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AI-Mediated Informal Digital Learning of English (AI-IDLE)

Guangxiang Leon Liu
and Ju Seong Lee

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edited by

Glenn Stockwell

The Education University of Hong Kong

Yijen Wang

Waseda University

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Guangxiang Leon Liu

Southeast University

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Guangxiang Leon Liu
Southeast University

Ju Seong Lee
The Education University of Hong Kong

Author for correspondence: Guangxiang Leon Liu, g.liu@seu.edu.cn,
G.Liu-20@outlook.com

Abstract: Artificial intelligence-mediated informal digital learning of English (AI-IDLE) is a rapidly emerging subfield of computer-assisted language learning that focuses on autonomous, self-directed second language (L2) English development through AI tools beyond the classroom. Extending the established research agenda on informal digital learning of English (IDLE), AI-IDLE responds to a changing context in which AI technologies and digital platforms with embedded AI functionalities are reshaping the ecology of informal language learning. This Element provides the first comprehensive synthesis of AI-IDLE research and practice, grounded in an integration of proactive language learning theory and cultural-historical activity theory. It examines key antecedents and outcomes of AI-IDLE and, through original case studies, illustrates how learners negotiate resources and navigate diverse sociotechnical environments to engage in AI-IDLE. The Element concludes by outlining pedagogical strategies for supporting AI-IDLE and identifying future research directions for advancing this nascent field.

This Element also has a video abstract:
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Keywords: artificial intelligence, informal language learning, computer-assisted language learning, AI-IDLE, informal digital learning of English

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1 Introduction

In the space of a generation – 25 years – all of humanity, or at least that huge part of it with some access to digital communications and/or intercontinental transport, has moved from near-total dependence on the knowledge and expertise, and planning of others to a level of autonomy and opportunity for self-teaching and “picking up” new languages unimagined in any other period of human history

(Dressman, 2019, p. 1).

Mark Dressman’s observation in the *Handbook of Informal Language Learning* captures the profound shift in how languages have been learned in an era of globalization and rapid technological change. Within just a few decades, learners have moved from relying almost exclusively on formal instruction to leveraging digital technologies for self-directed learning beyond the classroom. The rise of the internet, mobile devices, and social platforms has opened unprecedented opportunities for learners to encounter authentic input, communicate across borders, and craft their own pathways of language development (Reinders & Benson, 2017; Stockwell & Wang, 2024; Sundqvist & Sylén, 2016).

However, the rise of artificial intelligence (AI) marks another decisive turning point. As the world’s major economies invest heavily in developing robust AI ecosystems, with investments projected to reach USD 632 billion by 2028 (International Data Corporation, 2025), AI is permeating every aspect of our lives at a remarkable speed. Against this broader backdrop, the advent of generative AI has marked a watershed moment. Since the public release of large language model-driven platforms like ChatGPT in late 2022, AI tools capable of producing coherent, context-sensitive, and interactive content have become readily accessible to millions of users worldwide, at least in regions where internet connectivity is not a barrier. These tools often simulate anthropomorphic communication through text, audio, and multimodal interaction, offering learners a seamless experience that parallels human dialogue (Kohnke et al., 2023; Moorhouse & Wong, 2025; Soyoo et al., 2025; Zhou et al., 2026). Their capacity to personalize support, generate diverse linguistic outputs, and adapt to learners’ needs has positioned AI as a transformative partner in education, particularly in second and foreign language (L2) learning (Jenks, 2023; Lai & Sundqvist, 2025).

This Element situates itself at the intersection of informal language learning and computer-assisted language learning (CALL) in the age of generative AI. It particularly builds upon the established scholarship of informal digital learning of English (IDLE), which emphasizes self-directed English language development outside formal classrooms (Lee, 2022b; Lee &

Dressman, 2018; Soyoo et al., 2023). Its primary goal is to introduce and theorize a new construct: AI-mediated IDLE (AI-IDLE) that focuses on the autonomous, self-initiated L2 English development through various AI tools and platforms embedding AI functionalities (Liu et al., 2024, 2025). Importantly, AI-IDLE should not be understood as replacing or surpassing earlier forms of IDLE. Established IDLE practices, such as participation in gaming communities, fanfiction writing, meme creation, social media interaction, and digital content production, are already dynamic, personalized, and creative in nature (Dressman & Sadler, 2020; Lee, 2022b). Rather than marking a rupture, AI-IDLE represents a shift in the nature of technological mediation within informal learning ecologies. Unlike earlier IDLE practices that primarily relied on human–human interaction or learner–content engagement via mobile devices and digital media (Dressman et al., 2023; Guo & Lee, 2023; Soyoo et al., 2023), AI-IDLE introduces sustained human–AI dialogic interaction characterized by real-time generativity, adaptive feedback loops, and algorithmically mediated co-construction of knowledge. In particular, whereas much IDLE research has focused on learners consuming, sharing, or remixing digital content (e.g., watching YouTube videos, participating in online forums, or engaging in social networking), AI-IDLE requires learners to design prompts, iteratively refine outputs, and receive immediate, personalized responses that dynamically adapt to their linguistic input and evolving intentions.

What distinguishes AI-IDLE, therefore, is not that it is inherently more creative or more personalized than earlier forms of IDLE. Rather, personalization and dialogic interaction are built into the architecture of generative AI systems. These systems do not simply host user participation. They generate language in real time, simulate interlocutors, model genres, and adjust their responses in relation to learners' input at scale. In this sense, AI-IDLE shifts informal language learning from participation within digital spaces to sustained interaction with AI systems that actively shape the learning process. Learners can rehearse examination tasks, draft and revise written texts with iterative feedback, or explore additional languages through responsive dialogue – activities that previously depended more heavily on access to human tutors. By altering how learners obtain, interpret, and refine linguistic resources, AI-IDLE changes the conditions under which out-of-class learning opportunities are initiated and maintained.

The aim of this Element is threefold. First, it seeks to offer a comprehensive synthesis of AI-IDLE, grounding the concept within established CALL traditions while highlighting its distinctive contributions in a world shaped by generative AI. Second, it aims to propose an integrated theoretical model to capture both the learner's agency in using AI tools to shape learning

opportunities and the broader sociocultural structures that mediate such practices. Third, the Element strives to examine the empirical evidence, case studies, and pedagogical implications of AI-IDLE by synthesizing current research findings, illustrating lived experiences through individual cases, and translating insights into evidence-based strategies for teachers, institutions, and policy-makers. In doing so, it equips stakeholders with practical tools to help learners critically and creatively harness AI for lifelong L2 English development.

The significance of this Element lies in its timeliness and relevance. As learners worldwide increasingly encounter AI tools in their daily lives (Darvin, 2025b; Godwin-Jones, 2024), the capacity to engage with these tools strategically and responsibly is essential for their linguistic, cognitive, and social development. AI-IDLE has the potential to expand opportunities for more personalized and responsive forms of language support, reaching learners who may have previously lacked sustained exposure to English or continued individualized feedback. By incorporating more accessible and on-demand interactions, AI-IDLE can complement traditional resources and also provide psychologically safe spaces that may help reduce anxiety through low-stakes practice environments (Li et al., 2024; Tai & Chen, 2024; Van Horn, 2024), encouraging learners to take risks and build confidence without fear of negative judgment. Moreover, the continuity of availability means that learners can cultivate habits of sustained and even lifelong engagement with English that extend well beyond institutional boundaries (Bayly-Castaneda et al., 2024; Poquet & De Laat, 2021). At the same time, AI-IDLE raises critical questions about access, equity, ethics, and the evolving role of human teachers (Thorne, 2024). Issues such as unequal digital access, the reliability of AI-generated content, and the potential displacement or reshaping of teacher expertise underscore the need for careful reflection (Liu & Darvin, 2026; Moorhouse & Wong, 2025). These concerns, alongside the opportunities, will be addressed throughout the Element.

The structure of this Element follows a clear trajectory of inquiry, beginning with the nascency of AI-IDLE and moving progressively through theory, evidence, cases, pedagogy, and future directions. Section 2 traces the emergence of AI-IDLE within CALL, establishing its status as a new and rapidly evolving domain of research and practice. Section 3 then lays out the theoretical foundations, integrating the proactive language learning theory (PLLT) and cultural-historical activity theory (CHAT) into a framework that captures both individual agency and sociocultural mediation. Building on this foundation, Section 4 reviews the growing body of empirical evidence, with particular attention to the key antecedents and outcomes associated with AI-IDLE. Section 5 turns to detailed case studies, illustrating how learners in different contexts negotiate

resources, constraints, and opportunities to engage in AI-IDLE. [Section 6](#) shifts the focus toward pedagogy, presenting teaching implications, and professional development strategies to support integration within broader educational ecologies. Finally, [Section 7](#) looks ahead to the horizon, examining emerging technologies, research priorities, and ethical imperatives. Together, these Sections build a cumulative argument that situates AI-IDLE as both a timely subject of inquiry and a fundamental lens for reimagining the future of L2 English development in a world driven by ever-emerging AI technologies.

2 From IDLE to AI-IDLE

This section examines the nascent status of AI-IDLE at the intersection of informal language learning and CALL. It begins with an overview of IDLE in L2 development, then moves toward a clearer definition of AI-IDLE and concludes with an exploration of why AI-IDLE matters in contemporary L2 research and practice.

2.1 IDLE in L2 Development

Research on how learners use digital devices and online resources to develop English proficiency beyond the classroom has gained momentum over the past two decades. To describe this evolving field, scholars have employed a range of terms, including *extramural English* (Sundqvist & Sylvén, 2016), *online informal learning of English* (Sockett, 2014), *out-of-class language learning with technology* (Lai & Gu, 2011), and *the digital wilds* (Sauro & Zourou, 2019). Among these, the concept of IDLE has become one of the most widely adopted and representative due to its flexibility as a term that encompasses diverse informal learner practices and reflects the integration of digital technologies as an entirety into learners' everyday English learning experiences (Lee, 2022b; Rezai et al., 2025). Unlike formal instruction, which is typically planned, structured, and curriculum-driven, IDLE refers to voluntary and often self-initiated activities that make use of digital technologies for English language learning (Lee & Dressman, 2018; Sockett, 2014). It includes practices such as streaming videos, playing online games, listening to music, participating in fan communities, or interacting on social networking platforms. These activities are not necessarily designed for pedagogical purposes, yet they often create rich opportunities for exposure to authentic language, intercultural interaction, and skill development (Lee & Drajiati, 2020; Lee & Dressman, 2018; Liu, Zhang, et al., 2024).

A defining characteristic of IDLE is its strong connection to learner autonomy (Dressman & Lee, 2021; Zadorozhnyy & Lee, 2025). Students decide

when, how, and why to engage in English outside the classroom, motivated by personal interests, hobbies, or social needs rather than institutional requirements (Lee, 2022b). For instance, a teenager in Sweden may join an English-language gaming guild to improve teamwork and interpersonal communication skills, while a university student in South Korea may follow English-language podcasts to keep up with global trends. In both cases, the learning is incidental to other goals but can contribute to learners’ vocabulary expansion, listening fluency, and even pragmatic awareness in using English in authentic contexts.

To lay bare how IDLE differs from other types of informal learning, Liu (2025b) proposed the conceptual foundation of IDLE by integrating Phil Benson’s (2011) four dimensions of language learning beyond the classroom with insights from research on digital literacies for language learning (Darvin & Hafner, 2022; Jones & Hafner, 2021). As illustrated in Figure 1, IDLE can be conceptualized through six interrelated dimensions that reflect its dual identity as both informal and digitally mediated learning. The first four dimensions, drawn from Benson’s (2011) framework, articulate IDLE’s essential characteristics as a self-directed and learner-centered process. The *location* dimension situates IDLE in contexts outside formal classrooms, highlighting how online and mobile environments afford spontaneous language use. The *formality* dimension captures its open-ended, noninstitutional nature, unconstrained by standardized curricula or formal evaluation. The *pedagogical* dimension underlines the self-guided nature of IDLE, where individuals autonomously select

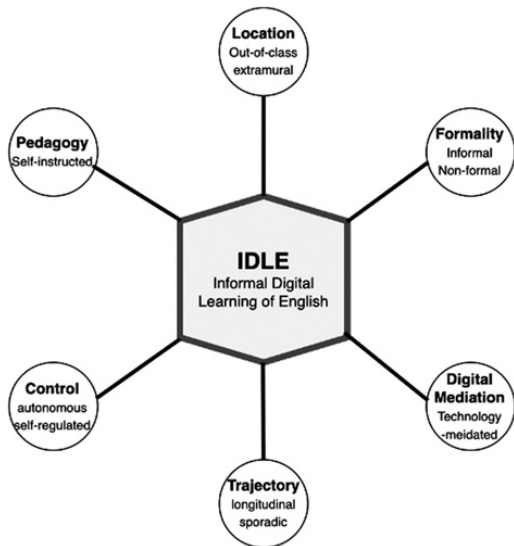


Figure 1 The conceptual basis of IDLE (Liu, 2025b).

content and methods that align with their interests. The *locus of control* dimension further stresses learner agency in determining goals, strategies, and self-assessment mechanisms. Building on these foundations, two additional dimensions extend the framework to account for the specificities of digital mediation. The *trajectory* dimension, following Chik (2019), foregrounds the temporal variability of learners' engagement in digital environments, which may range from consistent participation to intermittent activity over time, contrasting sharply with the fixed pacing of classroom instruction. Finally, the *digital mediation* dimension (Hafner et al., 2015; Jones & Hafner, 2021) examines how technological affordances shape informal learning experiences. It emphasizes that digital tools and platforms not only provide access to language input and social interaction but also transform the modes of communication, collaboration, and knowledge construction. These six dimensions offer a lens for conceptualizing IDLE as a distinct mode of language learning that reflects the fluid boundaries between formal and informal, individual and networked learning in a rapidly changing digital world.

Empirical studies grounded or aligned with this conceptualization have consistently shown that engaging in IDLE is able to foster a range of positive outcomes across linguistic, cognitive, and affective domains. Vocabulary growth is one of the most frequently reported benefits, particularly for learners who engage in video-based media and online gaming (Lee, 2019; Sockett & Toffoli, 2012). Informal exposure has also been linked to improvements in listening comprehension, as learners encounter natural speech patterns, diverse accents, and colloquial expressions (Lee, 2022b; Tsang & Lam, 2025). In writing, IDLE activities such as participation in online fanfiction communities or social media have been shown to enhance genre awareness and stylistic flexibility (Naghdipour, 2022; Sauro, 2017). Beyond linguistic skills, IDLE supports intercultural competence and identity development (Liu, Ma, et al., 2025). By participating in global digital communities, learners negotiate cultural meanings and position themselves as legitimate users of English (Dooly & Darvin, 2022; Liu & Darvin, 2024). Moreover, the voluntary nature of IDLE fosters intrinsic motivation. Learners often describe IDLE activities as enjoyable, entertaining, or relaxing, which in turn sustains engagement and reduces language anxiety (Lee & Dressman, 2018).

2.2 Revisiting IDLE in the Age of Generative AI

While IDLE scholarship has established a solid foundation, recent technological advances point toward a new phase in informal learning. Traditional IDLE practices largely revolved around exposure and participation: learners

consume online content, interact in online communities, or engage in interest-driven digital practices that indirectly foster English development (Lee, 2022b; Zhang & Liu, 2024). When viewed through the six-dimensional framework outlined earlier, these practices primarily activated the location, formality, and trajectory dimensions, while the digital mediation dimension focused largely on access to platforms and participation in networked communities. The emergence of AI, however, introduces a different form of mediation that reshapes how several of these dimensions operate in practice.

Consider the example of speaking practice. Previously, learners who wished to improve oral proficiency through IDLE might watch videos for input, join online forums for written interaction, or occasionally connect with English-speaking peers for synchronous exchanges. With AI-powered chatbots and language learning applications that integrate automatic speech recognition and intelligent dialogue simulation, learners can now independently engage in English dialogues in real time, receiving extended turns as well as feedback on pronunciation, grammar, and appropriateness. Here, the digital mediation dimension shifts from providing access to communicative spaces toward enabling responsive, algorithmically generated interaction. At the same time, the locus of control dimension is intensified, as learners not only decide when and why to engage but also actively shape the direction and content of dialogue through prompts and iterative refinement.

Writing provides another illustration of this transition. Earlier IDLE resources, such as grammar-checking apps or peer feedback in online communities, offered limited scaffolding. Today, generative AI tools can provide instant paraphrasing, style adjustments, and genre-specific modeling beyond the classroom (Moorhouse & Wong, 2025). A learner drafting a business email can request alternative phrasings, tone adjustments, or cultural adaptations, effectively co-constructing the text with an intelligent partner. In this respect, the pedagogical dimension is also reconfigured. While IDLE has always been self-guided, AI-mediated interaction embeds scaffolding mechanisms within the technology itself.

These scenarios suggest a paradigm shift from earlier forms of IDLE to what we now call AI-IDLE. Importantly, this shift does not replace the six dimensions identified in Section 2.1 but rather rearticulates them under conditions of new technological mediation. Whereas earlier forms emphasized locating and engaging with target-language resources across digital spaces, AI-IDLE centers on dialogic interaction and co-construction with intelligent AI systems. The trajectory dimension may also take on new temporal patterns, as learners engage in rapid cycles of prompting, feedback, and revision within single learning episodes. In this new paradigm, learners are not only consumers of

content but also designers of interactional pathways who continuously adjust prompts, evaluate outputs, and refine their linguistic choices. This transformation invites a reconsideration of how agency, mediation, and learning processes are conceptualized within informal digital environments. In the following section, we take a closer look at AI-IDLE and explain why it represents an important development in the field.

2.3 Defining AI-IDLE

Recognizing that generative AI not only introduces new cultural tools that mediate human activity but also alters the broader ecology of informal learning (Poquet & De Laat, 2021; Stockwell, 2024), Liu et al. (2024, 2025) proposed the concept of AI-IDLE. They define it as *self-directed*, *autonomous*, and *independent* English learning practices outside formal classrooms that are mediated by AI technologies powered by large language models (LLMs) and other increasingly multimodal intelligent systems. The terms “self-directed,” “autonomous,” and “independent” are used with care rather than as synonyms. “Self-directed” refers to learners’ initiation and regulation of learning activities. “Autonomous” points to their capacity to determine goals, select procedures, and evaluate outcomes. “Independent” signals the relative absence of direct institutional oversight or teacher supervision. Taken together, these terms describe the learner-driven character of informal AI-mediated learning.

AI-IDLE is also framed as an umbrella concept to refer to terms like GenAI-IDLE (Guan et al., 2024) and ChatGPT-assisted IDLE (Cui et al., 2025). Although generative AI tools based on LLMs are currently the most visible mode of AI technologies, the term implies a wider range of AI tools, systems, and techniques used for informal digital learning, such as adaptive feedback engines, speech recognition systems, and multimodal AI platforms. The concept of AI-IDLE is therefore not tied to any single platform or limited to generative AI alone.

AI-IDLE further draws attention to the variety of activities learners undertake as they explore what AI systems can provide, including immediate feedback, error correction, and exposure to diverse genres and registers (Liu, Lee, et al., 2025; Liu & Ma, 2024). Earlier forms of IDLE often relied on online materials such as videos, blogs, fan communities, or interest-driven interaction like online gaming (Soyoof et al., 2023; Sundqvist & Sylvén, 2016). By contrast, AI-IDLE involves sustained interaction with AI systems that can generate, assess, and adjust content in real time (Guan, Zhang, et al., 2024; Li et al., 2024; Liu, Lee, et al., 2025). In this context, AI is not merely a repository of information. It functions as an interactive partner, though one shaped by algorithmic

constraints, potential bias, and uneven power relations embedded in its design (Darvin, 2025b; Dovchin, 2024). The shift from consuming digital resources to interacting with adaptive systems brings renewed attention to learner agency in technology-mediated practice.

This raises a central question: How do learners interpret and negotiate their relationship with AI technologies in self-directed learning (Godwin-Jones, 2024)? In a case study of eight Chinese university EFL learners, Liu, Lee, and Zhao (2025) identified different levels of agency in IDLE learners’ engagements with generative AI. As shown in Table 1, at the most basic level, some learners used AI primarily for content consumption, such as requesting translations, grammar corrections, or vocabulary explanations (Liu & Zhao, 2025). This pattern resembles earlier IDLE practices, though AI offers greater speed and responsiveness. At an intermediate level, learners used AI tools to generate additional practice opportunities and to adapt tasks to their own goals, for example, by role-playing oral exam scenarios or creating customized reading passages. (Li et al., 2024; Van Horn, 2024). Here, learners exercised more

Table 1 Level of agency and AI-IDLE practices (Liu, Lee, et al., 2025).

Level of agency	Description	Representative AI-IDLE activities
Receptive AI-IDLE practices (lower agency)	Learners primarily consume AI-generated content with minimal modification	• Using ChatGPT to get instant explanations of unfamiliar English expressions encountered in daily media consumption; • Requesting basic error correction for social media posts without deeper engagement; • Using AI-generated sample responses to understand different English email formats; • Getting quick translations and explanations of English songs or movie dialogue;

Table 1 (cont.)

Level of agency	Description	Representative AI-IDLE activities
Participatory AI-IDLE practices (full agency)	Learners actively direct and customize AI interactions based on learning needs	• Engaging AI in free-form conversations about personal interests while requesting feedback on language accuracy; • Creating customized vocabulary learning sets by asking AI to generate contextual examples from specific domains; • Actively modifying AI's language level and requesting explanations of colloquial expressions encountered online; • Designing topic-specific discussion scenarios for practicing academic speaking with detailed feedback requests;
Co-creative AI-IDLE practices (shared agency)	Learners develop sophisticated partnerships with AI, collaboratively producing content	• Collaboratively refining English blog posts by iteratively discussing stylistic choices with AI; • Using AI feedback to improve English podcast scripts while maintaining personal voice; • Developing English social media content through ongoing AI-assisted revision and style enhancement; • Co-creating personalized IELTS listening learning materials by combining AI suggestions with authentic language experiences;

control by shaping prompts to fit their goals. At the highest level, learners treated AI as a co-creative partner. They co-authored essays, experimented with stylistic variation, and explored intercultural situations. Rather than accepting outputs at face value, they revised prompts, questioned responses, and reflected on how AI shaped their learning. This highest level of engagement is typically associated with the development of critical digital literacies. Learners cultivate particular dispositions, draw on available resources, and become aware of the power relations embedded in AI systems. The progression from consumption to personalization to co-creation shows that AI-IDLE is not a single, uniform practice. It encompasses a range of engagements shaped by learners' aims, orientations, and literacies. Within this range, prompting AI, revising its responses, or rejecting its suggestions becomes part of an ongoing negotiation. Learners are positioned not simply as users of tools but as active participants in shaping their own learning environments and outcomes.

2.4 Differentiating AI-IDLE from IDLE

While AI-IDLE builds on the foundation of IDLE scholarship, it warrants recognition as a distinct construct within CALL for several reasons. Specifically, the learning processes AI-IDLE enables are qualitatively different from earlier forms of IDLE. Traditional IDLE emphasized exposure to digital resources and participation in online communities (Dressman & Sadler, 2020; Lee & Dressman, 2018). By contrast, AI-IDLE foregrounds dialogue, co-construction, and adaptive scaffolding. Learners can prompt AI tools to generate personalized examples, simulate authentic conversations, or provide iterative feedback on their writing (Lee & Cho, 2025; Liu et al., 2024, 2025). These are not incidental affordances but core capabilities of generative AI technologies that transform how learners interact with language. Importantly, AI-IDLE reshapes the form–meaning continuum. Whereas earlier IDLE activities tended to be either form-focused (e.g., memorizing vocabulary, grammar apps) or meaning-focused, such as gaming and chatting online (Lee, 2022b; Zhang & Liu, 2024), AI-IDLE allows learners to toggle between the two orientations dynamically within a single interaction. For example, a learner might role-play an interview with an AI on a particular topic (meaning-focused) and then immediately request grammatical analysis of their responses (form-focused). This fluid integration illustrates why AI-IDLE represents not merely a midpoint between the two orientations but a distinctive hybrid practice that reconfigures the continuum itself.

Additionally, AI-IDLE reconfigures the nature of learner agency. In traditional IDLE, agency was typically expressed in choosing resources, selecting

platforms, or regulating the pace of engagement (Lyriqkou, 2019). In AI-IDLE, however, agency extends to how learners frame prompts, evaluate system outputs, and harness or resist the biases embedded in AI responses (Darvin, 2025b; Soyoof et al., 2025). This shift is best understood through the lens of *distributed agency* (Godwin-Jones, 2024). Rather than attributing agency to AI itself, agency emerges through the interactional configuration between learners and AI platforms, each contributing different forms of control within a shared activity. Learners set goals, interpret responses, and decide whether to accept, revise, or reject AI-generated content, while AI systems shape the process through their programmed affordances and constraints. Agency, therefore, is enacted not only through independent decision-making but also through ongoing negotiation with intelligent systems, which requires new strategies and literacies to ensure that learners retain meaningful control over their learning.

Therefore, AI-IDLE particularly foregrounds the importance of critical digital literacies. Because AI platforms are not neutral, learners must be able to interrogate how outputs are produced, whose perspectives are amplified, and which are excluded (Darvin, 2025b; Dooly & Darvin, 2022; Liu & Darvin, 2026). Engaging in AI-IDLE thus requires learning not only *through* AI but also *about* AI – its affordances, limitations, and sociopolitical implications. The development of these literacies would empower learners to critically reflect on their dependence on AI tools and to avoid the risk of uncritically accepting system-generated content as authoritative.

Finally, AI-IDLE faces limitations and challenges that differ from those in traditional IDLE. Learners engaged in non-AI IDLE practices often encountered issues such as fragmented learning experiences, an overabundance of resources leading to information overload, and a lack of scaffolding or guidance to transform exposure into development (Dressman & Sadler, 2020; Liu, Soyoof, et al., 2025). By contrast, AI-IDLE introduces new risks related to access, misinformation, overreliance, and the ethical use of data. For example, young learners may find it difficult to discern when AI-generated content is inaccurate, biased, or incomplete, and the very convenience of instant, adaptive support can encourage dependence on AI tools while reducing opportunities for authentic human interaction. It is also important to acknowledge that human–AI interactions, no matter how advanced, cannot fully substitute for human–human communication, which remains a more natural and often more effective avenue for developing not only linguistic proficiency but also nonlinguistic outcomes such as interest, motivation, and intercultural understanding. After all, most learners study English in order to use it in real-world contexts where authentic interaction with people is essential. These challenges underscore the double-edged nature of AI-IDLE: It expands

possibilities for informal learning in powerful ways but simultaneously demands heightened critical awareness and responsibility from both learners and educators.

2.5 Why AI-IDLE Matters

As generative AI tools become embedded in everyday life, learners are encountering them with growing frequency outside formal classrooms (Godwin-Jones, 2024; Thorne, 2024). To overlook these practices would be to disregard a crucial dimension of contemporary language learning. In what follows, we outline several reasons why AI-IDLE must be recognized as particularly significant at this historical moment.

First, AI-IDLE expands the range of informal learning opportunities by offering on-demand, low-cost, and scalable interaction (Liao et al., 2025; Liu & Zhao, 2025). For learners who may lack access to qualified teachers or authentic communicative environments but can still negotiate access to generative AI platforms (e.g., through the freemium model of ChatGPT), AI provides an alternative space for sustained English use. By lowering barriers to participation, AI-IDLE has the potential to mitigate long-standing inequalities in informal learning and extend opportunities to learners who have traditionally been marginalized (Bulathwela et al., 2023).

Second, engaging in AI-IDLE fosters lifelong learning habits in a world increasingly mediated by AI. Because AI tools are available across devices and platforms, they can be seamlessly incorporated into learners' daily routines. Engaging in short AI-mediated interactions, whether practicing pronunciation, paraphrasing, or engaging in role-play, can become part of everyday practice, reinforcing habits of sustained and even lifelong language development (Bayly-Castaneda et al., 2024; Poquet & De Laat, 2021). Importantly, this integration into daily life differentiates AI-IDLE from earlier forms of IDLE, which often depended on more sporadic or interest-driven engagements.

Third, AI-IDLE represents an important part of future CALL research and practices. CALL has long traced technological shifts, from multimedia CD-ROMs to mobile-assisted language learning (MALL), and later to informal digital practices (Stockwell, 2012; Wang, 2025). AI-IDLE can be seen as the continuation of this trajectory, but one that both extends and challenges existing frameworks (Godwin-Jones, 2024). Unlike earlier technologies, AI is not merely a tool for accessing or presenting content but an interlocutor that actively shapes the conditions of learning (Moorhouse & Wong, 2025). This relational quality requires CALL scholars to revisit assumptions about autonomy, interaction, and assessment in informal contexts and to account for the ways in which learners negotiate with intelligent systems rather than solely with human peers.

Finally, the study of AI-IDLE bridges applied linguistics with emerging fields such as AI literacy, human–computer interaction, and digital ethics (Celik, 2023; Soyoo et al., 2025). This interdisciplinarity is necessary because the challenges and opportunities of AI-IDLE cannot be fully understood through a single disciplinary lens. For instance, insights from sociocultural theory help explain how AI-mediated practices are embedded in broader communities and norms, while literacy studies foreground how learners critically interpret, evaluate, and recontextualize AI-generated texts. Meanwhile, perspectives from technology design and human–computer interaction highlight how interface features, algorithmic transparency, and user experience shape learning practices. Bringing these strands together ensures that AI-IDLE research can address not only linguistic outcomes but also ethical questions, learner identities, and the broader societal consequences of AI adoption. In this sense, we argue that AI-IDLE is not simply another subfield of CALL but a critical site where debates about AI, language education, and society converge.

3 Theoretical Foundations for AI-IDLE

The rapid expansion of AI-mediated informal learning calls for theoretical perspectives that can both capture the agentic practices of individual learners and situate those practices within the broader sociocultural contexts in which they unfold. This is because learners are not only making choices about which resources to use; they are actively negotiating with intelligent systems that respond, adapt, and even anticipate their actions. Recognizing how generative AI introduces these new dynamics that might not be fully captured by traditional theories of self-directed learning (e.g., Lai, 2013) or Benson’s four dimension framework of language learning beyond the classroom (Benson, 2011; Reinders & Benson, 2017), this section proposes an integrated framework that brings together PLLT and CHAT. We highlight that PLLT provides a lens for understanding how learners exercise proactive agency in shaping opportunities and pursuing specific outcomes in AI-IDLE environments. CHAT, in turn, situates these agentic practices within activity systems, highlighting how tools, communities, and sociocultural rules mediate learning in informal contexts. Next, we elaborate on how these theories allow us to theorize AI-IDLE as both an agentic practice of individual learners and a culturally embedded activity system.

3.1 PLLT

PLLT, proposed by Papi and Hiver (2025a), conceptualizes L2 acquisition as a process driven by initiative and intentionality on the part of learners. Rather than treating learners as passive recipients of linguistic input, PLLT emphasizes

their role as active participants who seek out, create, and capitalize on opportunities for input, interaction, feedback, and reflection (Papi & Hiver, 2025b). From this perspective, progress in language learning is not something that happens by accident but emerges from learners' deliberate choices and sustained efforts. The theory further recognizes learners as integrated individuals whose motivations, goals, and aspirations extend beyond classroom requirements. Their capacity for self-regulation, like deciding when, how, and why to act, anchors language development within broader personal projects and life trajectories (Papi & Hiver, 2025a, 2025b). In this sense, PLLT challenges views of acquisition as something that merely “happens” to the learner, instead presenting L2 learning as a purposeful, agent-driven endeavor within a specific social context (Douglas Fir Group, 2016).

PLLT also directs attention to the interplay between individual dispositions and contextual affordances. While environments, tools, and resources may enable or constrain opportunities, learners differ significantly in how they exploit them (Atkinson, 2025). For example, two individuals exposed to the same resources may achieve very different outcomes depending on their motivation, persistence, and willingness to act. PLLT thus provides a lens that examines both external conditions and internal orientations, offering insight into why proactive engagement often produces more sustainable outcomes (Papi & Hiver, 2025a). Although PLLT was originally formulated with reference to traditional classroom contexts, its core principles are not bound to specific instructional settings. Rather, its emphasis on learner agency and intentionality offers conceptual tools that are particularly well suited to understanding learning in out-of-class digitally mediated environments. In such contexts, the need for learners to initiate interactions, regulate personal learning strategies, and critically evaluate feedback becomes even more pronounced, thereby extending PLLT's relevance into digital learning spaces (Liu & Hossain, 2026; Zhao et al., 2026).

Extending PLLT into AI-mediated environments, AI-IDLE can be conceptualized as a particularly intensified form of self-initiated and agency-driven learning (Liu & Zhao, 2025). In contrast to earlier forms of IDLE, where initiative was often expressed through the selection of online materials or communities, AI-IDLE requires learners to actively shape the learning process in collaboration with AI systems. By way of illustration, a learner preparing for a speaking test might prompt an AI chatbot to simulate an examiner, practice responses, and then receive feedback on accuracy and appropriateness. Another learner drafting an academic essay might refine prompts iteratively to generate examples that reflect the conventions of scholarly writing. In both cases, the learner is not merely consuming content but crafting opportunities and regulating interactions to achieve specific goals. AI-IDLE, therefore, illustrates

PLLT's emphasis on strategic engagement. Learners must frame prompts that elicit relevant responses, evaluate the usefulness of AI feedback, and decide how to incorporate or modify suggestions within their own repertoires (Liu & Zhao, 2026). These processes require reflection, critical evaluation, and adaptation, which represent the hallmarks of proactive and agentic learning behavior (Lin & Huang, 2025).

Finally, AI-IDLE, through the lens of PLLT, foregrounds the individuality of learners as self-motivated actors with diverse aims. Some may prioritize academic success, others intercultural communication, and others still creative self-expression. Their engagement with AI reflects not only linguistic needs but also broader life projects and personal investments. This aligns with PLLT's recognition that language learning is inseparable from learners' identities, aspirations, and social trajectories (Papi & Hiver, 2025a). In this sense, AI-IDLE is not simply another digital practice but a particularly agentic mode of informal learning in which learners co-construct resources, design pathways, and shape environments in pursuit of personally meaningful objectives.

3.2 CHAT

While PLLT illuminates the proactive, agent-driven nature of learners' engagement with AI tools, it does not fully account for the sociocultural and systemic dimensions that shape these practices. Learners' choices are never exercised in isolation but are mediated by broader contexts, including the cultural meanings of tools, the communities in which learners participate, and the institutional or societal rules that govern their use (Darvin & Norton, 2015; Lave & Wenger, 1991). To capture these dynamics, it is necessary to complement PLLT with a framework that situates individual agency within collective activity systems. CHAT provides such a perspective by conceptualizing learning as a socially mediated process in which tools, rules, and communities interact to structure action. It proposes that human activity can be examined as a structured process that takes place within specific conditions, is mediated by tools or artifacts, and is directed toward achieving a particular goal (Cong-Lem, 2022). It includes six major elements:

- (1) **Subject.** The subject refers to the individual or group whose perspective frames the analysis of the activity system (Engeström, 1987). It emphasizes the actor(s) whose actions and intentions drive the pursuit of the object.
- (2) **Object.** The object represents the goal, problem space, or material focus that motivates and directs activity (Engeström, 2001). It is dynamic and becomes transformed into outcomes through the subject's engagement.

- (3) **Tools (Mediating Artifacts).** Tools are the material and symbolic instruments that mediate the relationship between subject and object (Engeström, 1987; Vygotsky, 1978). They both enable and constrain activity, carrying cultural and historical values.
- (4) **Community.** The community includes the wider network of actors who share the same object and shape the activity system (Engeström, 1987). It highlights the collective dimension of activity beyond the individual subject.
- (5) **Rules.** Rules refer to explicit and implicit norms, conventions, and regulations that govern interactions within the activity system (Engeström, 2001). They can facilitate coordination but may also generate tensions or contradictions.
- (6) **Division of Labor.** Division of labor describes how tasks, roles, and authority are distributed both horizontally and vertically within the activity system (Engeström, 1987). It structures participation and shapes how the object is pursued and transformed.

Rooted in the research of a team of Russian psychologists, such as Lev Vygotsky (1978) and Alexei Leontiev (1978), CHAT has developed across three generations over the past century, each extending the scope of analysis. The first generation, grounded in Vygotsky's (1978) cultural-historical theory, emphasized the role of mediated action, where human activity is shaped by tools and signs that carry cultural and historical meaning. The second generation, articulated by Engeström (1987), shifted the focus from individual mediation to collective activity systems, introducing a model that includes subjects, objects, tools, rules, communities, and divisions of labor to capture the complexity of social practices. The third generation of CHAT, developed by Engeström (2001), extends this framework further by examining how multiple, interacting activity systems come into contact, overlap, and generate contradictions that serve as sources of learning and innovation. As shown in Figure 2, this model depicts two interacting activity systems, each composed of subjects, tools (mediating artifacts), rules, communities, and divisions of labor oriented toward their respective objects (Engeström, 2001). The overlap between Object 1 and Object 2 illustrates how distinct systems engage around partially shared goals, creating a zone of interaction and negotiation. The emergence of Object 3 represents a new, transformed object that arises through this interaction, often driven by contradictions or tensions within and between systems. Such a framework highlights that learning and innovation occur not within isolated activities but through the networked relations of multiple activity systems.

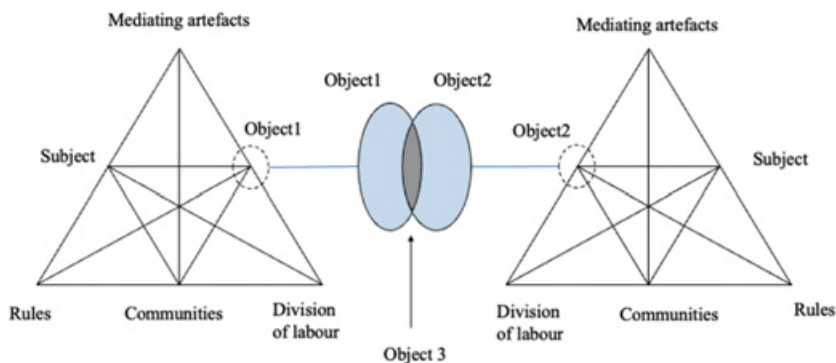


Figure 2 Third generation of CHAT adapted from Engeström (2001) (Cong-Lem, 2022, p. 1100).

To elaborate on how the expansive model CHAT works in practice, Engeström (2001) outlines five core principles. The first emphasizes that the activity system itself, that is, “collective, artifact-mediated, and object-oriented,” yet always connected to other systems, serves as the central unit of analysis (Engeström, 2001, p. 136). The second principle highlights the multivoiced nature of activity systems, stressing that the diversity of perspectives and histories among participants functions both as a potential source of conflict and as a driver of creativity and innovation (Engeström, 2001). The third draws attention to the historicity of activity systems, requiring analysis to take into account their local developmental trajectories as well as the historical evolution of the concepts and tools that shape them (Engeström, 2001). The fourth principle identifies contradictions as the engine of development and change. Defined as “historically accumulating structural tensions within and between activity systems” (Engeström, 2001, p. 137), contradictions are not superficial disagreements but tensions that accumulate historically within and across activity systems. Conflicts and disturbances can thus be seen as surface expressions of deeper systemic contradictions, which, when investigated, reveal the forces driving transformation (Engeström & Sannino, 2011). Finally, the fifth principle focuses on the transformative potential of activity systems. Drawing on Vygotsky’s concept of the zone of proximal development (ZPD), Engeström (1987) reconceptualizes transformation as the collective movement from current everyday practices toward new, historically more advanced forms of activity. Contradictions spark reflection, questioning, and collaborative problem-solving, ultimately leading to an expanded reconceptualization of the object and motive of the activity, thereby opening up broader developmental possibilities (Engeström, 2001).

3.3 The PLLT × CHAT Model of AI-IDLE

While CHAT foregrounds the systemic and sociocultural mediation of learning, it may risk underplaying the learner's agency (Cong-Lem, 2022; Engeström, 2001). PLLT, on the other hand, emphasizes initiative, self-regulation, and strategic behavior, but it can overlook how these proactive choices are embedded in broader institutional, technological, and community structures. To capture the full complexity of AI-IDLE, we propose that an integrated theoretical model is necessary: one that simultaneously accounts for learners' agentic practices and the systemic contexts in which they unfold. The model illustrated in Figure 3 positions AI-IDLE as a culturally mediated activity system while foregrounding proactive learning behaviors as the driving force that transforms systemic tensions into opportunities for growth (e.g., language learning outcomes).

Before elaborating on the components of the theoretical model presented in Figure 3, it should be clarified that this Element conceptualizes AI-IDLE primarily as a set of proactive, learner-initiated behaviors. This positioning differs from some recent empirical studies that have operationalized AI-IDLE as a learning context or environment (e.g., Cui et al., 2025; Tang et al., 2025; Yang & Du, 2025). From this perspective, AI-IDLE refers to AI-mediated informal digital learning environments within which learners regulate their learning process and construct their independent learning trajectories through AI–Human interactions. We highlight that these two conceptualizations are not contradictory. Rather, they represent different analytical lenses. AI-mediated informal digital learning environments constitute the sociotechnical conditions of action, whereas AI-IDLE, as framed through PLLT × CHAT, emphasizes the agentic activities learners enact within those environments. By distinguishing between environment and activity, the model accommodates both strands of scholarship while preserving its focus on proactive participation in AI-mediated learning practices.

As shown in Figure 3, AI-IDLE cannot be reduced to individual learner behaviors. Rather, it is situated in a complex web of mediations, rules, communities, and shifting roles. At the same time, learners are not passive participants in this system. They anticipate, plan, and strategically regulate their engagement with AI tools. At the core of the model is the *subject*, the learner who engages in English learning beyond the classroom. The learner is understood as an agentic individual who anticipates needs, initiates actions, and strategically regulates behaviors to pursue specific goals (Grant & Ashford, 2008; Papi & Hiver, 2025a). These proactive learning behaviors, depicted on the left side of

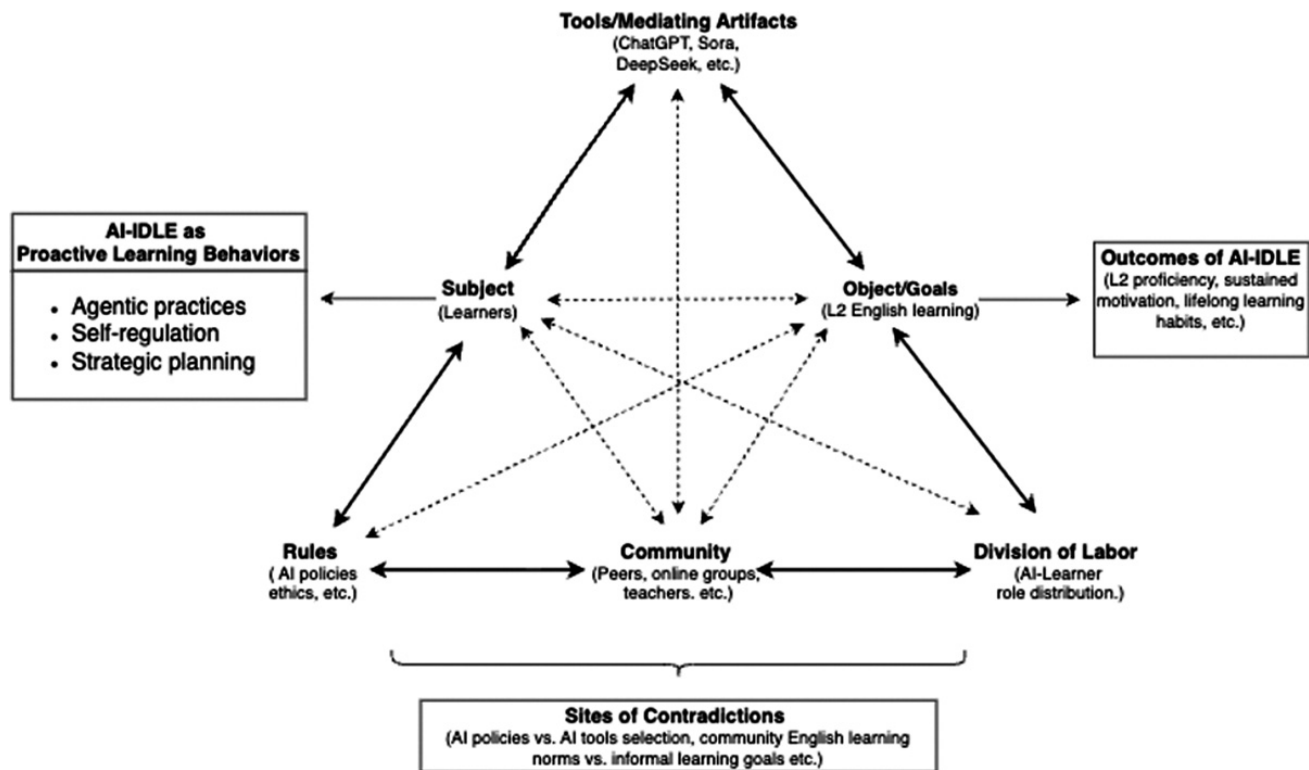


Figure 3. An integrated model of AI-IDLE

Figure 3 The PLLT × CHAT model of AI-IDLE.

Figure 3, are not external to the system but drive how learners interact with other components, from tools to communities to rules.

The learner's actions are always oriented toward an *object or goal*, in this case, L2 English development. As the model indicates, the object is not static but evolves through activity. A learner may initially focus on vocabulary expansion, later shift toward writing fluency, and eventually aim at professional communication or intercultural competence. The object thus reflects both immediate needs and longer-term aspirations, which may expand or transform as learners encounter new opportunities or constraints in their environments. Through cycles of proactive planning, enactment, and adjustment, learners transform the object into concrete outcomes, such as improved proficiency, sustained motivation, and lifelong learning habits. In this way, the object becomes a dynamic driver of activity, constantly reshaped by learners' investments, self-regulation, and the mediational structures within which they operate.

The interaction between subject and object is mediated by *tools*. In AI-IDLE, these include multiple AI tools such as ChatGPT, Sora, or DeepSeek, which learners use for tasks like text generation, dialogue simulation, or other form-based learning activities. CHAT emphasizes that tools are not neutral; they both enable and constrain action (Vygotsky, 1978). In practice, this means that AI tools shape the style, quality, and scope of learner engagement, offering real-time scaffolding while also embedding biases, limitations, and assumptions about language (Darvin, 2025b). For example, the accessibility of instant AI feedback may encourage learners to take risks in language production, yet overreliance can reduce exposure to authentic communicative settings. From a PLLT perspective, learners must proactively navigate these affordances, crafting prompts, evaluating responses, and deciding what to adopt, revise, or resist to suit the needs of productively learning the target language beyond the classroom. This requires not only technical skill but also critical awareness, as learners learn to treat AI outputs as resources to be interrogated rather than as authoritative answers.

The activity system is further embedded within a *community*. Although AI-IDLE is often framed as individual and autonomous practices (Liu et al., 2025), learners participate in broader networks that are inseparable from their AI practices. Their peers may share prompts collectively, testing which types of questions elicit the most useful responses. Teachers may discuss responsible AI use in the classroom, framing learners' attitudes toward what counts as legitimate or ethical practice. Learners may also attend online groups that evaluate AI tools, where shared discussions shape not only tool selection but also norms of critical awareness (see Liu, Lee, et al., 2025).

These communities shape how learners interpret AI feedback, position themselves as legitimate L2 users, and even negotiate their learning identities. Importantly, the sense of belonging to a learning community provides emotional support and reinforces motivation, especially when learners encounter the uncertainties of AI-generated feedback.

Rules structure how AI-IDLE is enacted and valued. Explicit rules include platform regulations, institutional guidelines, or national AI policies, while implicit rules involve peer expectations, cultural conventions, and tacit understandings of appropriate AI use. These rules often produce tensions. Institutional policies that restrict AI in coursework may conflict with learners' informal practices of using AI for low-stakes writing. In addition, AI platforms themselves impose usage restrictions through subscription tiers or moderation policies, which can further constrain how learners engage (Godwin-Jones, 2024). Such contradictions, as Engeström (2001) emphasizes, are not simply barriers but developmental forces that trigger change, pushing learners to renegotiate strategies or reframe goals. For learners, proactively navigating these rules involves not only complying with formal regulations but also critically assessing implicit norms and strategically deciding when, how, and why to engage AI for learning purposes. Thus, rules act both as boundaries and as opportunities for learners to refine their agency.

The *division of labor* highlights how responsibilities are distributed among learners, peers, and AI systems within informal learning contexts. In earlier forms of IDLE, learners largely bore the responsibility for locating resources and evaluating input, for example, by searching for pronunciation tutorials on YouTube and judging their usefulness. In AI-IDLE, some of these functions are partially delegated to AI systems, such as generating customized examples or simulating conversational exchanges. This redistribution reshapes, but does not diminish, learner agency. Rather than being replaced by AI, learners must interpret, evaluate, and selectively adopt system outputs within an ongoing interaction.

At the same time, this shift raises questions about authority and dependence. Who determines what counts as appropriate or effective language practice: the learner or the algorithmic system generating suggestions? Learners must weigh the convenience and responsiveness of AI output against their own judgment and broader communicative goals. The division of labor is therefore not fixed. It remains dynamic and contingent, structured by how learners choose to engage with AI systems and how they position these systems within their informal learning practices.

Contradictions play a central role in shaping how AI-IDLE evolves. CHAT views contradictions not simply as conflicts or barriers but as historically accumulated tensions that can drive development and innovation (Engeström, 2001; Engeström & Sannino, 2011). In AI-IDLE, such tensions may arise when institutional policies restrict the use of generative AI for assignments, while learners continue to experiment with these tools informally to support writing practice. Another contradiction emerges when community expectations emphasize the importance of authentic human communication, yet learners rely on AI chatbots for oral practice because of their availability and lack of judgment. Contradictions can also be embedded within the tools themselves, for instance, when AI-generated essays reproduce formulaic structures or cultural biases that conflict with learners' goals of developing authentic academic or intercultural competence. These frictions compel learners to proactively negotiate strategies, reinterpret rules, or recalibrate their goals, thus reconciling the tensions for L2 development opportunities. On this ground, rather than undermining learning, contradictions act as catalysts that encourage learners to reflect critically, refine their approaches, and expand the scope of AI-IDLE practices.

Seen in this way, contradictions should not be analyzed in isolation but in relation to how **the entire activity system** functions as an interconnected whole. The subject (learner) brings motivations and dispositions to the process, orienting actions toward the object of L2 English development. This pursuit is mediated by tools such as generative AI platforms, shaped by explicit and implicit rules, and embedded within communities that validate, contest, or reinterpret learner practices. The division of labor further redistributes responsibilities, as AI systems take on roles once held solely by human interlocutors or teachers, requiring learners to renegotiate their own positions. When contradictions arise, for example, when AI feedback contradicts institutional guidelines or community norms, they reverberate across the entire system, compelling adjustments in how tools are used, how rules are interpreted, and how goals are pursued. By integrating PLLT into this systemic frame, the model highlights that such adjustments are not passive responses but proactive acts of agency: learners anticipate problems, plan alternative strategies, and redesign their pathways to learning. In this sense, contradictions become sites where agency and structure meet, driving the evolution of AI-IDLE as both an individual practice and a sociocultural phenomenon.

Taken together, this integrated model of AI-IDLE captures both sociocultural complexity and individual proactivity. From CHAT, it inherits sensitivity to mediation, community, and systemic contradictions. From PLLT, it incorporates the recognition that learners anticipate, plan, and regulate their actions in ways that actively shape the system. The novelty of the model lies in its demonstration

that learning is neither solely a matter of adapting to systemic conditions nor entirely about autonomous initiative. Rather, it is the interplay of systemic mediation and proactive engagement that defines AI-IDLE.

4 The Antecedents and Outcomes of AI-IDLE

While research explicitly framed under the label AI-IDLE remains limited, a growing body of scholarship on learners' self-directed use of AI and related digital practices provides an empirical basis for understanding this emerging domain. These studies vary in terminology and theoretical orientation, yet they consistently show that learners are turning to generative AI tools beyond formal classrooms to support their L2 development. The purpose of this section is therefore to synthesize existing evidence on the antecedents associated with learners' out-of-class engagement with AI for English learning and the outcomes linked to such practices. It is important to note that most of the studies reviewed here were not conducted within the PLLT × CHAT framework proposed in [Section 3](#). Rather than imposing this newly articulated model onto prior research, we draw on it as a conceptual lens that helps interpret patterns in the literature and situate them within a broader theoretical landscape. In this way, [Section 4](#) maps the current empirical terrain, while the framework developed earlier provides a grounding structure for understanding how these findings may cohere within a more integrated account of AI-IDLE.

4.1 Antecedents of AI-IDLE

4.1.1 Cognitive Antecedents

Cognitive antecedents are among the most consistently identified predictors of learners' involvement with AI-IDLE. At the core is how learners perceive the affordances of AI tools, namely, whether they see them as flexible, useful, and capable of supporting their individual goals. Studies have shown that learners' recognition of personalization and adaptability in generative AI strongly shapes their willingness to integrate these tools into informal learning practices (Liu et al., 2025; Wang & Wang, 2024; Wu & Wang, 2025). For instance, Li et al. (2024) found that learners adopt ChatGPT or similar systems because they perceive them as responsive partners that can tailor explanations, adjust difficulty, and align with their knowledge level or interests. Such perceptions represent proactive cognitive evaluations: learners do not passively accept AI tools but assess their potential to create opportunities for self-directed engagement. Gao and Du (2026) adopted a person-centered latent profile analysis approach to examine how distinct emotional patterns in AI-IDLE are associated with learners' emotion regulation strategies and perceived AI affordances. By

demonstrating that adaptive regulation strategies such as cognitive reappraisal predict membership in more positive emotional profiles, their study highlighted the role of self-regulatory processes as key learner-internal capacities shaping engagement with AI tools. In this sense, it contributes to understanding cognitive antecedents of AI-IDLE by foregrounding self-regulation-related mechanisms that influence how learners interpret and act upon AI-mediated affordances.

At the same time, CHAT reminds us that these cognitive acts are not isolated mental processes but are mediated by the tools themselves (Engeström, 2001). AI systems embed design choices, biases, and constraints that shape learners' evaluations of usefulness and ease of use. Research grounded in the technology acceptance model supports this perspective, showing that perceived usefulness and ease of use are strong predictors of adoption in AI-mediated informal learning (Dizon et al., 2025; Liu & Ma, 2024). These variables can be reframed as the cognitive basis of proactivity, as learners normally evaluate whether a given AI tool lowers barriers to action, whether it enhances the return on their efforts, and whether it aligns with their objectives within the activity system. When these conditions are met, learners are more likely to invest time and effort in sustainable AI-IDLE practices.

4.1.2 Affective Antecedents

Affective factors are central drivers of AI-IDLE, influencing not only whether learners adopt AI tools but also the extent to which they sustain their engagement over time. Research has shown that learners who maintain high motivation and experience positive emotions such as enjoyment or reduced anxiety are more likely to continue using AI tools beyond initial encounters, integrating them into regular study routines and everyday practices (Haristiani, 2019; Liu et al., 2024; Tram et al., 2024; Wang & Li, 2024). These affective states, therefore, act as critical antecedents that energize and sustain proactive learning behaviors. Specifically, motivation consistently emerges as a strong affective predictor of AI-IDLE practices. Learners with promotion-focused goals, such as preparing for future professional communication or intercultural encounters, are more inclined to explore the creative and generative potential of AI tools compared to those motivated mainly by exam requirements (Lee & Cho, 2025; Liu et al., 2024). This type of forward-looking motivation fosters proactive planning and deliberate exploration, encouraging learners to design tasks, frame prompts, and test responses in ways that align with long-term goals. At the same time, motivation is rarely individual in isolation. It is reinforced or constrained by the rules and communities learners

operate within. By way of illustration, institutional policies may channel motivation toward or away from AI (Polyportis & Pahos, 2025), while peer groups that share prompts and feedback can amplify enthusiasm and broaden the scope of engagement (Wang et al., 2025).

Enjoyment and confidence play an equally important role in sustaining AI-IDLE practices. When learners find AI interactions entertaining or creatively stimulating, they are more likely to embed short, playful exchanges into their everyday lives (Tram et al., 2024). Enjoyment transforms what might otherwise feel like a learning task into a habit that supports consistent exposure and practice. It also strengthens learners' capacity to regulate their effort, helping them sustain engagement even when tasks become demanding. However, it should be noted that enjoyment too is socially mediated (Gajadhar et al., 2008). It can be amplified when learners share humorous, playful, or creatively generated AI outputs with peers, turning individual experiments into moments of collective fun and validation that strengthen group cohesion. At the same time, it may be diminished when institutional discourses frame AI use as illegitimate, risky, or academically dishonest, creating a sense of stigma that undermines learners' willingness to take pleasure in such activities. In these cases, what could have been a source of enjoyment and motivation becomes tinged with hesitation. Similarly, confidence in learning the target language sets important conditions for learners' agentic use of AI for informal language learning. Research has suggested that learners with high confidence beliefs in learning a foreign language are more willing to experiment, adapt, and persevere when outputs are imperfect or when tasks require more sophisticated prompting (Huang et al., 2024; Liu & Zhao, 2025). In this sense, confidence enables learners to trust their own judgments in evaluating AI responses, sustaining self-regulation, and encouraging cycles of planning, monitoring, and adjustment. By contrast, those with lower confidence may often avoid sustained use, particularly if community norms or institutional rules position AI use as difficult, illegitimate, or risky.

In addition to enjoyment and confidence, anxiety in real-life learning environments has been shown to encourage AI-IDLE adoption, especially among learners who struggle in high-stakes or face-to-face communicative settings (Chang & Sun, 2024; Cong-Lem et al., 2024; Haristiani, 2019). This is because AI tools provide judgment-free, low-pressure environments where learners can practice language without fear of negative evaluation (Moorhouse & Wong, 2025). This buffering effect is especially significant for learners with high communication apprehension, as it allows them to build fluency and confidence incrementally before transferring skills to real-world contexts. Yet this affordance is not without tension: learners may still feel conflicted if institutional

policies label such practices as inappropriate. On this ground, these affective antecedents highlight how emotions and motivations are intertwined with community influence and the broader normative structures. Learners' willingness to persist with AI-IDLE arises not only from their individual drive but also from the ways in which their emotional energies are supported or constrained by the social environments in which they operate. Motivation provides the initial momentum for sustained engagement, while enjoyment channels that effort into a rewarding habit. Confidence strengthens resilience in the face of challenges, and reduced anxiety lowers psychological barriers to participation. Together, these intertwined affective forces shape the psychological conditions under which learners engage with AI proactively and strategically in their pursuit of L2 English development.

4.1.3 Sociocontextual Antecedents

Sociocontextual factors shape not only who engages in AI-IDLE but also how such engagement unfolds in practice, because learners do not interact with AI tools in a vacuum and their experiences are filtered through broader social, cultural, and institutional environments that condition opportunities and constraints (Burris & Leander, 2024; Darwin, 2025a). Prior studies have revealed that age, cultural background, and prior language proficiency each influence the extent to which learners can experiment with and benefit from AI-mediated informal practices (Dizon, 2024; Liu & Zhao, 2025; Van Horn, 2024). For example, younger learners who are open to digital technologies may be more willing to test out new AI platforms, while more advanced learners may adopt them for complex, creative purposes. These learner characteristics may often intersect with the wider sociotechnological environment to shape participation in an AI-infused learning world.

Another crucial antecedent concerns the availability of AI tools and learners' access to resources. Students in resource-rich environments, supported by stable internet connections and institutional subscriptions, are likely to face fewer obstacles than those in under-resourced settings, where limited access to premium AI models curtails learning opportunities (Bentley et al., 2024; Edmett, 2025). This reality is captured in Liu and Darwin's (2026) case study of two Chinese female undergraduates, Chen and Natalia.

Chen, who grew up in a middle-class family with ample cultural, material, and social resources, was able to bypass initial barriers and engage meaningfully with ChatGPT. She crafted targeted prompts and developed personalized chatbots, investing in the identity of a competent L2 English learner and skilled AI user. Natalia, by contrast, came from a small rural town and, despite her

strong interest in AI, could only access “*灵心AI*” (Lingxin AI), a WeChat-based application powered by the ChatGLM model and advertised as free to the public. Yet, compared with ChatGPT, Lingxin AI was hampered by limitations in platform design, screen size (as it can only be accessed through mobile devices), memory capacity, and processing speed, which often resulted in frustrating and discouraging user experiences. Consequently, the two students invested in sharply contrasting digital literacy practices that afforded them unequal opportunities for English learning beyond the classroom. These disparities suggest how access to technological tools and infrastructures, often taken for granted, constitutes a decisive sociocontextual factor shaping AI-IDLE practices and experiences.

Beyond the issue of access, learners’ digital literacy or competence functions as an antecedent that cannot be overlooked. A growing body of literature has corroborated that learners who have the capacity to navigate digital environments, customize prompts, and manage multimodal features are better positioned to integrate AI into their learning routines (Hidayat-ur-Rehman, 2024; Liu & Zhao, 2025; Wang & Li, 2024). Conversely, those with limited digital competence may feel overwhelmed by the pace of technological change, thus reinforcing inequities in who can meaningfully benefit from AI practices. Importantly, the competence to read, write, and communicate with AI is not a fixed trait but emerges through ongoing participation (Leander & Burriss, 2020). Exposure to supportive communities, peer modeling, or teacher guidance can gradually strengthen learners’ digital competence, allowing them to overcome initial uncertainty and take fuller advantage of AI affordances. Over time, these accumulated practices can transform digital competence from a peripheral skill into a central resource that sustains learners’ autonomy and exploration of the “AI wilderness” (Alm, 2024). In this sense, digital competence not only enables participation but also mediates the depth and quality of learners’ proactive engagement with AI-IDLE.

Finally, sociocultural conditions can also exert a strong influence on how learners adopt and sustain digital practices like AI-IDLE, as explicit institutional policies, implicit cultural norms, and peer expectations together shape whether learners feel empowered or constrained in their use of AI (Jiang et al., 2025; Jin et al., 2025). For example, policies that restrict AI in coursework often discourage learners from experimenting openly, leading to what Giray terms “AI shaming” (Giray, 2024), while peer groups that circulate prompts or share evaluation strategies can help normalize and legitimize AI use. These conditions do not simply permit or prohibit adoption; they actively mediate how learners perceive the legitimacy and value of their engagement. Such influences can either foster a climate of curiosity and experimentation or generate

hesitation and avoidance, depending on whether AI practices are culturally sanctioned or stigmatized. In this sense, learners' willingness to use AI is always positioned within broader sociocultural environments that validate, contest, or stigmatize their practices, and their trajectories of AI-IDLE are inseparable from these evolving norms and discourses.

4.2 Outcomes of AI-IDLE

4.2.1 Linguistic Outcomes

The integration of AI tools into informal learning contexts has demonstrated notable impacts on learners' linguistic development across multiple domains of L2 proficiency. Research points to consistent gains in reading comprehension (Pan et al., 2025), writing performance (Aladini et al., 2025), and oral communication skills (Wang et al., 2024; Zou et al., 2024), as well as improvements in standardized test performance such as TOEIC scores (Hsu et al., 2023). Furthermore, engaging learners with the AI-mediated learning environments is able to reinforce foundational aspects of language development, including grammatical knowledge (Haristiani & Rifai, 2021) and vocabulary expansion (Liu et al., 2025; Wang et al., 2025).

Among the reported skills, speaking ability emerges as one of the most prominent areas of improvement, especially given how AI tools respond to a long-standing limitation in foreign language education, namely, the scarcity of opportunities for personalized oral practice (Chen & Goh, 2011). Studies have documented that AI-powered speech recognition and conversational agents can foster measurable gains in English pronunciation accuracy, often by highlighting phonetic subtleties that are difficult to address in group-based instruction (Wang et al., 2024; Zou et al., 2024). Importantly, the multimodal nature of AI platforms, which combine textual, auditory, and visual modalities, supports integrated speaking development that includes not only pronunciation and grammar but also fluency, coherence, and pragmatic appropriateness (Jeon & Lee, 2024). Furthermore, AI tools reshape the conditions of speaking practice by providing judgment-free environments where learners can rehearse without fear of embarrassment. This has been shown to reduce performance anxiety and encourage experimentation, especially among learners reluctant to speak in front of teachers or peers (Celik et al., 2025; Haristiani, 2019). Gamified features embedded in some AI-powered learning platforms like Duolingo further increase engagement, turning speaking practice from a high-stakes task into an enjoyable activity that learners willingly pursue in their free time (Liu et al., 2025; Zou et al., 2024). In this way, AI-IDLE facilitates not only skill acquisition but also greater persistence in oral practice, a key driver of their long-term linguistic improvement.

In the domain of writing, AI-IDLE likewise provides learners with scaffolding that extends beyond correction. Generative AI systems allow learners to explore paraphrasing, experiment with different registers, and practice genre-specific conventions (Moorhouse & Wong, 2025). When learners critically compare their own drafts with AI-generated outputs, they engage in contrastive reflection that sharpens awareness of form and meaning. This iterative process, over time, is able to help learners refine stylistic flexibility and genre awareness.

Also noted is that the linguistic outcomes of AI-IDLE demonstrate both continuity with and divergence from traditional IDLE. While earlier informal learning activities, such as online gaming or social networking, emphasized incidental exposure, AI-IDLE foregrounds targeted feedback and adaptive scaffolding that are personalized to individual needs. Learners thus are able to develop broader repertoires spanning accuracy, fluency, and pragmatic nuance while at the same time facing the challenge of critically evaluating system-generated input (Liu, Lee, et al., 2025). The extent to which these benefits translate into sustainable linguistic growth depends on how learners balance proactive engagement with reflective judgment in their interactions with AI tools.

4.2.2 Cognitive Outcomes

Cognitive outcomes in AI-IDLE are closely tied to the mental processes, strategies, and regulatory mechanisms that learners employ when interacting with AI technologies for L2 development. This is because generative AI tools can also open up opportunities for sharpening learners' cognitive engagement with the learning process by fostering reflection, problem-solving, and adaptive strategy use (Tram et al., 2024). Through constant interaction with AI, learners are prompted to monitor their own performance, test alternative formulations, and critically evaluate responses, processes that strengthen metacognitive awareness and facilitate more autonomous learning (Haristiani et al., 2021; Van Horn, 2024).

One of the most frequently observed outcomes relates to improved awareness and deployment of higher-order cognitive processing. For example, AI-mediated feedback has been shown to help learners refine their writing strategies, including organization, style adjustment, and genre awareness (Yuasa & Takeuchi, 2024). Similarly, engagement with AI tools fosters greater self-regulation, as learners must decide when and how to integrate system-generated suggestions into their own practice (Aladini et al., 2025). These iterative cycles of planning, monitoring, and revising echo the proactive behaviors emphasized in PLLT, positioning learners as intentional agents who regulate their progress rather than relying

solely on teacher direction. At the same time, the multimodal and interactive qualities of AI provide contexts that demand higher-order cognitive processing (Sun et al., 2023). Learners who engage in dialogue simulation or multimodal feedback environments must attend not only to linguistic form but also to pragmatic appropriateness, discourse coherence, and intercultural nuance (Jeon & Lee, 2024). Such affordances can push learners toward deeper levels of engagement, requiring them to analyze, adapt, and strategically recalibrate their language use in ways that extend beyond rote practice.

However, cognitive benefits are not automatic. Some learners may fall into patterns of surface-level engagement by uncritically accepting AI outputs, thereby bypassing opportunities for deeper cognitive analysis and reflection (Cong-Lem et al., 2024; Yankouskaya et al., 2025). The convenience of instant responses may also reduce perseverance in problem-solving if learners default to AI support too quickly. In such cases, AI-IDLE risks functioning more as a shortcut than as a catalyst for cognitive growth. The distinction between meaningful and superficial engagement underscores the centrality of learners' critical digital literacies, as cognitive gains are most robust when learners treat AI as a collaborative partner rather than a source of ready-made answers (Darvin, 2025b).

4.2.3 Affective Outcomes

Affective outcomes are a particularly impactful dimension of what learners can benefit from AI-IDLE. Emerging evidence suggests that engaging with AI in informal learning contexts can generate a wide range of affective benefits. Learners report greater enjoyment in their language use (Aladini et al., 2025), heightened confidence in speaking (Van Horn, 2024), reduced anxiety in communicative situations (Tai & Chen, 2024), stronger willingness to initiate interaction (Wang et al., 2024), and more positive orientations toward long-term L2 learning (Har & Ma, 2023). These gains matter because they help dismantle common psychological barriers (e.g., fear of errors, low self-assurance, or apprehension during spontaneous exchanges) that often limit active participation in formal classroom settings. By offering low-pressure environments where learners can experiment and take risks without fear of judgment, AI tools create new affective conditions that make sustained engagement more possible.

A particularly noteworthy dimension involves the reciprocal relationship between motivation and AI-IDLE practices. On the one hand, initial motivation levels shape whether and how learners choose to engage with AI platforms. On

the other hand, sustained interaction with these technologies can enhance, reframe, and even reconfigure motivational constructs over time (Jiang et al., 2025; Liu et al., 2024; Zhang et al., 2024). For example, in AI-mediated informal learning contexts, seemingly small achievements (e.g., sustaining a simulated conversation without breakdown) can become powerful motivational triggers. These experiences of success, occurring in low-stakes and self-directed settings, can help learners envision themselves as competent and confident L2 users, thereby crystallizing their ideal L2 self. Over time, such positive reinforcement not only sustains but also reshapes motivation, encouraging learners to re-engage with AI tools in more ambitious and creative ways. Moreover, the adaptive and personalized nature of AI systems strengthens intrinsic motivation by satisfying learners' needs for autonomy, competence, and relatedness (Wu & Wang, 2025). These affective dynamics align with Dörnyei's (2009) L2 Motivational Self System, which highlights how the L2 learning experience can be shaped by situational motives. In this way, AI-IDLE not only sustains existing motivation but also creates new motivational trajectories, embedding affective reinforcement into the daily routines of language learners.

5 Case Studies of AI-IDLE

Although large-scale surveys and controlled experiments have begun to clarify patterns in AI-IDLE (Guan, Li, et al., 2024; Liu et al., 2024), they often fail to capture the complexity of how learners actually negotiate opportunities, constraints, and aspirations in everyday practice. Case studies, therefore, provide an important complementary perspective by situating informal learning practices within the lived realities of individual learners (Sauro, 2022). Rather than treating engagement with AI as a uniform process, the case narratives are able to illuminate how learners' social backgrounds, institutional environments, and technological access interact with their own proactive choices. Such accounts help us to see AI-IDLE not as a monolithic phenomenon but as an assemblage of situated practices that evolve dynamically across contexts.

It is on this ground that this section presents three cases to elaborate on the uneven but diverse ways in which AI-IDLE is taken up globally. The three cases were carefully selected in our prior research projects to represent a range of sociocultural contexts (see Table 2 for details). The first case comes from China, where a female university student from a middle-class background negotiates access to different generative AI platforms beyond the classroom. The second case draws attention to the context of South Korea, where AI-IDLE unfolds against the backdrop of advanced technological infrastructures and widespread

Table 2 Demographic and contextual profiles of the three cases.

Case	Age	Gender	Country/ region	Educational level	Socioeconomic background	AI access conditions
Chen	Twenty-one	Female	China (Beijing)	3rd-year undergraduate (English Translation major)	Urban middle-class; parents highly educated civil servants	Access to domestic and international AI platforms via VPN, subscription, and transnational networks
Hyun-sung	Twenty-five	Male	South Korea	Final-year undergraduate (Business major)	Middle-class; rural upbringing	Open access to multiple AI tools (ChatGPT, Grammarly, ELSA, QuillBot); strong digital infrastructure
Joey	Fifteen	Female	Indonesia (Yogyakarta)	Secondary school student	Modest middle-class; limited financial resources	Access to free/low-cost AI tools via shared smartphone/tablet; intermittent internet

AI adoption. The third case focuses on a teenager from Indonesia, where access to high-quality AI platforms and resources is comparatively limited. The following subsections present the three cases in detail.

5.1 The Case of Chen

5.1.1 Background and Learning Context

Chen, a third-year undergraduate majoring in English Translation at a prestigious university in Beijing, embodies the profile of an urban middle-class student whose upbringing was saturated with educational privilege. Both of her parents are senior civil servants, with her father holding an MA in Chinese literature and her mother a BA in English. From childhood, they emphasized the value of English linguistic competence and academic excellence, ensuring Chen received years of private tutoring and exposure to English-language media. The family home was filled with books, foreign films, and access to international news outlets, cultivating her confidence in navigating multilingual and multicultural spaces well before entering university. By the time she began her undergraduate studies, Chen was already proficient in English and had scored highly in the *gaokao* (national college entrance examination), which secured her admission to one of China's top-tier universities. Her class background provided not only financial stability but also the cultural and symbolic capital necessary to view English learning as both a necessity and a natural extension of her academic trajectory. With a monthly allowance of approximately 3,000 RMB (around 415 USD), she could easily afford subscription-based digital platforms without financial strain.

At the institutional level, Chen's university had begun to issue guidelines on the integration of generative AI into students' academic and professional development since late 2022. Several documents stressed that AI tools could be valuable for language learning and personal growth if used responsibly, while at the same time prohibiting their misuse in plagiarism or wholesale text production for graded assignments. However, implementation of these guidelines was uneven. Chen shared that many of the instructors lacked the skills to model effective AI use in class, and enforcement of rules varied across departments. Within this context, Chen and her peers developed a relatively permissive culture of experimenting with AI for informal and extracurricular purposes. The overall stance of her university was therefore pragmatic rather than prohibitive: students were encouraged to explore AI's potential, provided they did so ethically and with awareness of its limitations.

5.1.2 Negotiating Access to AI Tools

Chen's trajectory into AI-IDLE was not automatic but required deliberate negotiation of technical, financial, and social resources. While her privileged background enabled her sustained familiarity with digital tools and early engagement with Chinese domestic AI platforms (e.g., Doubao, Ernie Bot, and Kimi chatbot), gaining access to international generative AI tools like ChatGPT in China was complicated by infrastructural and sociotechnical barriers. In particular, official access to these AI platforms (e.g., ChatGPT, Claude, Sora) requires stable VPN software, an overseas phone number, and even a foreign-issued credit card. For many Chinese students, these barriers largely limit their experimentation with the international AI tools. For Chen, however, her early digital socialization and class-based advantages enabled her to overcome these obstacles. She had learned to use VPNs in middle school and cultivated an online fluency that made technical navigation less daunting. Her parents' willingness to cover the subscription fees and her existing networks of friends abroad, who provided foreign mobile numbers and credit card access, gave her the material and social means to register quickly and without significant disruption. These negotiations suggest how Chen's negotiation of AI practices was scaffolded by intersecting forms of capital. Financially, Chen could afford the recurring subscription costs and maintain reliable VPN services. Culturally, she had the digital competence and procedural knowledge to set up accounts, troubleshoot connectivity issues, and customize platform settings. Socially, she drew on transnational peer networks to bypass national restrictions. In this sense, her access was not simply a matter of downloading an app but an active orchestration of resources that reflected both her privileged positioning and her proactive disposition toward technology.

Once established, Chen's access expanded to include other emerging AI platforms beyond ChatGPT. She experimented with multimodal tools such as Sora for video-based input and DeepSeek for interactive translation, building a repertoire of AI-mediated environments to suit different learning needs. Her willingness to try multiple platforms demonstrated not only curiosity but also an orientation toward diversifying her learning ecology. Rather than relying on a single tool, Chen selectively mobilized platforms for complementary purposes such as using one for conversational practice, another for writing enhancement, and yet another for exploring multilingual interests.

5.1.3 AI-IDLE in Practice: From English Development to Multilingual Aspirations

With stable access to domestic and international generative AI platforms, Chen gradually integrated them into her everyday routines, experimenting with

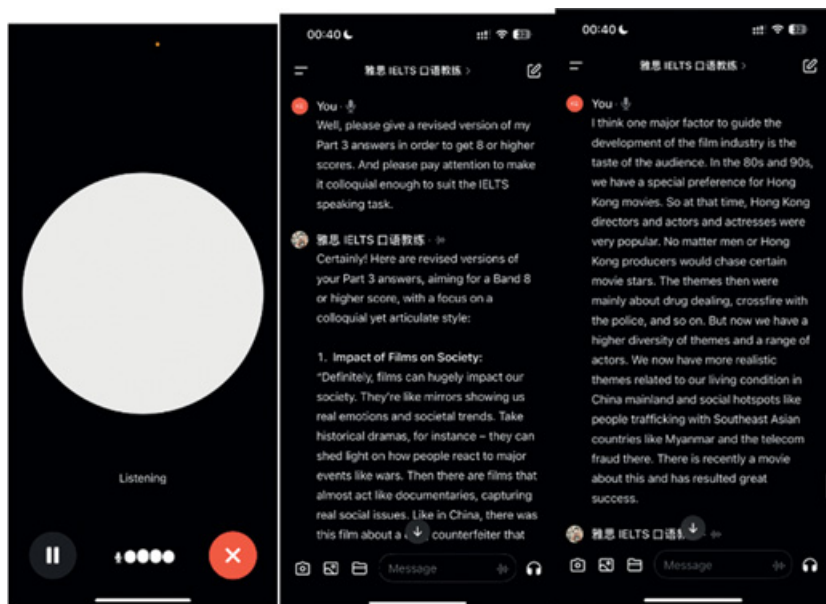


Figure 4 Example of Chen using the ChatGPT mobile application to rehearse IELTS speaking tasks.

a wide range of practices that blurred the boundaries between academic support, language learning, and informal exploration. She made extensive use of different AI platforms' dialogic functions, prompting them to role-play as an oral English examiner, a debate partner, or a peer in casual conversation. For example, as a subscribed user of ChatGPT, she often relied on ChatGPT's voice interaction function to rehearse IELTS speaking tasks (see Figure 4), while also using the tool to investigate subtle differences in English vocabulary, such as distinguishing between closely related terms.

These self-directed simulated exchanges allowed her to rehearse spontaneous responses, refine her pronunciation, and receive targeted feedback in real time. Holding that Claude is better than ChatGPT in terms of its text generation and analysis, she frequently used it as a writing scaffold, asking it to generate genre-specific English text, such as translation drafts, and polished versions of her own English essays, which she then revised critically. Over time, this iterative cycle of prompting, evaluating, and editing strengthened her sense of agency by empowering her to no longer merely consume input but actively co-construct knowledge with AI.

Notably, upon recognizing ChatGPT's affordance of creating personalized chatbots, Chen designed her own customized GPT, *Lingua Friend*, to function as a personal English tutor beyond the confines of formal coursework. She

configured the bot as an instructor capable of delivering contextualized explanations of grammar, vocabulary, and authentic usage, thereby transforming routine interactions with AI into opportunities for personalized, dialogic English practice. The design process itself was a reflective learning experience: Chen experimented with tone, instructional prompts, and response parameters until the chatbot embodied the communicative warmth and pedagogical clarity she sought in a tutor. As her engagement deepened, Chen gradually expanded the scope of *Lingua Friend*, motivated by curiosity and a growing aspiration toward multilingual competence. As she explained during the interview,

The use of AI for out-of-class English learning inspired my interest in exploring AI tools for other languages. I mean, if I can use AI to learn English by myself, then I can also learn other languages in the same way.

Chen, in the interview excerpt, demonstrated that AI-IDLE not only supported her English learning but also cultivated a sense of autonomy and translingual confidence that extended to her broader linguistic goals. As such, Chen updated the instructions of her *Lingua Friend* as “a wise and approachable language tutor specializing in English, French, Japanese, Arabic, Turkish, Greek, and Spanish” (Figure 5). By deliberately crafting a polyglot AI assistant with a friendly, supportive teaching style, Chen not only demonstrated an understanding of how to optimize AI interactions for knowledge construction but also exemplified a proactive and creative form of AI-mediated informal language learning that blended her ambition for multilingual learning and technological fluency in an AI-infused world.

Through these practices, Chen also encountered and negotiated contradictions that reshaped her identity work as a language learner who is able to critically use AI. While AI offered unprecedented immediacy and adaptability, she remained acutely aware of its limitations, such as occasional inaccuracies, cultural biases, and an absence of authentic emotional nuance. Rather than seeing these flaws as failures, she reframed them as opportunities to cultivate critical awareness. For example, when ChatGPT provided awkward translations of Chinese idioms into English, she said that “I often cross-checked its suggestions against bilingual dictionaries and the interpretations of friends who could speak and use English more properly.” She also reflected on how algorithmic knowledge differs from human cultural understanding, noting that “while AI can provide grammatically accurate explanations and broad cultural references, it sometimes fails to capture the emotions and situated meanings that come from our lived intercultural experience.” In

Create

Configure



Name

Lingua Friend

Description

Wise and approachable language tutor.

Instructions

Lingua Friend is a wise and approachable language tutor, specializing in English, French, Japanese, Arabic, Turkish, Greek, and Spanish. She provides comprehensive language learning experiences with a focus on authentic usage and cultural insights. When 'context' is mentioned, she offers real-life examples of the word or phrase in question, ensuring they are correct and culturally authentic. When 'grammar' is mentioned, she analyzes the grammar of sentences or explores the etymology and meanings of words or phrases.

Conversation starters

Can you give me the context for this French phrase?

×

Explain the grammar of this Japanese sentence.

×

What's the etymology of this Arabic word?

×

Show me a real-life example using this Turkish idiom.

×

×

Figure 5 The GPT of “Lingua Friend.”

doing so, Chen positioned herself not only as a consumer of AI outputs but also as a critical evaluator who could discern the tool’s affordances and constraints.

Her AI-IDLE practices thus became closely tied to her identity as a proactive, future-oriented learner. She described herself as someone “living with AI as a companion,” which revealed a vision of herself as both a capable AI user and an aspiring multilingual professional. This positioning was reinforced by her peers, who often sought her advice on effective prompting strategies, further consolidating her identity as a digitally competent and innovative language learner. In the case of Chen, AI-IDLE was not simply about mastering English proficiency but about shaping a broader trajectory of selfhood: one that connected her middle-class educational privilege, her access to cutting-edge technologies, and her aspirations for a globalized, AI-infused future of multilingual communication.

5.2 The Case of Hyun-sung

5.2.1 Background and Learning Context

Hyun-sung, a twenty-five-year-old business major at a local university in South Korea, grew up in a quiet rural town surrounded by rice fields and distant mountains. English, for much of his early life, remained a distant abstraction – something visible on television commercials or the packaging of imported goods rather than a living language. His parents, both middle-class office workers with no overseas experience, conducted all aspects of family life in Korean. There were no English books or magazines at home, no foreign neighbors, and few chances to encounter native speakers. In his small provincial community, English felt disconnected from daily experience.

Hyun-sung's Formal exposure to English began when he entered middle school, where English was taught as a mandatory subject under the national curriculum. Yet instruction was dominated by grammar translation, rote memorization, and test-oriented drills. Teachers were under pressure to complete the textbook and prepare students for university entrance exams, leaving little room for authentic communication. For Hyun-sung, English was a hurdle to clear, not a medium of meaning. However, informal influences gradually seeped in from popular culture. When his father installed satellite TV, he discovered American sitcoms and sports broadcasts that fascinated him despite the language barrier. Later, through YouTube and Korean-subtitled webtoons, he began to pick up rhythm, humor, and expressions that made English sound alive.

A turning point emerged through his passion for drumming. Searching online for tutorials, he encountered English-speaking musicians explaining rhythmic techniques and music production tips. Even though comprehension was partial at first, repeated viewing and imitation helped him internalize technical vocabulary or words like groove, ghost note, or snare dynamics without conscious study. What began as curiosity about music gradually evolved into incidental English learning. By his late teens, Hyun-sung associated English not only with tests but with creative self-expression. This shift in meaning transformed English from an academic requirement into an instrument for connecting with global communities of shared interest. The aspiration to travel abroad followed naturally.

Influenced by YouTube travel vloggers who navigated the world with ease, he began saving money from part-time work and eventually embarked on a two-month backpacking trip across Australia at age twenty. That journey became a watershed moment for his linguistic and personal growth. During his travels across Australia, from Sydney to Melbourne, Adelaide, and the outback, Hyun-sung experienced English as a tool for survival rather than a classroom subject.

He used it daily to order meals, make friends, and share music with fellow travelers from Germany, Japan, and Brazil. The experience transformed his perception of English from a distant goal to a lived practice. Yet upon returning to Korea, the communicative momentum quickly faded. Immersed again in a predominantly Korean-speaking environment, he struggled to sustain the same level of engagement. Attempts to join local English conversation classes proved disappointing because of the large class sizes, scarce speaking opportunities, and expensive tuition fees.

5.2.2 Negotiating Access to AI Tools

Notably, Hyun-sung's access to these AI tools was facilitated by South Korea's highly developed digital infrastructure, affordable high-speed internet, widespread smartphone use, and domestic enthusiasm for educational technology. At the same time, his autonomy in experimenting with AI reflected a broader cultural shift among young Koreans who balance formal test-driven education with self-directed digital exploration. For Hyun-sung, AI provided the flexibility to continue learning informally on his own terms, beyond the institutional boundaries of the university classroom.

Motivated to maintain his fluency in English, Hyun-sung turned to the online world. Around this time, social-media algorithms began promoting videos by Korean influencers who demonstrated the use of AI tools such as ChatGPT, QuillBot, Grammarly, and ELSA Speak for English learning. A video from *Talk To Me in Korean* particularly resonated, illustrating how ChatGPT could simulate real-life dialogue and provide personalized feedback. Feeling pretty intrigued, Hyun-sung created an account and initiated his first session with the prompt: "Can you be my English-speaking partner and correct my mistakes naturally?" The model's immediate and encouraging response contrasted sharply with his classroom experiences, as it corrected errors gently, maintained conversation flow, and never embarrassed him in front of peers.

This safe and adaptive environment rekindled his motivation to use AI. Over time, he diversified his use of AI platforms, treating them as interconnected resources in a self-constructed learning ecosystem. ChatGPT became his conversational partner and job-interview coach; Grammarly served as a stylistic editor; QuillBot refined paraphrasing and lexical variation; ELSA Speak provided real-time pronunciation feedback. He even used Google Sheets to log his interactions, tracking the number of conversational turns, topics, and newly acquired vocabulary.

5.2.3 AI-IDLE in Practice: From Passion for Drumming to Professional Aspirations

As he approached graduation, Hyun-sung began preparing applications for foreign-affiliated companies, a process that demanded professional English proficiency in both writing and speaking. The AI tools that had once supported his informal conversational practice have now evolved into strategic partners for career advancement.

For written communication, he relied heavily on ChatGPT to design a cover-letter template tailored for international business contexts. After studying numerous examples on LinkedIn and YouTube, he synthesized the advice through dialogue with the model, asking it to “help craft a one-page cover letter with a polite, persuasive tone” (see [Figure 6](#)). ChatGPT not only provided an organized template but also explained the rhetorical logic behind each section, such as how to balance self-promotion with cultural humility. When translating subtle Korean expressions of modesty, the AI offered contextualized alternatives rather than literal renderings, helping him sound both authentic and professional. He iteratively revised his drafts through AI feedback, learning to evaluate tone, coherence, and audience expectations. Through this process, he felt he was collaborating rather than merely correcting, which represents a hallmark of self-directed AI-IDLE.

In parallel, he used ChatGPT’s voice mode to simulate English job interviews. Through mobile voice interaction, he practiced real-time dialogue with AI “recruiters,” receiving instant verbal feedback on clarity and fluency. The model’s supportive demeanor (e.g., praising strengths and offering specific phrasing tips) helped him build confidence without fear of judgment. He experimented with multiple voices to mimic different interviewer personalities and recorded his sessions for self-evaluation. In between, ELSA Speak supplemented pronunciation training, and Grammarly fine-tuned his written self-introductions. Together, these tools composed a multimodal AI-mediated environment that integrated listening, speaking, reading, and writing in a seamless cycle.

Over time, Hyun-sung’s engagement with these platforms went beyond functional training and entered the realm of metacognitive reflection. He began to analyze not only what he learned but how he was learning. By comparing the feedback from different AI tools, he noticed variations in tone, focus, and accuracy, which prompted him to consider the biases embedded in algorithmic design. He became more selective in his use of AI outputs, cross-checking linguistic suggestions against authentic business documents and native-speaker models online. Such critical awareness signaled his maturing learner identity as Hyun-sung was no longer a passive consumer of AI-generated language but an

📧 Cover Letter Template – Business/Marketing Role (International Application)

Your Name

Your Address

City, Postal Code

Email | Phone | LinkedIn (optional)

[Date]

Hiring Manager's Name

Company Name

Company Address

City, Postal Code

Dear [Hiring Manager's Name],

I am writing to express my interest in the [Job Title] position at [Company Name], as advertised on [Platform or Source, if relevant]. With a strong background in [your key area—e.g., business strategy, marketing analytics, or brand management], and a passion for [relevant aspect—e.g., global market development or digital communication], I am eager to contribute to your team's success.

In my previous role as [your position] at [your company/university/organization], I [describe one or two strong accomplishments—e.g., developed data-driven marketing campaigns that increased engagement by 25%, managed partnerships with international clients, or coordinated cross-cultural communication projects]. These experiences have honed my skills in [mention key transferable skills—e.g., strategic planning, market research, stakeholder communication, or content marketing], which I believe align closely with your company's mission to [reference something about the company's vision or recent initiative].

I am particularly drawn to [Company Name] because of [specific reason—e.g., its global outlook, innovation-driven culture, or reputation for empowering employees to take initiative]. I am confident that my [academic background/professional expertise/soft skills] and my commitment to [values like teamwork, innovation, or customer focus] would make me a valuable addition to your international team.

Thank you very much for considering my application. I would welcome the opportunity to further discuss how I can contribute to [Company Name]'s goals. I look forward to the possibility of an interview at your convenience.

Yours sincerely,

[Your Full Name]

Figure 6 The screenshot of the AI-generated cover letter provided by Hyun-sung.

informed evaluator who understood the sociotechnical dynamics behind these tools.

Through this sustained engagement, Hyun-sung's AI-IDLE practices reshaped his identity as a learner and professional. What began as a hobbyist drummer's curiosity matured into a proactive pursuit of linguistic and career growth. His journey reflects the synergy between intrinsic motivation

(e.g., curiosity, creativity, and self-improvement) and extrinsic aspirations for employability in global markets. More broadly, it illustrates how Korean learners leverage AI affordances to transcend the rigidities of exam-driven education, reclaiming language learning as a personally meaningful and socially situated act. Ultimately, Hyun-sung's experience exemplifies how AI-IDLE can sustain continuity between past informal interests and future professional goals. By merging the playfulness of his musical beginnings with the pragmatism of business communication, he transformed AI from a novelty into a trusted companion, one that supports not only linguistic competence but also critical awareness, ethical discernment, and agency in navigating an increasingly AI-mediated world.

5.3 The Case of Joey

5.3.1 Background and Learning Context

Joey, a fifteen-year-old secondary school student from Yogyakarta, Indonesia, represents a compelling example of how informal digital learning and AI-assisted practices can nurture strong English proficiency and digital literacy in resource-limited settings. Born into a modest middle-class family, she grew up in a small apartment with her parents and younger brother. Her father worked as a local government employee, while her mother, who had some overseas experience working in Malaysia during her twenties, managed a small online clothing business. Despite limited financial means, her parents valued English as a skill that could expand their daughter's future opportunities.

In Joey's household, English was not framed as an academic subject but as a form of imagination and aspiration. Her mother made conscious efforts to create a small English-rich environment at home, filling the living room bookshelf with second-hand storybooks, donated magazines, and used DVDs. When asked about her earliest memories of English, Joey smiled and said, "I remember the smell of those used books from flea markets – old but magical. I didn't understand every word, but I loved looking at the pictures and pretending I knew what they said." Her mother emphasized exploration rather than memorization: "We didn't have money for tutoring or English courses, so I made sure our house felt like a small English playground." For Joey, English quickly became associated with play, curiosity, and creativity rather than classroom pressure.

Her exposure to English began through cartoons like *Dora the Explorer*, *SpongeBob SquarePants*, and *Barney & Friends*, which she watched with Indonesian subtitles. By grade three, she had become fascinated with fantasy fiction. Her mother found both the Indonesian and English versions of the *Harry*

Potter series, and Joey read them side by side. “I didn’t know what every word meant,” she said, “but I guessed from the story. I liked feeling like a detective.” English music also played a central role in her learning. Her mother’s old CD player became her language laboratory. Joey would listen to songs by Taylor Swift, Avril Lavigne, and Westlife, following the printed lyrics she found online or in magazines. “I sang *Love Story* by Taylor Swift again and again until I could sound like her,” she recalled. “I didn’t realize it was English learning. I just wanted to sing it perfectly.”

5.3.2 Negotiating Access to AI Tools

The digital shift in Joey’s learning began when her family purchased a second-hand desktop computer. Although the internet connection was slow and unstable, the device opened a new window to global entertainment and interaction. At first, Joey used it mainly for playing offline games such as *The Sims 3*, but later she discovered *Minecraft*, which became her favorite. Within this virtual world, she met other players from different countries and quickly realized that English was the shared language of communication. She began using English spontaneously in chat messages and voice exchanges – describing game plans, joking with teammates, and asking for advice on building structures. “In *Minecraft*, I just used English because everyone else did,” she explained. “It didn’t feel like learning; it was just talking.”

Her growing comfort with English extended to other digital spaces. She joined online fan groups discussing movies and books and followed YouTubers who reviewed games or explained science experiments in English. Her mother noticed the change. “She started to talk with confidence,” she said proudly. “Sometimes she used expressions even I didn’t know.” Joey’s informal digital practices (e.g., reading, chatting, listening, and creating) became intertwined, forming the background from which her AI-mediated learning would later develop.

When Joey turned fourteen, her school implemented a Bring-Your-Own-Device policy. Although she did not have a personal laptop, she shared her mother’s smartphone and later used an inexpensive tablet that had been purchased during the pandemic for online classes. It was around this time that she began experimenting with simple AI-based tools. Her first discovery was Google Translate, which she used while reading English fanfiction on Wattpad. At first, she depended heavily on it, but she soon realized that its translations were often awkward or funny. “Sometimes it didn’t make sense,” she said. “So I tried to guess the meaning first and then checked with Google.” This small habit of questioning before accepting became a defining part of her approach to technology.

Her introduction to generative AI came in 2024 when she encountered a YouTube influencer demonstrating how ChatGPT could hold natural English conversations. Out of curiosity, Joey typed, “Hi, can you talk with me in English like a friend?” The AI’s friendly response surprised her. “It replied so kindly,” she recalled. “After that, I talked to it every day.” Using ChatGPT’s voice mode, she practiced speaking about her school day, favorite songs, and even her dreams of traveling abroad. “It never got tired,” she said. “If I made mistakes, it just corrected me softly.”

Joey gradually incorporated other tools into her daily routine. She used Grammarly to check her written assignments, QuillBot to paraphrase sentences, and CapCut to record and edit her English presentations. When preparing a science project, she created a full workflow: reading the textbook in Bahasa Indonesia, drafting the English version with ChatGPT, refining it with Grammarly, rehearsing aloud, and finally recording herself to evaluate pronunciation and timing. Her teacher was so impressed with her fluency that she allowed Joey to deliver the entire presentation in English. Also, several classmates began experimenting with ChatGPT after seeing her example.

5.3.3 AI-IDLE in Practice: From English Learner to Digital Content Creator

By fifteen, Joey’s AI-assisted learning had expanded far beyond classroom assignments. She began to see herself not only as an English learner but as a content creator who could communicate with the world. Her TikTok account, which started as a hobby, soon became a creative outlet where she blended storytelling, technology, and language learning. Her early videos summarized *Harry Potter* plotlines in English, with captions she designed in Canva and video editing done in CapCut. When she felt shy about appearing on camera, she experimented with Synthesia avatars to narrate her scripts. “I just wanted to share stories I loved,” she said, “but people started commenting, ‘Your English is so natural!’ That made me want to keep going.” Encouraged by positive feedback, she diversified her content to include English song reviews, grammar tips, and short skits about cultural differences. Within a year, her channel had over 5,000 followers and more than 100,000 likes. Joey also collaborated with peers from Malaysia, the Philippines, and the United States, creating short dialogue videos using AI-driven tools such as Descript for audio editing and Runway ML for enhancing visuals. These projects allowed her to use English as a means of cross-cultural teamwork rather than a subject of study. “We never met in real life,” she said, “but we laughed a lot while planning and editing our videos.”

Through these creative practices, Joey developed a keen sense of digital authorship. While she appreciated how AI simplified her production process, she was also aware of its shortcomings. “Sometimes ChatGPT’s script sounded too formal,” she noted. “I would rewrite it so it sounded like me.” She spoke thoughtfully about ethical use: “AI should help us, not do everything for us. I still want to think on my own.” Her ability to use AI confidently yet critically reflected a growing digital maturity grounded in experience rather than instruction.

Joey’s story shows how AI-IDLE can emerge even in limited-resource settings when curiosity, persistence, and imagination converge. By combining accessible tools such as ChatGPT, Grammarly, Canva, and CapCut, she turned English learning into a creative pursuit that connected her with audiences far beyond her classroom. Through these everyday acts of participation and creation, she transformed AI from a learning aid into a companion for self-expression, which fosters not only her linguistic skills but also her confidence as a young digital citizen in an increasingly interconnected world.

5.4 Cross Case Analysis

By presenting and analyzing these cases, we aim to reveal that AI-IDLE functions as a situated activity system rather than a homogeneous or purely technological phenomenon. Viewed through the PLLT × CHAT model introduced in [Section 3](#), each learner can be understood as a subject operating within a culturally mediated system, orienting proactive behaviors toward the object of L2 English development while negotiating tools, rules, communities, and shifting divisions of labor. Each learner navigates a distinctive range of social, cultural, and technological conditions, transforming them into opportunities for informal English learning. Through these negotiations, AI-IDLE emerges as a process of continual adaptation in which learners appropriate available tools, exercise agency within constraints, and reshape their linguistic and digital identities across time. What differentiates contexts is not simply the level of access to technology but the ways in which learners perceive the AI-mediated learning affordances and enact autonomy within their sociotechnical structures.

A unifying thread across the three cases is that access to AI-IDLE is not static but actively orchestrated. From a CHAT perspective, access reflects how subjects mobilize mediational tools within structurally uneven conditions. Chen mobilizes various forms of capital to negotiate infrastructural and policy barriers, assembling a diverse AI toolkit through VPNs and transnational contacts. Hyun-sung, situated in a technologically advanced environment, draws upon South Korea’s infrastructure to curate AI platforms aligned with evolving

professional goals. Joey demonstrates how AI-IDLE can thrive in resource-limited contexts through persistence and creative recombination of free tools. Across these stories, access emerges not only as possession but as an ongoing act of reorganizing the activity system's mediational resources.

Once access is secured, learners often reconfigure disparate AI-enabled resources into integrated learning ecosystems. In terms of the model, this reflects a dynamic restructuring of the division of labor between humans and AI. Chatbots, writing assistants, pronunciation tools, and video editors are combined to support learners' exploration, rehearsal, feedback, and refinement. While AI automates certain forms of scaffolding, learners assume responsibility for goal setting, evaluation, and strategic adjustment. Agency, in this sense, is not the absence of assistance but the proactive management of mediation, like deciding when to delegate, when to verify, and when to override AI outputs. Such negotiated redistribution of roles illustrates how AI-IDLE reshapes but does not diminish learner agency within the activity system.

Proactivity constitutes the shared motivational and regulatory core of all three trajectories. Chen customized a personalized AI tutor aligned with multilingual ambitions; Hyun-sung tracked, reflected, and recalibrated his goals in his AI-IDLE practices; Joey designs and refines digital content through iterative AI-supported production beyond the classroom. These trajectories closely mirror PLLT's recursive cycle of anticipation, enactment, monitoring, and adjustment. In each case, proactive learning behaviors drive transformation of the object, from discrete tasks (e.g., using ChatGPT to learn vocabulary outside of the classroom) into concrete developmental outcomes (e.g., vocabulary expansion). In this sense, through repeated cycles of regulation and adaptation, learners are able to convert momentary AI interactions into sustained trajectories of growth. Notably, contradictions emerge across all cases as pivotal developmental forces. These contradictions are not incidental obstacles but systemic tensions that catalyze reorganization of activity (Engeström, 2001). For example, institutional ambivalence toward AI compels Chen to define ethical boundaries independently. Her proactive regulation thus transformed contradiction into an opportunity for exploring "the AI wilderness" (Alm, 2024).

Identity development further illustrates this systemic interplay. Chen constructed her identity as a designer of learning environments; Hyun-sung renegotiated his learner identity by reframing English as a professional resource; Joey redefined herself as a digital author. Within the model, identity can be understood as emerging from sustained engagement with the object through mediated action within communities and rules. AI functions not merely as a tool but as a mediational space through which learners reinterpret their aspirations and relationships with the English language. AI-IDLE thus opens up spaces for both

linguistic development and identity work situated within evolving sociotechnical systems.

Furthermore, contextual differences shape how the activity system is configured. Chen's socioeconomic privilege expands her digital repertoire; Hyun-sung benefits from the infrastructural normalization of AI in his learning context; and Joey compensates for material constraints through digital resilience and family support. These differences demonstrate that the structure of the activity system, its tools, rules, and community configurations, varies across contexts, even as learners' proactive attempts remain the driving force. Equity, therefore, cannot be reduced to tool availability alone. It involves enabling learners to develop the literacies and strategic dispositions necessary to reorganize their activity systems productively.

Finally, the three narratives converge on a central insight of the integrated model: productive AI-IDLE arises from the dynamic interplay between systemic mediation and individuals' proactive agency. Learners do not merely adapt to technological structures, nor do they act in isolation from them. Rather, they continuously reshape the activity system through goal-oriented action, critical reflection, and negotiated redistribution of roles. In this way, the cross-case synthesis extends the PLLT $\times$ CHAT framework by demonstrating how subject, object, tools, rules, community, division of labor, and contradictions interact in lived AI-IDLE practices. AI-IDLE thus appears as a dialogic and evolving activity system in which agency and structure co-constitute one another over time.

6 Reimagining Pedagogical Practices for AI-IDLE

If AI-IDLE represents a transformative shift in how language learning unfolds, the pressing question for educators is how to integrate its principles into formal education without losing its flexibility and learner-driven character. The challenge is not to institutionalize informal learning, but to design pedagogical environments that acknowledge, extend, and ethically harness students' existing AI-mediated practices. Doing so requires moving from viewing AI use as an isolated skill to understanding it as part of a larger ecology of language learning, one that bridges classroom instruction, personal experimentation, and digital participation (Godwin-Jones, 2025). Additionally, moving from observation to pedagogy involves a broader reimagining of the roles of teachers, institutions, and learners within this emerging ecology. As illustrated in [Figure 7](#), we highlight several interrelated pathways for supporting AI-IDLE practices in pedagogy. The process begins with epistemic and pedagogical efforts to bridge formal and informal learning spaces, creating channels through which

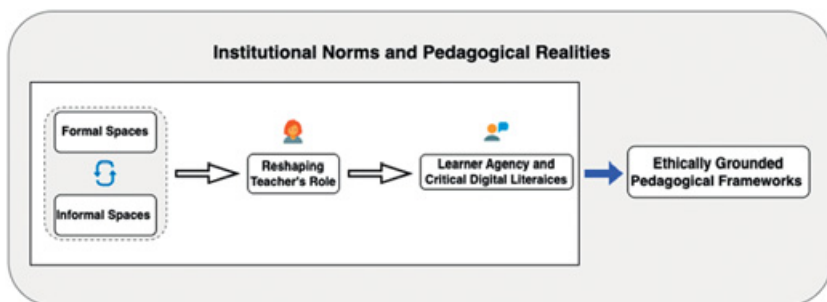


Figure 7 Key pathways for pedagogically supporting AI-IDLE practices.

experiences in one domain can inform the other. Within such a continuum, teachers are encouraged to rethink their professional roles that are not as gatekeepers of knowledge, but as mentors who validate, scaffold, and contextualize students' informal AI engagements as legitimate forms of learning. Learners, in turn, are expected to cultivate individual agency and critical digital literacies that transform technological mediation into opportunities for sustained linguistic and personal growth.

Together, these developments pave the way toward *ethically grounded pedagogical frameworks* in which AI-IDLE becomes an integral component of language education rather than a peripheral or contested practice. Crucially, these innovations must be enacted in ways that align with institutional norms, cultural expectations, and pedagogical realities. Institutions should therefore develop supportive policies, infrastructures, and professional development opportunities that foster equitable, critical, and creative AI use across disciplines. The broader pedagogical objective is not to reproduce AI-IDLE within classroom walls, but to build reciprocal bridges between autonomous experimentation and guided instruction so that both environments mutually reinforce one another. In doing so, educators can cultivate pedagogies that are not only technologically enhanced but also socially grounded, ethically responsive, and attuned to the evolving realities of language learning in the age of AI.

In what follows, we discuss these pedagogical pathways in greater detail and examine how each step contributes to a holistic and sustainable model for integrating AI-IDLE into the formal curriculum.

6.1 Bridging Formal and Informal Spaces

Similar to what has been noted in IDLE-informed pedagogy (Dressman et al., 2023; Lee, 2022b), incorporating AI-IDLE into formal instruction begins with

recognizing the permeability between in-class and out-of-class learning. Many learners already engage with generative AI tools autonomously, crafting prompts, simulating dialogues, or experimenting with feedback loops. However, these informal practices often remain disconnected from curricular aims. Teachers can bridge this gap by legitimizing AI-IDLE as a valuable component of language learning rather than an extracurricular indulgence.

One practical approach is to include AI learning journals in which students reflect on their interactions with AI platforms (e.g., documenting prompts, outputs, and self-assessments) to connect self-directed learning to formal objectives such as vocabulary expansion, genre awareness, or intercultural competence. For instance, teachers might provide a structured journal template prompting students to record (a) the goal of their AI interaction, (b) the exact prompt used, (c) the AI response, (d) the revisions made, and (e) a short reflection on what was learned and what remained problematic. Such structured documentation can translate informal experimentation into analyzable learning data. Similarly, portfolio-based assessment can allow students to showcase outcomes of AI-mediated projects, from AI-assisted essays to chatbot role-plays, thus valuing self-initiated exploration as evidence of learning progress. Teachers may allocate a small percentage of course grades (e.g., 10–15%) to AI-informed portfolio artifacts, thereby institutionally recognizing informal learning without allowing AI to replace core assessment.

To sustain this bridge, teachers can create after-class assignments that deliberately invite learners to engage with AI tools outside class and bring their insights back to collective reflection in the classroom. For example, a writing course might require students to use AI feedback to revise drafts and then analyze which suggestions were accepted, modified, or rejected. This activity can be scaffolded through a “feedback audit” worksheet where students categorize AI suggestions into useful, partially useful, or inappropriate, and justify their decisions using linguistic criteria. Such reflective integration enables students to articulate standards for quality language use while critically evaluating AI mediation. In speaking courses, instructors might design structured AI rehearsal tasks in which students simulate job interviews or debate scenarios with AI before performing them in class. Students could submit short audio recordings of their out-of-class AI practice sessions, along with a reflection identifying specific pronunciation or pragmatic adjustments made. This helps create continuity between private rehearsal and public performance.

Importantly, the key to bridging formal and informal learning in AI-mediated learning environments lies in treating AI-IDLE not as an add-on but as a natural extension of language learning practice. Rather than importing AI wholesale into classroom instruction, teachers can create cyclical pedagogical designs in

which informal AI exploration feeds into classroom discussion, and classroom criteria guide subsequent AI engagement. In doing so, learners are supported in inhabiting the boundary between formal instruction and self-directed exploration in a principled and pedagogically supported manner.

6.2 Rethinking the Teacher's Role

Efforts to bridge formal instruction and informal AI-mediated practices, as discussed in the [previous section](#), inevitably invite teachers to reconsider their professional positioning within this evolving ecology. While bridging strategies can begin with concrete classroom tasks, their sustained implementation requires a deeper shift in how teachers understand their roles. The incorporation of AI-IDLE into the curriculum, therefore, calls not only for pedagogical adjustment but also for a redefinition of teacher identity. In the age of increasingly powerful AI tools, educators can no longer be understood primarily as knowledge transmitters. Rather, they are called to function as AI literacy mentors who model responsible, reflective, and critical engagement with technology (Gentile et al., 2023). This repositioning aligns with contemporary understandings of teacher agency in digital contexts, which emphasize guidance, curation, and ethical mediation instead of simple demonstration of tools (Ashton, 2022). When teachers attempt to connect classroom learning with students' informal AI practices, they must navigate questions of legitimacy, authorship, and appropriate use. Addressing these tensions requires them to engage AI not as external observers but as informed participants in the same sociotechnical environment their students inhabit.

In practical terms, teachers can scaffold learners' AI use by making the logic of generative systems more transparent, discussing the sources of bias and error in outputs, and demonstrating strategies for verifying, revising, or contextualizing AI feedback. In language classrooms, this might take the form of structured prompt-design sessions in which students formulate queries, analyze responses, and compare them against linguistic and pragmatic norms. Such activities do more than introduce technical skills. They would position teachers as mediators who help students interpret and regulate their interactions with AI.

At the same time, rethinking the teacher's role also involves teachers' professional development. Many educators may initially experience uncertainty when confronting rapidly evolving AI tools, especially in contexts where institutional policies remain ambiguous. Rather than concealing this uncertainty, teachers can model reflective engagement with AI by openly examining the affordances and limitations of AI alongside their students. Professional development, therefore, should extend beyond technical training to include

opportunities for collaborative reflection on pedagogical dilemmas, ethical considerations, and shifting classroom dynamics. Peer-learning communities, interdisciplinary workshops, and cross-departmental exchanges can support this process, fostering a culture in which experimentation is accompanied by dialogue and shared responsibility.

Ultimately, redefining the teacher's role is not a preliminary step that precedes bridging efforts but a continued process that deepens and sustains them. As teachers move from implementers of tasks to reflective mentors within AI-mediated environments, they can create the professional conditions necessary for ethically grounded and contextually responsive integration of AI-IDLE.

6.3 Cultivating Learner Agency and Critical Digital Literacies

A central insight emerging from the case studies is that meaningful participation in AI-IDLE depends not on access to technology alone but on the *quality of agency* learners exercise within AI-mediated systems. The case studies also reveal that learners who approach AI as a collaborator rather than as an oracle display higher levels of reflection, adaptability, and sustained motivation. They set goals, plan strategically, monitor their learning, and modify their approaches based on evolving feedback. Cultivating such dispositions requires pedagogies that empower students to act agentively, while also fostering the critical digital literacies needed to critique, question, and reconfigure the technologies they use. Here, we outline four interconnected steps through which learners' agentic abilities and critical digital literacies can be developed and sustained.

Step 1: Fostering Proactivity and Reflective Agency. Learner agency in AI-IDLE is inherently proactive: students must anticipate opportunities, design strategies, and take initiative in managing their learning trajectories. Formal instruction can play a vital role in shaping this capacity by creating structured opportunities for *deliberate autonomy*. For instance, task designs can invite students to use AI tools to explore a linguistic challenge, such as improving argument structure or understanding pragmatic tone, and then reflect on how their choices of prompts, follow-up questions, and revisions influenced outcomes. Through guided reflection, learners become aware of the cyclical nature of proactive learning: planning, enactment, monitoring, and adjustment. However, agency is not simply the freedom to act; it is also the *capacity to act wisely* (Godwin-Jones, 2024; Liu, Lee, et al., 2025). Students must be taught to discern when and how to engage AI effectively. Over-reliance on automated feedback can erode critical thinking, while avoidance of AI deprives learners of valuable scaffolding. Teachers can thus design “metacognitive checkpoints” where learners periodically evaluate the extent to which AI support has

contributed to or limited their independent performance. Such pedagogical structures encourage *reflective agency* that serves as a balance between curiosity and caution, that allows learners to use AI confidently without surrendering their judgment.

Step 2: Building Critical Digital Literacies. Critical AI literacies extend beyond knowing how to operate tools; they involve understanding how algorithms shape knowledge, whose voices are amplified or silenced in data, and how technological mediation affects meaning-making (Darvin, 2025b; Darvin & Hafner, 2022; Liu, 2025a). Within AI-IDLE, these literacies are essential for transforming passive use into critical participation. Classroom interventions can begin with *data awareness tasks*, where students analyze AI outputs to identify patterns of bias, stereotyping, or linguistic homogenization. For example, learners might compare AI-generated descriptions of cultural practices across languages and discuss what the differences reveal about the system's training data. Such activities are able to link linguistic inquiry to broader questions of representation and power, helping learners recognize that language learning through AI is also a form of sociotechnical engagement.

Teachers can further promote critical literacy by embedding *source interrogation* into assignments. When students use AI to generate examples, explanations, or translations, they can be required to trace and verify the information through reputable sources or peer discussions. This habit of triangulation cultivates skepticism and analytical thinking, which are skills indispensable for both language learning and digital citizenship in a world complicated by misinformation and technological uncertainty. Moreover, discussing the limits of AI accuracy and contextual understanding can help further reinforce an awareness that human judgment remains central to meaning-making, even in highly automated environments.

Step 3: Encouraging Ethical and Collaborative Engagement. Agency and critical digital literacies development must also be grounded in ethical awareness and community collaboration. As highlighted in the PLLT x CHAT model of AI-IDLE in Section 3.3, AI-IDLE does not occur in isolation but through participation in shared activity systems governed by explicit and implicit rules. Students' understanding of ethics, authorship, and accountability can be strengthened through class discussions that address real-world dilemmas: Should AI-generated ideas be cited? How much revision by an AI assistant still counts as one's own work? How do learners respect privacy when sharing prompts or outputs online? Through these dialogues, learners move beyond compliance-based ethics toward *situated ethical reasoning*, recognizing that responsibility in AI use is context-dependent and socially negotiated. Collaborative projects can further extend this ethical dimension by encouraging

learners to co-construct AI-mediated outputs. Group tasks that involve comparing AI-generated texts, jointly refining prompts, or designing peer-led tutorials on AI use foster collective reflection on fairness, accuracy, and representation. These practices can help transform learners' critical digital literacies from an individual competency into a shared, dialogic process.

Step 4: Sustaining Motivation through Autonomy and Achievements.

Finally, cultivating agency and critical digital literacies must align with affective dimensions of learning. As earlier sections have shown, AI-IDLE can heighten enjoyment, confidence, and willingness to communicate by offering low-stakes, personalized engagement. Educators can sustain these affective benefits by designing tasks that allow visible progress and authentic accomplishment. For instance, students might use AI to simulate job interviews or generate intercultural dialogues, then perform them in class to reflect on their linguistic gains and emotional confidence. Linking self-initiated AI projects to tangible outcomes can also reinforce learners' sense of ownership and validate their proactive efforts. In the long term, motivation is sustained when learners view AI not as a shortcut but as a partner in their linguistic or even personal development. When classrooms nurture curiosity, reflection, and ethical inquiry, learners begin to see their interactions with AI as integral to their evolving linguistic and digital identities. Such dispositions form the foundation for lifelong learning in an increasingly AI-infused world where agency, literacy, and criticality converge as the hallmarks of the empowered language learner.

6.4 Designing Ethically Grounded Pedagogical Frameworks

An important lesson from AI-IDLE may be that meaningful engagement with AI is always situated within systems of value. Learners' informal practices reveal a desire for autonomy and personalization, but also raise questions of fairness, data privacy, and even authorship. To translate these realities into pedagogy, ethical reflection must be integrated into the very fabric of AI-mediated learning rather than treated as an external constraint. This calls for classrooms where discussions of authorship, originality, and collaboration with AI are approached as inquiries into what it means to learn and create in a digital age. When students analyze and compare AI-generated and self-produced texts, they begin to perceive themselves not as isolated users but as participants in larger sociotechnical systems where human agency interacts with algorithmic design.

Within this ecology, the ethics of AI-IDLE extend beyond questions of individual conduct to encompass issues of *equity and access*. As our case evidence and broader literature indicate, learners differ greatly in their ability to engage with AI depending on socioeconomic background, linguistic

repertoire, and digital competence. Institutions, therefore, play a decisive role in ensuring equitable conditions for AI-mediated learning. Providing open-access platforms, institutional subscriptions, multilingual interfaces, and targeted digital literacy training can help reduce disparities and democratize opportunities for participation. Yet equity must also be epistemic: all learners, regardless of background, should be empowered to critique, adapt, and reshape technologies in light of their own linguistic and cultural realities. On this ground, designing ethically grounded pedagogical frameworks for AI-IDLE involves aligning ethical awareness, pedagogical design, and institutional support. Teachers are encouraged to model reflective and responsible AI use, while institutions establish clear yet enabling policies that legitimize experimentation and protect learners' rights. The goal is not to constrain innovation but to create a sustainable ecology where autonomy, accountability, and inclusion coexist. In this way, ethics becomes the connective tissue that binds together the pedagogical pathways discussed earlier, ensuring that AI-IDLE evolves not only as a site of innovation but also as a practice grounded in fairness, responsibility, and humanistic values.

6.5 Aligning Institutional Policies with Pedagogical Realities

The sustainable integration of AI-IDLE ultimately depends on the coherence between institutional policies and pedagogical realities. While previous sections have emphasized the roles of teachers, learners, and ethical frameworks, these efforts cannot be sustained without institutional environments that enable rather than constrain innovation. Many universities and language programs have begun issuing statements and guidelines on the responsible use of generative AI. Yet, these policies often remain reactive (or framed primarily around plagiarism prevention or academic misconduct) rather than proactive in cultivating constructive, reflective, and pedagogically meaningful engagement.

A more forward-looking institutional stance would recognize AI not merely as a risk to academic integrity but as a potential *partner in learning* when used transparently and critically. Policies should therefore move beyond restriction to clarification, providing concrete definitions of “acceptable use” accompanied by examples of ethical and creative AI-mediated practices. Such clarity can alleviate the uncertainty and hesitation frequently reported by both teachers and students, who may wish to explore AI's affordances but fear institutional repercussions. In tandem, assessment frameworks must evolve to reflect the expanded aims of AI-informed pedagogy by valuing process-oriented outcomes such as self-regulated learning, digital literacy, and reflective engagement alongside linguistic accuracy and content mastery.

This institutional reorientation also requires fostering a culture of collaboration and shared expertise. As earlier discussions have suggested, language educators should not shoulder the challenges of AI integration alone. Partnerships among applied linguists, computer scientists, instructional designers, and educational technologists can generate interdisciplinary resources that enrich classroom practices that provide supportive conditions for learners' involvement in AI-IDLE. Initiatives such as AI literacy workshops, student innovation labs, or collaborative research projects can help normalize critical experimentation and position AI use as an integral part of responsible academic inquiry. When institutional support takes this form, ethical engagement becomes a shared enterprise rather than an individual burden.

Aligning institutional vision with pedagogical realities thus means moving from reactive regulation to proactive cultivation or from compliance toward creativity. In such an ecosystem, teachers are empowered to guide exploration rather than enforce prohibition, and learners are encouraged to engage AI as collaborators in their out-of-class linguistic and intellectual development. Together, these collaborative efforts and ethos form the foundation for reimagining a sustainable AI-IDLE pedagogy that situates technological innovation within a culture of trust, inclusivity, and continuous learning, preparing both educators and learners to navigate the evolving intersections of language, technology, and humanity.

7 Future Directions and Concluding Remarks

The preceding sections have shown that AI-IDLE represents not merely a new learning mode but a profound transformation in how language learning is conceived and enacted. Through the integration of PLLT and CHAT, AI-IDLE has been framed as a socioculturally mediated and tool-driven process in which learners actively navigate AI affordances, social relations, and institutional conditions to advance L2 English development beyond formal classrooms. The literature synthesis and case analyses reveal that learners' engagement in AI-IDLE is influenced by cognitive, affective, and sociocontextual factors and produces multifaceted outcomes spanning linguistic, cognitive, and emotional domains. Most importantly, learners emerge not as passive recipients of instruction or users of tools but as designers of their own learning ecologies who continually negotiate meanings, resources, and identities within AI-infused environments. This epistemic reorientation carries significant pedagogical implications, enabling us to reimagine how to pedagogically design and support AI-IDLE practices in a contextually sensitive and ethically grounded way. Building upon this foundation, we, in the final remarks, look toward the future

landscape of AI-IDLE and propose the key research and methodological priorities to deepen our understanding of this rapidly developing phenomenon.

7.1 The Evolving Ecology of AI-IDLE

As AI technologies evolve at an unprecedented speed, the landscape of AI-IDLE will continue to expand in both scope and complexity. The rise of multimodal, embodied, and context-aware AI systems that serve the goal of artificial general intelligence (AGI) is blurring the boundaries between linguistic, visual, and affective communication, allowing learners to interact with intelligent agents across speech, gesture, and visual expression (see Cong & Mo, 2025). These developments are likely to transform informal language learning environments into immersive and multisensory spaces, where learners co-construct meaning with AI companions, simulate intercultural communication, and engage in real-time feedback loops that mirror authentic social interaction. In this emerging ecosystem, AI will increasingly act as both interlocutor and collaborator as it will not merely provide the target language output but dynamically and automatically adapt to learners' proficiency levels, affective states, and communicative intentions. Such a higher level of personalization has the potential to make informal learning more responsive and individualized than ever before. In such a future, AGI-mediated learning environments may not simply extend today's adaptive affordances but turn AI-IDLE into a symbiotic learning ecology, where human and AI continuously learn from, shape, and recalibrate one another. In such spaces, language learning will no longer revolve around using AI as a tool but around co-evolving with it, which points toward an epistemic partnership that redefines what it means to know, communicate, and learn in a posthuman age (Burriss & Leander, 2024).

At the same time, the diversity of AI-IDLE practices will deepen due to issues of unequal access to technologies and the associated "AI divide" and divergent local discourses about AI use. In well-resourced contexts, learners may integrate multimodal AI platforms seamlessly into their personal routines of language learning and other types of knowledge acquisition activities, while in under-resourced settings, creative workarounds (e.g., such as shared accounts, community-based access, or reliance on open-source models) will continue to define participation in AI-IDLE from the Global South. The spread of AI-IDLE will therefore generate not a single, unified phenomenon but multiple situated forms of learning, each shaped by the interplay of one's material resources, learning aspirations, and the essential educational infrastructures.

Another defining feature of the future AI-IDLE landscape will be the growing importance of critical digital literacies and meta-learning. Learners will

increasingly need to understand not only how to use AI tools but also how these systems learn, adapt, and represent knowledge. This meta-awareness (i.e., understanding the biases, data sources, and design logics underlying AI behavior) will become central to developing critical and creative engagement. As such, AI-IDLE may evolve from a practice of using AI for informal language learning into a broader form of learning with and about AI, where language becomes a medium through which learners explore the epistemic and ethical dimensions of AI itself. Ultimately, the future of AI-IDLE will hinge on how learners, educators, and institutions collectively negotiate this new terrain by balancing the pursuit of innovation with the preservation of human judgment, empathy, and intercultural understanding.

7.2 Research Priorities and Methodological Innovations

As AI-IDLE develops into a more complex, multimodal, but increasingly accessible learning ecology, research must also broaden in scope and design. Much of the current scholarship remains confined to variable-centered, cross-sectional studies based largely on self-report questionnaires. These studies offer initial insight into learners' perceptions and attitudes, but they often treat AI-IDLE as a set of fixed relationships among isolated variables. In many cases, the selection of constructs such as motivation, emotion, or sociotechnical factors appears only loosely connected to an explicit theoretical framework. As a result, the findings tend to show what correlates with what, without clarifying how or why AI-mediated informal learning unfolds as a situated and agentic process.

As such, we emphasize that if the field is to progress, researchers must resist the practice of "*simply playing with variables*" and instead adopt process-oriented and theory-driven approaches that are sensitive to context. The PLLT $\times$ CHAT model outlined in this Element offers one such foundation. It conceptualizes AI-IDLE not as the sum of discrete influences but as an activity system in motion, shaped by learners' proactive orientations, technological mediation, and the sociocultural conditions in which they participate. This perspective calls for longitudinal and multilayered designs that trace trajectories of change rather than capture single moments in time. Multi-sited ethnography and longitudinal digital diary studies, for example, can illuminate how learners' engagement with AI tools fluctuates, stabilizes, or shifts across contexts and over time.

Intervention-based research also deserves greater attention. Carefully designed pedagogical interventions help clarify how formal instruction and informal AI-mediated practices intersect. Instead of merely documenting existing practices, intervention studies can examine, through experimental or quasi-experimental designs, how structured classroom integration (e.g., AI learning

journals, guided feedback audits, or AI-supported rehearsal tasks) shapes learners' agency, self-regulation, and informal language development over time. Such designs can provide stronger grounds for causal inference while offering practical guidance for educators.

Comparative and context-sensitive inquiry is equally important. Much of the literature to date reflects resource-rich and English-dominant environments, leaving underexplored how learners in under-resourced or multilingual settings work within limited access or uneven institutional support. Cross-contextual research, particularly in the Global South (see Liu & Hossain, 2026), can document how learners adapt to infrastructural constraints and negotiate linguistic and cultural resources to participate in AI-IDLE. Without such work, claims about AI-IDLE risk will remain geographically narrow and socially uneven.

Advancing AI-IDLE scholarship finally requires sustained collaboration among applied linguists, computer scientists, learning technologists, and scholars of ethics. Longitudinal inquiry, intervention studies, and contextually grounded case analyses should be viewed as complementary rather than competing approaches. Altogether, they can clarify the mechanisms through which AI-mediated informal learning develops and can be responsibly integrated into educational practice. Only through such coordinated efforts can the field move from descriptive accounts toward explanatory models that reflect the complexity of AI-IDLE in real-world settings.

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Technology in Second Language Education

Glenn Stockwell

The Education University of Hong Kong

Glenn Stockwell has published several books exploring the use of technology in second language teaching and learning. He is Editor-in-Chief of *Computer Assisted Language Learning* and the *Australian Journal of Applied Linguistics*. He is interested in how technology shapes the learning environment from both teacher and learner perspectives.

Yijun Wang

Waseda University

Yijun Wang has published numerous research articles and book chapters in the field of technology and language education, specifically looking at learner and teacher motivation and the development of autonomy. She is currently Editor-in-Chief of *Technology in Language Teaching & Learning* and regularly reviews for multiple journals in the field.

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