decides whether other competencies are actually put to use.

GenAI also changes what metacognition involves. Users now need to keep track of which ideas came from them and which came from GenAI (source tracking), decide how much to trust an output (trust calibration), and monitor a system whose workings they cannot see (monitoring under transparency asymmetry) (Teng, 2026). Teng proposes five recursive processes: building metacognitive knowledge, task-aware planning, output monitoring, critical evaluation, and adaptive reliance regulation. In plain terms, AI-literate learners plan before they prompt, check what comes back, and adjust how much they lean on GenAI next time. With this kind of reflection, GenAI can strengthen learners' self-regulation rather than weaken it (Teng, 2026). Yeo (2027) shows how formative assessment can build this capacity.

Beyond the four lenses: Relationships, creativity, and equity

Two further concerns are central to developing a more comprehensive conceptualization of AI literacy in applied linguistics. The first is the human side of language. Tin (2027) argues that creativity in the GenAI era should value process and collective creativity, not only finished products, and that some creative steps are worth keeping for humans alone. Bui (2027) reports that learners' early enthusiasm for GenAI conversation partners can fade because of weak social presence and flat intonation. In an exploratory study, Bui (2026a) found a revealing trade-off: learners giving directions to an GenAI chatbot reported greater willingness to communicate, which they linked to lower anxiety and less fear of losing face, whereas learners working with a peer produced more syntactically complex speech. GenAI and human partners, in other words, offer different affordances, and good task design can use both. Fang and Liao (2027) show that heritage languages are passed on through family relationships, memory, and identity, which GenAI cannot replace.

The second is equity. Many leading models were built mainly on English data. Fang and Liao (2027) show that output in heritage and minoritized languages may look grammatical yet still reflect Anglophone ways of thinking, and they call for community-grounded models and community control over language data. Moorhouse (2027) warns that GenAI may flatten linguistic diversity in academic writing, and argues that scholars need not only functional skills but also a critical understanding of how GenAI disrupts authorship and gatekeeping in publishing. These concerns lead to our fourth proposition: AI literacy includes knowing when not to use GenAI. Examples in the volume include device-free learning phases (Chang & Hung), creative steps reserved for humans (Tin), in-class writing (Yeo), and a scholar's reasoned choice not to use GenAI (Moorhouse).

Extending the integrated model: A layered model of AI literacy

Building on the integrated model of AI literacy for applied linguistics presented in the concluding chapter of our edited volume (Teng et al., 2027), this section extends that model in two ways. It grounds each dimension in the lenses and propositions developed above, and it links each dimension to the gap in existing frameworks that it addresses. At the base of the model is human agency and accountability: GenAI can take on tasks, but responsibility for judgements, claims, and learning stays with people. On this foundation sit five dimensions (Table 1).

Table 1. *Five dimensions of AI literacy in applied linguistics: Theoretical grounding and gaps addressed*

Dimension	Key question for users	Theoretical grounding	Gap addressed
Functional	How does this tool work, and how can it fail?	Lens 2 (mediation): a tool must be understood before it can serve as a scaffold	Operational gap: explains how GenAI produces language and why it fails
Evidential	What evidence supports this output?	Lens 3 (epistemic cognition); Proposition 3: fluency is not evidence	Operational gap: specifies what counts as evidence of language use and of learning
Metacognitive	Should I use GenAI here, and how much should I trust it?	Lens 4 (metacognition): planning, monitoring, and regulating reliance	Product gap: shifts attention from outputs to how the process is regulated

Dimension	Key question for users	Theoretical grounding	Gap addressed
Relational-creative	What should remain human?	Lens 2 (mediation); Proposition 2: scaffold, not substitute	Product gap: protects the interactional and creative processes of language development
Critical-ethical	Whose language is represented, who decides, and who benefits?	Lens 1 (social practice); Proposition 4: knowing when not to use GenAI	Universality gap: recognizes uneven language coverage and legitimizes strategic non-use

The five dimensions work together. Metacognition acts as the link: it turns functional and evidential knowledge into action, and it supports the relational and critical choices about when GenAI helps and when it gets in the way. The model is also situated. A student drafting an essay, a teacher designing an EMI lesson, and a researcher running an SEM analysis all draw on the same five dimensions, but in different proportions. Bringing these ideas together, we define AI literacy in applied linguistics as the situated capacity of learners, teachers, and researchers to understand, use, evaluate, and govern GenAI in language-related practices while retaining human agency, accountability for claims, and care for the linguistic, social, and ethical consequences of those practices (Teng et al., 2027). This definition departs from competency-based definitions in three ways. First, it treats governing GenAI (deciding whether, when, and how far to use it) as part of literacy, so strategic non-use becomes a literate choice rather than a deficit. Second, it locates literacy in practices rather than in individuals: the same learner may be highly literate when checking collocations against a corpus but less so when drafting an essay. Third, it applies differently to learners and teachers. For learners, the dimensions centre on using GenAI without bypassing their own language development; for teachers, they extend to designing tasks and assessments in which learners' GenAI use is visible and purposeful. AI literacy is thus both a personal capacity and a pedagogical responsibility.

Theoretical Implications

The framework has three theoretical implications. First, AI literacy in applied linguistics should be understood as an *epistemic* matter, not only a technical or ethical one. Its core question, how language relates to evidence, is one that our field needs to define and answer. Applied linguistics can therefore contribute to, not merely borrow, AI literacy theory.

Second, metacognition should be seen as the mechanism that connects the dimensions, not as one more item on a list. This gives researchers a testable explanation for a common puzzle: why people who know about GenAI's limitations still use it uncritically.

Third, AI literacy is plural and sometimes contested. A theory that equates AI literacy with maximum GenAI use would mis-represent what skilled users actually do. Strategic restraint is part of literacy, not a lack of it (Tacelosky et al., 2025).

Fourth, the framework extends literacy theory itself. Earlier literacy theories assumed that humans remained the authors of meaning (New London Group, 1996). Because GenAI also produces language, AI literacy needs an account of co-authored meaning in which the human contribution is visible and owned.

Finally, the framework affects how language ability is defined. If performance is shared between learners and tools, construct definitions must specify which parts of a task should

remain unassisted and which may be legitimately mediated, making AI literacy part of the construct rather than a separate skill.

Future Directions for AI Literacy Development

For theory, the layered model needs empirical validation through classroom interventions and design-based research that test frameworks such as TRACE and LTPACK (Teng et al., 2027). Measurement should move beyond domain-general competency scales (Deng et al., 2026; Xu et al., 2025) to capture verification behaviour, calibrated trust, and strategic non-use, using process data such as prompt logs as well as self-report. Longitudinal research should trace how AI literacy develops as tools become agentic and multimodal, especially since early enthusiasm for GenAI can fade (Bui, 2027).

For practice, AI literacy should be developed within, not alongside, language education. Learning tasks can move learners from operating GenAI to verifying its output, regulating their reliance, and deciding when not to use it (Teng, 2026, 2027). Teacher education can integrate AI literacy with assessment literacy and task design, so that learners' GenAI use becomes visible and purposeful (J. G. Wu et al., 2025; Yeo, 2027). AI literacy development must also reach beyond universities and Asian settings to younger learners and minoritized language communities, who should help shape the tools and norms involved (Fang & Liao, 2027). Extending research to these areas will enable us to strengthen our conceptualization of AI literacy to keep pace with its development and use in applied linguistics.

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CRediT authorship contribution statement

Mark Feng Teng: Conceptualization, Methodology, Writing – original draft.

Marie Alina Yeo: Conceptualization, writing – review & editing.

Gavin Junjie Wu: Writing – review & editing.

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Author bio

Mark Feng Teng, PhD. is a PT faculty member at the Department of English, The Hang Seng University of Hong Kong. His research specializes in computer-assisted vocabulary acquisition, reading and writing. He is recognized as one of the top 2% most-cited researchers (single year) worldwide (2021 - 2026) and career-long impact (2024 - 2026) in the area of Language and Linguistics by Stanford University.
Email: markfteng@gmail.com
ORCID: https://orcid.org/0000-0002-5134-8504

Marie Alina Yeo has taught English, trained teachers and led projects across Southeast Asia, China and Australia for nearly four decades. Her interests include CLIL, GenAI-mediated writing and assessment, and academic publishing. She co-edits *RELC Journal* and has published in *TESOL Journal* and *Applied Linguistics Review*.
Email: marie.yeo@relc.org.sg
ORCID: https://orcid.org/0000-0003-0136-2532

Junjie Gavin Wu is an Assistant Professor and Ph.D. Supervisor at Macao Polytechnic University, as well as the Vice President of PacCALL and the Vice President of GloDAL. He is Editor-in-Chief of *SN Social Sciences* (Scopus, Springer), Editor-in-Chief of *Applied Language Sciences*, an Executive Associate Editor of *Computers & Education: X Reality* (ESCI), and an Executive Associate Editor of *Artificial Intelligence in Language Education* (Castledown). Gavin has authored around 100 English publications, with over 40 papers appearing in SSCI/SCI journals.
Email: gavinjunjiewu@gmail.com
ORCID: 0000-0003-4937-4401