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Navigating a World of Informal Digital Language Learning: A Research Agenda

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Abstract

Rapid advances in digital technologies have reshaped how additional languages are learned beyond the classroom, bringing informal digital language learning (IDLL) to increasing prominence in second language (L2) education. Despite its growing importance, IDLL research remains constrained by several persistent limitations, including an English-centric evidence base, limited methodological diversity, and a concentration of research in well-resourced contexts. To address these limitations and advance the field, this paper proposes a research agenda organized around seven key directions, grounded in a six-dimensional conceptualization of language learning beyond the classroom: location, formality, pedagogy, locus of control, trajectory, and digital mediation. Drawing on a comprehensive review of existing research, we identify underexplored areas of IDLL and outline priorities for future inquiry. In doing so, we seek to broaden the conceptual, methodological, linguistic, and contextual scope of IDLL research and provide directions for its continued development in language education.

Keywords: Informal digital language learning; research agenda; computer assisted language learning; language learning beyond the classroom

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Introduction

Global digital transformation has fundamentally reshaped the ways in which languages are learned. Over the past several decades, successive technological shifts, from wired devices in the 1990s and 2000s, to mobile and social media platforms in the 2010s, and more recently to generative artificial intelligence (AI) tools, have progressively extended language learning beyond textbook-centered classrooms and created new opportunities for second language (L2) learning and use (Lee, 2026; Liu & Zhao, 2026a; Soyoof et al., 2023). With digital technologies now embedded in learners' everyday lives, language learning beyond the classroom increasingly draws on a wealth of online resources, including internet memes, music, and short videos, with growing evidence linking such activities to a range of linguistic and non-linguistic outcomes (cf. Lee & Chiu, 2023; Lee & Dressman, 2018; Rezai et al., 2024; Ushioda & Dörnyei, 2017; Zadorozhnyy & Lee, 2025). This growing body of evidence has contributed to the emergence of informal digital language learning (IDLL) as an important area of inquiry within computer-assisted language learning (CALL). IDLL broadly concerns L2 learners' self-directed and autonomous language learning through digital devices and online platforms beyond formal educational settings (Liu & Soyoof, 2026).

As research on language learning beyond the classroom has expanded, researchers have proposed a range of partially overlapping terms to describe such learning practices (see Figure 1). While these terms generally converge on language learning beyond formal educational settings, they differ considerably in conceptual scope. As Figure 1 illustrates, these differences can be understood along four dimensions: whether a definition encompasses non-formal activities (vs. only informal ones), teacher-initiated practices (vs. only learner-initiated ones), "real-world" contexts (vs. only digital environments), and languages other than English (vs. only English). Together, these dimensions produce a continuum of conceptual scope, ranging from broad formulations such as language learning (and teaching) beyond the classroom (Reinders et al., 2022) to more narrowly defined concepts such as online informal learning of English (Sockett, 2011).

Among these terms, informal digital learning of English (IDLE), first conceptualized by Lee and Dressman (2018) and further elaborated by Lee (2022a), has received particularly strong scholarly attention (Liu & Soyoof, 2026). IDLE focuses on learners' self-directed use of digital technologies to learn and use English beyond formal educational settings (Liu, 2024; Liu & Hossain, 2026). With English occupying a prominent position as a global lingua franca (Jenkins, 2006, 2013), IDLE has become the most extensively researched area within the broader field of IDLL (Liu & Soyoof, 2026).



Figure 1. *Terms about Language Learning Outside Formal Educational Settings (Arndt & Kusyk, 2026, p. 2)*

The growing body of IDLE scholarship has contributed to the broader development of IDLL at conceptual, theoretical, and empirical levels. Conceptually, prior research has worked to delineate IDLL from related constructs and clarify its scope (Lee, 2026; Liu & Soyoof, 2026; Sundqvist & Sylvén, 2016). Theoretically, established theories and frameworks have been extended to explain learners' informal digital practices. For instance, Guo and Lee (2023) drew on Bronfenbrenner's (1979) ecological systems theory to examine factors shaping learners' IDLE participation, while Liu and Ma (2024) applied Davis's (1989) technology acceptance model to explain EFL learners' adoption of ChatGPT for IDLE. Alongside these applications of established theories, new frameworks, including Lee's (2022a, 2025) IDLE continuum model and care – innovation –sustainability model, have been developed to conceptualize and inform IDLL practices across educational contexts. Empirically, a growing body of evidence derived from surveys, interviews, and experimental studies has documented diverse linguistic and non-linguistic outcomes associated with IDLL (see Figure 2).

Despite these advances, IDLL research remains uneven in its linguistic and geographical coverage. Most studies continue to focus on English learning in digital environments, leaving languages other than English (LOTEs) and learning in non-digital, real-world contexts comparatively underexplored (Guo & Lee, 2023; Lee, 2026). In a review of 206 publications on informal language learning published between 2000 and 2020, Kusyk et al. (2025) found that English was the target language in 66.4% of the publications, compared with only 7.0% for French and 6.6% for Japanese. Such an Anglocentric evidence base limits our understanding of how informal language learning may differ across languages with distinct linguistic, sociocultural, and digital contexts. A similar imbalance is evident in the geographical

distribution of IDLL research. Many empirical studies have been conducted in relatively well-resourced contexts, including Sweden (e.g., Lee & Sylvén, 2021), South Korea (e.g., Lee, 2019), and Austria (e.g., Trinder, 2017), whereas learners in less-resourced countries and regions remain comparatively underrepresented.

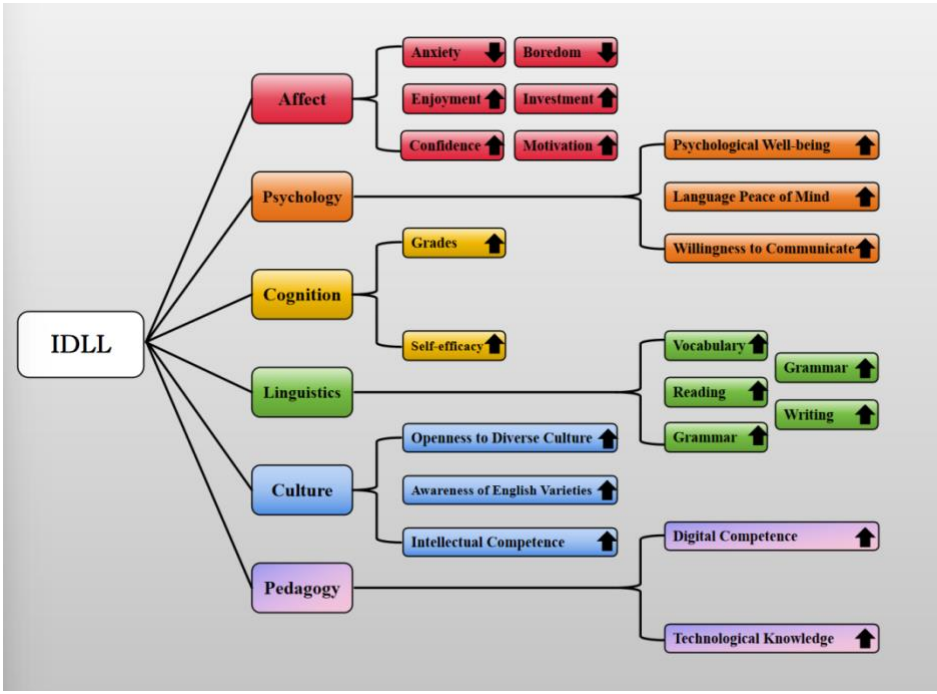


Figure 2. *Benefits of IDLL (Lee, 2026)*

Against this backdrop, this paper develops a research agenda for broadening and advancing IDLL scholarship. Rather than simply cataloguing existing gaps, we identify key areas in which further conceptual, methodological, linguistic, and contextual work is needed and outline directions for future research. The following section first establishes the conceptual basis for understanding IDLL, before turning to seven research directions intended to address persistent limitations in the field and extend its scope.

Conceptual Basis

IDLL builds on more than a decade of research into technology-supported learning in Teaching English to Speakers of Other Languages (TESOL) and second language acquisition (SLA). As this area has expanded, however, it has developed alongside a proliferation of related and partially overlapping concepts, including extramural English (Sundqvist, 2009), out-of-class language learning with technology (Lai & Gu, 2011), and computer-assisted language learning in the digital wilds (Sauro & Zourou, 2019), with no single term encompassing the full range of practices examined in the field (Kusyk et al., 2025). The resulting conceptual overlap can blur important distinctions among different forms of learning beyond the classroom. For example,

equating IDLL with extramural English overlooks distinctions between semi-structured extracurricular practices and less structured extramural practices (Zhang & Liu, 2024). Conceptual ambiguity is compounded by limited theoretical grounding in parts of the literature. Kusyk et al. (2025) reported that 33% of the IDLL studies they reviewed did not specify a conceptual or theoretical framework, a proportion that reached 37% in Soyoof et al.'s (2023) review. A clearer conceptual basis is therefore needed to organize the diverse practices encompassed by IDLL and guide future research. For this purpose, we draw on Liu's (2025b) six-dimensional conceptualization of language learning beyond the classroom as the organizing framework for the research agenda developed in this paper.

Language learning beyond the classroom has historically received less scholarly attention than classroom-based language learning (Benson, 2011). To conceptualize this broad domain and establish a basis for systematic analysis, Benson (2011) proposed an analytical framework comprising four dimensions: location, formality, pedagogy, and locus of control. Benson's (2011) four original dimensions capture complementary aspects of learning beyond the classroom. Location specifies where learning occurs, extending from homes and community spaces to online environments outside the conventional classroom. Formality concerns how far learning is organized within institutional structures and tied to predetermined curricula or assessment. IDLL typically occupies the less formal end of this continuum, although its boundaries with more structured learning practices may remain fluid. Pedagogy, by contrast, concerns the extent and nature of instruction. Benson (2011) conceptualized this dimension as a continuum ranging from self-instruction, where learners intentionally use materials designed for language learning, to naturalistic learning, where language development may arise incidentally through activities not primarily undertaken for learning. Finally, locus of control concerns who makes decisions about the learning process. Compared with formal instruction, IDLL generally gives learners greater control over what, when, where, and how they learn. These four dimensions thus capture the spatial, organizational, instructional, and agentive characteristics of learning beyond the classroom, but they offer a less explicit account of how such learning develops over time and is shaped by digital technologies.

To address these aspects, Liu (2025b) added trajectory and digital mediation (see Figure 3). Trajectory introduces a temporal perspective, drawing attention to how learners' informal practices develop, shift, and sometimes discontinue over time rather than assuming a stable pattern of participation. Digital mediation, meanwhile, captures the constitutive role of technology in shaping what learners can do and how they interact. From this perspective, digital technologies are not simply channels through which existing learning practices are transferred outside the classroom; their affordances can reshape learners' access to linguistic resources, forms of interaction, and opportunities for participation. The two additional dimensions therefore extend Benson's framework from describing the conditions under which learning beyond the classroom occurs to examining how such learning evolves within changing digital environments.

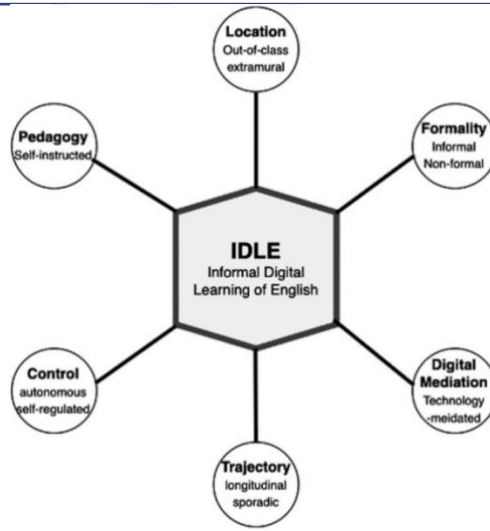


Figure 3. *The Conceptual Basis of IDLE (Liu, 2025b)*

Together, these six dimensions provide a conceptual lens for examining the multiple forms that IDLL can take, reflecting "*the fluid boundaries between formal and informal, individual and networked learning in a rapidly changing digital world*" (Liu & Lee, 2026, p. 6). Importantly, the framework also provides the conceptual bridge between the current literature and the research agenda developed below. By considering where IDLL occurs, how it is organized and directed, how it changes over time, and how technologies shape these processes, the six dimensions help identify areas that have received disproportionate attention as well as those that remain insufficiently examined. The next section builds on this framework to develop seven directions for future IDLL research.

The Seven Research Directions

Promoting Methodological Diversity in IDLL Research

A growing body of research has established IDLL as an important mode of language learning, but understanding what learners actually do in informal digital environments requires methods suited to the conditions under which such learning occurs (Khanh-Quynh & Ngo, 2026; Lee, 2026). Unlike classroom learning, IDLL often unfolds across multiple digital spaces, at irregular intervals, and with limited researcher or teacher oversight. Learners may move between platforms, activities, and purposes, while their practices change over time and remain closely tied to their everyday lives (Lee, 2022, 2026). These characteristics pose a methodological challenge: approaches that capture learners' perceptions at a single point in time may reveal important patterns, but they provide only a partial account of how IDLL is actually practiced and develops. Methodological diversity is therefore particularly important for building an evidence base that reflects the dynamic and context-dependent nature of IDLL (Reinders & Benson, 2017).

Existing research, however, has relied heavily on a relatively limited set of designs and data sources. In a scoping review of 30 IDLL studies, Soyoof et al. (2023) found that 36.7% adopted qualitative designs and 26.7% mixed-methods designs, while questionnaires (46.6%) and interviews (36.6%) were the most frequently used instruments; only two of the nine qualitative studies were longitudinal. Kusyk et al. (2025) similarly reported that 80% of the studies they reviewed were cross-sectional, with questionnaires (35%) and interviews (23%) dominating data collection. Reviewing 103 studies, Guo and Lee (2023) likewise identified questionnaires, interviews, and observations as the most commonly used instruments. This pattern is also evident in Lee's (2022b) review of 76 studies, which showed that methods capable of capturing learning as it occurs, including language logs, computer tracking, stimulated recall, and personal learning histories, were used much less frequently. Taken together, these reviews point not simply to a lack of methodological variety, but to a mismatch between the dynamic character of IDLL and the predominantly retrospective and cross-sectional methods used to investigate it.

This mismatch has several consequences for what the field can claim about IDLL. First, heavy reliance on self-reported data makes it difficult to determine how closely reported practices correspond to learners' actual digital behavior, as participants may inaccurately recall or report the frequency and nature of their IDLL activities (Guo & Lee, 2023; Lee, 2026). Second, cross-sectional designs provide limited insight into how learners begin, maintain, modify, or discontinue informal digital practices over time, and they cannot readily establish the direction of relationships between IDLL and learning outcomes (Kusyk et al., 2025; Soyoof et al., 2023). Relatedly, the widespread use of correlational analyses, including structural equation modeling, has been valuable for identifying relationships among IDLL, learner characteristics, and outcomes, but cannot by itself establish causal effects (Kusyk et al., 2025; Lee, 2026). Third, methods centered primarily on individual learners can overlook the social and ecological conditions within which their practices develop, including family resources, peer networks, educational institutions, and broader technological environments (Guo & Lee, 2023). The methodological challenge facing IDLL is therefore not simply that the field needs more methods. It needs methods that correspond more closely to the temporal, behavioral, and ecological characteristics of the phenomenon being studied.

Decentering English in IDLL Research

Despite its inclusive label, IDLL remains strongly Anglocentric in its empirical and theoretical development. Languages other than English (LOTEs) continue to be substantially underrepresented as target languages (Liu, Zhao, et al., 2024; Sundqvist & Sylvén, 2016). This imbalance is not surprising given the historically privileged position of English in international communication, education, technology, and digital media. The global prominence of English has been shaped by colonial histories as well as contemporary economic and institutional structures, processes examined critically through concepts such as linguistic imperialism (Phillipson, 2008). Consequently, English is often positioned as a necessary linguistic resource, whereas LOTEs may be perceived as optional additions to learners' linguistic repertoires (Lu & Shen, 2022; Takahashi & Harumi, 2026; Ushioda & Dörnyei, 2017). These broader conditions have also shaped the knowledge base of IDLL. Much of what is currently known about IDLL, including its conceptual models, measurement instruments, and relationships

with learner variables such as willingness to communicate, enjoyment, and self-efficacy, has been developed primarily through research on English (Dressman & Sadler, 2020; Guo & Lee, 2023; Kusyk et al., 2025; Liu, Zhang, et al., 2024; Soyoof et al., 2023).

Decentering English, however, requires more than simply replicating IDLE studies with another target language. LOTEs themselves constitute an extremely heterogeneous category. They differ in global and regional status, linguistic distance from learners' existing languages, writing systems, learner populations, and the availability of digital resources and communities. Research on LOTE motivation has likewise concentrated disproportionately on a relatively small group of widely taught, high-prestige languages, particularly European languages taught across Europe, North America, and East Asia (Mendoza & Phung, 2019). Treating all LOTEs as a single alternative to English therefore risks reproducing another form of simplification: evidence derived from French, German, or Spanish cannot automatically represent the experiences of learners of Malay, Khmer, Swahili, or other languages with different linguistic and sociocultural conditions.

One important source of such variation is linguistic distance. Chiswick and Miller's (2005) scalar measure, for example, places Norwegian and Swedish among the languages closest to English, followed by French, German, and Spanish, whereas Vietnamese, Mandarin, Japanese, and Korean are considerably more distant. Such differences may shape informal learning in ways that English-centered models do not fully capture. Learners encountering unfamiliar writing systems, phonological distinctions, morphological structures, or limited lexical overlap may need different resources and develop different patterns of practice outside the classroom. Importantly, however, linguistic distance should not be treated as determining learners' experiences; its effects interact with motivation, prior linguistic knowledge, access to resources, and the social meanings attached to particular languages. Huang's (2019) study of university students in Taiwan learning eight LOTEs across Southeast Asian, Northeast Asian, and European language groups, for instance, showed that intended effort was associated primarily with learning experience, ideal self, and interest in the target-language culture or community. Woore et al. (2026) similarly found differences in the motivational structure of secondary-school learners studying European languages and Chinese in England: perceived language aptitude emerged as a separate motivational component for learners of European languages, whereas learners of Chinese placed greater emphasis on novelty, challenge, and its character-based writing system. These findings suggest that constructs established in English-learning research may remain relevant across languages, but their salience, configuration, and interpretation can vary with the target language and learning context.

The online availability of the target language introduce another important source of variation. Languages differ considerably in the quantity and diversity of online content available to learners, the size and accessibility of digital communities, and their representation in emerging technologies. For widely used languages with large digital ecosystems, learners may readily encounter streaming media, social networking content, online communities, and AI-supported resources. For languages with smaller digital footprints, informal learning may depend on a much narrower range of resources and interlocutors. Liu and Zhao (2026b), for example, note that learners of Malay may encounter constraints related to the availability of subtitled media, online communities, and specialized digital learning resources. The opportunities for IDLL

are therefore partly structured by the digital ecology of the target language itself. This raises questions that are largely invisible when research focuses predominantly on English: How do learners pursue informal digital learning when target-language resources are scarce? Which platforms and communities become particularly important? And how do learners compensate when mainstream digital and AI tools provide uneven support across languages?

Emerging research on LOTEs already indicates the value of asking such questions. Informal digital learning of Chinese (IDLC), in particular, has developed into a growing strand of IDLL research. Zhao, Liu, et al. (2026), studying 519 multilingual learners of Chinese in Thailand, found that shyness was indirectly associated with classroom participation through enjoyment and boredom, while the two emotions were linked to different aspects of the Chinese learning experience. Other work has begun to identify heterogeneity within IDLC itself. A latent profile analysis of 516 adolescent learners of Chinese in New Zealand showed that the relationship between digital competence and IDLC participation differed according to learners' boredom profiles (Zhao, Wang, et al., 2026). Research is also beginning to extend to less commonly taught languages. Liu and Zhao's (2026b) mixed-methods study of Chinese students learning Malay as a third language, for example, identified motivation and self-efficacy as important predictors of their informal digital learning. Although this evidence remains too limited to support broad cross-linguistic conclusions, it demonstrates why English-derived assumptions need to be examined rather than simply transferred to other target languages.

Future research should therefore pursue multilingual expansion in a way that treats target language as theoretically consequential rather than merely as a change of research setting. The empirical base needs to extend beyond both English and the relatively small group of high-prestige LOTEs that currently receive most attention, with greater attention to less commonly taught languages such as Malay and Khmer and to languages with comparatively limited digital resources (Liu, Zhao, et al., 2024; Liu & Zhao, 2026b). Also, constructs and instruments developed in IDLE should be tested for conceptual and measurement equivalence before being applied across languages. Rather than assuming that constructs such as enjoyment, self-efficacy, willingness to communicate, or digital competence function identically, comparative studies can examine which relationships remain stable and which become language- or context-specific (Dörnyei & Al-Hoorie, 2017). Multi-language and same-learner designs would be especially informative because they can help distinguish differences associated with the target language from differences attributable to learner background or educational context.

Decentering English thus means more than increasing the number of LOTE studies. It requires using linguistic diversity to reconsider what IDLL is, how it is practiced, and whether its established explanations travel across languages. Comparative research across languages with different linguistic features, social positions, and digital resources can reveal which aspects of current IDLL knowledge are broadly applicable and which are products of the particular conditions surrounding English. In this sense, LOTEs should not occupy the margins of IDLL research. They provide an important basis for testing and extending the field's theoretical claims.

Examining the Global South in IDLL Research

IDLL research remains geographically concentrated in relatively well-resourced and

technologically connected settings (Liu & Hossain, 2026), including South Korea (Lee, 2019), Sweden (Lee & Sylvén, 2021), and Hong Kong SAR (Liu, Ng, et al., 2024). This concentration matters because access to informal digital language learning is shaped by the material and educational conditions surrounding learners. In many parts of the Global South, digital participation is expanding rapidly, yet learners may encounter uneven connectivity, limited access to devices and paid digital services, and considerable variation in the quality of formal language education (Liu & Hossain, 2026). Evidence derived predominantly from well-resourced settings may therefore capture only some of the conditions under which IDLL occurs.

The Global South, however, should not be understood simply as a geographical category or as a synonym for economically developing countries. It also provides an epistemological perspective for examining how historical, economic, and social inequalities shape whose experiences are represented in knowledge production and whose remain peripheral (McCallum & Tafazoli, 2024; Pennycook & Makoni, 2019). From this perspective, relevant contexts may include not only countries conventionally classified as part of the geographical South, but also marginalized communities and populations within wealthier societies. This distinction is particularly important for IDLL because digital technologies are often assumed to expand access to language-learning opportunities outside formal education. Yet access alone does not ensure comparable opportunities for learning. Learners also need reliable connectivity, appropriate devices, digital literacies, relevant linguistic resources, and online content that they can access and use (Lai & Sundqvist, 2026; Soyoof et al., 2026). IDLL may therefore create new opportunities while simultaneously reproducing existing inequalities. Examining the Global South allows researchers to investigate the conditions under which each possibility occurs rather than assuming that digital access is inherently democratizing.

The limited research conducted in less-resourced contexts already illustrates the importance of attending to the relationship between learner agency and structural conditions. Studies of rural university students in China, for example, have shown how learners who were marginalized in urban educational settings because of their accents and socioeconomic backgrounds used digital spaces to develop alternative identities as legitimate English users and accumulate forms of social and cultural capital that could be carried across online and offline contexts (Liu, 2025a; Liu & Darvin, 2024). In rural Bangladesh, Liu and Hossain's (2026) survey of 508 university students found that IDLL participation was associated more strongly with self-efficacy, enjoyment, and the ideal L2 self than with the demographic and infrastructural variables included in their study. Prior IDLL experience was also related to learners' adoption of AI tools for out-of-class learning. These findings demonstrate that learners exercise considerable agency even under constrained conditions, but they should not be taken to mean that individual motivation or confidence can simply compensate for structural disadvantage. Rather, they raise an important question for future research: how does learner agency interact with unequal access to material, social, and digital resources in shaping IDLL?

This question remains difficult to answer because evidence from the Global South is still limited and unevenly distributed. Existing constructs and instruments have often been developed and validated in comparatively well-resourced educational settings, leaving uncertain whether they capture the conditions and experiences of learners across Africa, Asia, Latin America, and the Middle East (Lee, 2026; Liu & Darvin,

2024). Moreover, considerable heterogeneity exists both across and within these regions. National-level categories can obscure differences between urban and rural learners, socioeconomic groups, educational institutions, and communities with very different levels of digital access. Similar forms of marginalization may also occur within the Global North. Rural and working-class learners in high-income countries, for instance, can experience inequalities in access to digital resources and educational opportunities (Warschauer, 2003). A Global South perspective can therefore direct attention to structural positions and unequal distributions of resources rather than treating national income or geographical location as sufficient explanations of learners' IDLL experiences.

Future research should consequently move beyond simply adding more Global South countries to the existing IDLL evidence base. The more consequential task is to examine how local conditions reshape the processes and outcomes that current IDLL theories seek to explain. This requires, first, greater attention to whether established constructs and instruments are conceptually and culturally appropriate in the settings in which they are used, rather than routinely importing measures developed elsewhere (Pennycook & Makoni, 2019). Locally grounded qualitative work can identify forms of participation, constraint, and learner experience that existing scales may overlook, while subsequent quantitative research can test whether these constructs operate similarly across contexts. Comparative and multigroup studies can then examine variation not only across countries but also across urban and rural settings, socioeconomic positions, age groups, and educational backgrounds (Guo & Lee, 2023; Lee, 2026; Liu & Hossain, 2026).

Research should also examine inequality as multidimensional rather than reducing it to internet access or device ownership. Intersectional designs can investigate how socioeconomic position, gender, geography, educational opportunity, language background, and digital literacy combine to shape who can access particular forms of IDLL and what learners are able to do with that access (cf. Soyoof et al., 2026). Longitudinal and comparative work would be particularly useful for determining whether IDLL reduces some inequalities while creating or reinforcing others over time. Equally important is research on the strategies learners and communities themselves develop under conditions of constraint, including how they appropriate low-cost technologies, share resources, and construct locally relevant digital learning practices.

Examining the Global South, then, should do more than improve the geographical representation of IDLL research. It provides an opportunity to reconsider assumptions derived from well-resourced settings about access, autonomy, learner agency, and the role of digital technology itself. By placing unequal material and social conditions within the explanation of IDLL rather than treating them as background variables, research can better determine when digital language learning expands opportunities, when it reproduces existing inequalities, and why these outcomes differ across learners and contexts.

Interrogating Issues of Digital Inequality in IDLL Research

The growing availability of digital technologies is often assumed to expand opportunities for autonomous language learning, but availability does not imply equal capacity to benefit from those opportunities. Learners differ not only in whether they possess digital devices but also in the resources, knowledge, dispositions, and social

networks that allow them to turn technologies into resources for language learning (Liu, Soyoof, et al., 2025). This distinction shifts the question of inequality from whether learners can access technology to what they are able to do with that access. Two learners using the same platform may encounter very different possibilities depending on their digital literacies, prior experiences, economic resources, and access to knowledgeable others. Inequality in IDLL should therefore be understood not simply as a digital divide between those who are connected and those who are not, but as differences in learners' capacity to convert digital access into opportunities for language learning.

Social class provides an important lens for understanding how these differences develop. Learners accumulate unequal forms of economic, cultural, and social capital through family resources, prior digital socialization, educational experiences, and social networks, which in turn shape how confidently and effectively they navigate informal digital environments (Liu & Darvin, 2026). Economic capital may determine whether learners can pay for subscriptions or premium services; cultural capital can shape their knowledge of which resources are useful and how they should be used; and social capital can provide access to information, assistance, and networks otherwise unavailable to them. These resources are also mutually convertible. A learner with knowledgeable peers or transnational networks, for example, may acquire information about tools and resources that another learner with similar hardware cannot readily access. The inequality at stake is therefore cumulative: advantages established before a particular IDLL activity begins can shape which resources learners encounter, how they use them, and what they subsequently gain from them.

The rapid expansion of generative AI makes these differences particularly visible. Liu and Darvin's (2026) case study, for example, contrasted two learners whose opportunities to use AI for language learning differed despite both having access to digital technologies. Chen was able to access ChatGPT through technical knowledge, overseas payment credentials, and transnational networks and use it as a multilingual learning resource, whereas Natalia relied on a domestic WeChat-based application with character limits, advertisements, and more restricted functionality. The contrast illustrates a layered form of digital inequality: hardware access represents only one level, while platform access, technical knowledge, payment capacity, and social networks determine the quality and range of resources available thereafter. As AI systems increasingly differentiate between free and paid tiers, informal language learning may become further stratified according to who can access more capable models, longer interactions, advanced features, and fewer usage restrictions (Liu & Darvin, 2026).

Platform design itself must therefore enter the analysis of inequality. IDLL does not occur in technologically neutral spaces. Commercial platforms determine which functions are free, which require payment, what content algorithms make visible, and what users must exchange for access. Some ostensibly free services, for instance, monetize participation through advertising or peer-recruitment requirements (Liu & Darvin, 2026). Such arrangements can convert economic inequality into differences in learning experience: learners with greater resources can purchase convenience, functionality, and choice, while those relying on free services may encounter interruptions, restricted features, or narrower forms of support. Inequality in IDLL is thus produced not only by differences among learners but also through the commercial and technological systems within which their learning takes place.

These processes can be understood through theories that connect individual action with social structure. Darvin and Norton's (2015) model of investment, for example, directs attention to the interaction among identity, capital, and ideology in shaping whether learners are willing and able to invest in particular language practices. Applied to IDLL, this perspective helps explain why formally identical digital opportunities can generate unequal forms of participation. Learners enter digital spaces with different resources and social positions, encounter platforms organized by particular economic and ideological logics, and may consequently receive unequal returns on their investment. From this perspective, inequality is not an external condition that merely influences IDLL; it can be reproduced through the very processes by which learners access, select, and use digital resources.

Yet inequality remains comparatively peripheral in IDLL scholarship (Liu, Soyoof, et al., 2025). Much research has examined learner-level predictors and outcomes without asking how these variables themselves may be socially patterned. Digital competence, self-efficacy, autonomy, and frequency of IDLL participation, for example, are often modeled as individual characteristics, even though opportunities to develop them may depend partly on learners' prior access to economic, cultural, and social resources. Treating these constructs only as individual differences can therefore obscure the social conditions through which those differences emerge. A stronger critical tradition in IDLL research would examine not only whether learners differ, but how such differences are produced, accumulated, and converted into unequal learning opportunities and outcomes.

Future research should consequently move from documenting digital divides to explaining the mechanisms through which advantage and disadvantage are reproduced in IDLL. Social class deserves particular attention, with studies examining how economic, cultural, and social capital independently and jointly shape learners' access to platforms, digital literacies, patterns of participation, and learning outcomes (Liu, Soyoof, et al., 2025; Liu & Darvin, 2026). Longitudinal research would be especially valuable for determining whether small initial differences in resources accumulate over time: early access may foster digital competence, which encourages greater participation, which may in turn generate further linguistic and social resources. Conversely, limited early access may constrain opportunities to develop the very capabilities needed for later participation. Such work would allow researchers to examine inequality as a developmental process rather than a static difference between groups.

The rise of generative AI also creates a new set of questions about platform-based inequality. Research should examine whether improvements in lower-cost and locally available AI systems reduce disparities in access to high-quality language-learning support or simply shift inequality from basic access to differences in model quality, functionality, personalization, and user expertise (Liu & Darvin, 2026). Intervention research can complement this work by testing whether measures such as subsidized access, targeted AI literacy support, and institutional provision of digital resources reduce disparities in learners' opportunities to participate in IDLL (Liu, Soyoof, et al., 2025). Crucially, such interventions should evaluate not only whether disadvantaged learners participate more, but whether they gain access to comparable quality of resources and comparable opportunities to benefit from them.

Interrogating inequality therefore requires IDLL research to move beyond the binary question of who has digital access. The more consequential issue is how

resources and advantages are converted across stages of informal digital learning: from access to literacy, from literacy to participation, and from participation to learning opportunities and outcomes. Examining these processes can reveal whether IDLL disrupts existing social inequalities or provides new spaces through which they are reproduced.

Positioning IDLL as an Emergent Individual Difference Variable

Individual differences (IDs) have long occupied a central position in SLA research, comprising relatively stable characteristics such as aptitude as well as more dynamic factors such as motivation, anxiety, and self-efficacy (Dewaele, 2009; Li & Mizumoto, 2026; Li et al., 2022). The expansion of language learning into everyday digital spaces introduces another potentially consequential source of learner variation: the extent to which learners independently seek, create, and use opportunities for language learning outside formal instruction. Growing evidence suggests that participating in IDLL may therefore be conceptualized as an emergent ID variable that captures systematic differences in learners' informal digital practices and their relationship with L2 development (Liu, Soyoof, et al., 2025; Sundqvist, 2024). Importantly, this conceptualization does not treat IDLL as an inherent learner trait. Rather, it positions IDLL as a behavioral and context-sensitive form of individual variation that develops through interactions among learner characteristics, prior experiences, and available digital opportunities.

Such a positioning reflects broader changes in how IDs themselves are understood. Contemporary ID research has increasingly moved away from viewing learner characteristics as isolated and stable traits toward examining how they change and interact with learning environments (Dewaele, 2009; Li et al., 2022). IDLL fits particularly well within this dynamic view because learners differ substantially in whether, how often, and in what ways they use digital resources for language learning, and these differences can themselves change through experience. Research on extramural English similarly suggests that, in highly digitalized settings, out-of-class exposure and participation can constitute a substantial part of learners' language-learning experience and should therefore be considered when explaining variation in proficiency (Sundqvist, 2024). IDLL thus differs from conventional IDs in an important respect: it is simultaneously an outcome of learner differences and a learning experience through which subsequent differences may develop.

Existing research provides growing evidence for the first side of this relationship. Motivational theories, for example, help explain why some learners participate more actively in IDLL than others. Within the L2 motivational self system, discrepancies between learners' current and imagined future selves can motivate behaviors directed toward desired future identities (Dörnyei, 2009), providing one explanation for why learners independently seek language-learning opportunities outside formal settings. More recent research has begun to specify how different motivational orientations relate to such practices. Drawing on regulatory focus theory, Liu and Zhao (2026b) found among Chinese learners of Malay that promotion-focused motivation directly predicted informal digital learning of Malay, whereas prevention-focused motivation was related to it indirectly through self-efficacy, which emerged as the strongest direct predictor. Findings of this kind position IDLL not as incidental technology use but as patterned behavior partly shaped by learners' motivational and psychological characteristics.

The relationship may also operate in the opposite direction. Participation in IDLL can provide linguistic input, communicative experiences, feedback, and opportunities for successful language use, which may subsequently reshape learners' proficiency, confidence, motivation, and other individual characteristics. Liu and Soyoof's (2026) meta-analysis of 47 studies, for example, identified a positive association between IDLL and L2 achievement. The predominantly cross-sectional evidence, however, makes it difficult to determine whether learners achieve more because they participate more extensively in IDLL, whether more proficient and motivated learners are more likely to pursue IDLL, or whether these processes reinforce one another over time. This reciprocal possibility is central to conceptualizing IDLL as an emergent ID variable. IDLL may be both shaped by existing learner differences and implicated in the development of new ones.

A second conceptual issue concerns how this form of individual variation should be represented. Much existing research operationalizes IDLL primarily through frequency or amount of participation. Yet learners who report similar amounts of IDLL may undertake substantially different activities and experience different learning opportunities. Liu and Soyoof (2026) found that the magnitude of the association between IDLL and L2 achievement was similar across different measurement types, raising questions about whether frequency alone adequately captures the dimensions of informal digital experience that matter for learning. Zhang and Liu (2024) responded to this problem by conceptualizing IDLE multidimensionally through IDLE practices, others and support, authentic L2 experience, resources and cognition, frequency and devices, and IDLE-enhanced benefits. Such work points toward a broader understanding of learner variation in IDLL that concerns not only how much learners participate but also what they do, with whom, through which resources, and under what conditions.

Future research should therefore examine IDLL as a dynamic component within a broader system of individual differences rather than positioning it exclusively as either predictor or outcome. One priority is to test reciprocal relationships between IDLL and established IDs. For example, motivation or self-efficacy may initially predict greater IDLL participation, while successful informal experiences may subsequently strengthen motivation or self-efficacy, producing feedback processes that unfold over time. A second priority is to establish which dimensions of IDLL constitute consequential learner variation. Rather than relying predominantly on aggregate frequency scores, researchers can distinguish quantity from quality and composition, examining differences in activity type, cognitive involvement, interaction, learner control, and patterns of participation across digital spaces.

Positioning IDLL as an emergent ID variable therefore does not mean adding another fixed characteristic to the established inventory of learner differences. It instead extends ID research to a form of behavioral variation that is produced through learners' interaction with their environments and can itself become a source of subsequent variation. The central task for future research is to explain this reciprocity: why learners develop different patterns of IDLL, how these patterns change, and how accumulated informal digital experiences feed back into the individual differences that initially shaped them.

Bridging IDLL and Formal Instruction

Research has documented associations between IDLL and a range of linguistic and

non-linguistic outcomes, including vocabulary (Lee, 2019), listening (Chen, 2024), reading (Liu & Darvin, 2024), speaking (Bin-Hady & Al-Tamimi, 2021), motivation (Liu, 2024), willingness to communicate, and self-efficacy (Zadorozhnyy & Lee, 2025). Yet learners' informal digital experiences often remain disconnected from formal language education (Guo & Lee, 2023; Lee et al., 2026; Soyoof et al., 2026). This raises an important pedagogical question: how can formal instruction draw on IDLL without turning self-directed practices into teacher-directed activities? Bridging should therefore not mean absorbing IDLL into the curriculum, but creating productive connections between formal and informal learning while preserving learners' locus of control. Teachers are particularly important as boundary brokers who can recognize, respond to, and extend learners' informal digital experiences (Lai & Sundqvist, 2026).

Asset-based pedagogy provides one basis for such connections by treating learners' existing knowledge and practices as resources rather than deficits (López, 2017). Soyoof et al. (2026), for example, proposed a recognition-activation model in which teachers recognize learners' informal digital literacies and draw on them for classroom reflection and academic work. This approach resonates with bridging activities (Thorne & Reinhardt, 2008) and the ethnographic-metacognitive approach, in which teachers guide learners in examining relationships between their out-of-class digital practices and formal language learning (Lai & Sundqvist, 2026). The goal is thus not simply to introduce digital resources into classrooms, but to connect learners' existing informal experiences with further language learning.

Teachers' capacity and willingness to make these connections are consequently important. In a survey of 1,008 teachers of English in China, Liu and Wang (2024) found that intentions to integrate IDLL were associated with attitudes, subjective norms, and perceived behavioral control, while teachers' digital literacies and technology experiences contributed to their perceived capacity for integration. Zadorozhnyy and Yu (2023) similarly found that preservice teachers who reconciled their identities as language learners and teachers developed greater self-efficacy in designing personalized IDLL tasks. Teacher support can also be orientational, through encouragement and cognitive guidance, or behavioral, through incorporating digital resources into teaching (Hoi & Mu, 2021). Together, these findings position teachers not merely as technology users but as mediators between learners' formal and informal learning experiences.

Existing research, however, has focused more on teachers' perceptions and intentions than on how bridging is actually enacted and experienced (Lai & Sundqvist, 2026). Concrete pedagogical designs remain insufficiently examined in terms of their implementation and effects (Lai & Sundqvist, 2026; Liu, Ma, et al., 2025). A further conceptual issue concerns the boundary of IDLL itself. As teacher direction increases, an activity may shift along the dimensions of formality, pedagogy, and locus of control and become an extracurricular extension of formal instruction rather than IDLL. Research therefore needs to examine not only whether bridging occurs, but how teachers can support learners' informal practices without taking control of them.

Future research should consequently move from teachers' reported willingness to bridge IDLL toward examining bridging as a pedagogical process. Design-based and intervention studies can develop and compare approaches such as bridging activities, recognition-activation, and ethnographic-metacognitive pedagogy, while qualitative research can examine how teachers and learners negotiate connections between learning contexts (Lai & Sundqvist, 2026; Soyoof et al., 2026). Particular attention

should be given to whether classroom support subsequently changes learners' self-directed practices and whether learners' evolving IDLL experiences, in turn, influence classroom learning. Such work would conceptualize bridging as a reciprocal relationship between formal and informal learning rather than the one-way integration of IDLL into the classroom.

Understanding the Affordances of Emerging Technologies in IDLL Research

Emerging technologies are continually reshaping what learners can do in IDLL, making their changing affordances an important direction for future research. Affordances are not simply fixed properties of technologies but possibilities for action that emerge through the relationship between technological features, learners, and the contexts in which technologies are used (Pegrum, 2014). From this perspective, the same technology may offer different learning possibilities depending on learners' goals, competences, and patterns of use. The central question is therefore not simply whether a new technology supports language learning, but what forms of informal learning it makes possible, for whom, and under what conditions.

Research on mobile-assisted language learning provides an important foundation for understanding such affordances. Portable technologies have been associated with ubiquity, continuity, spontaneity, situatedness, connectivity, social interactivity, and personalization, allowing language learning to occur across locations and activities (Kukulska-Hulme, 2018; Reinders & Benson, 2017). Generative AI extends these possibilities by allowing learners not only to access linguistic resources but also to interact with systems that generate responses, adapt input, provide feedback, and simulate conversational partners. Zhang and Wan (2025), for example, found that Chinese EFL learners used DeepSeek as both a tutor and conversation partner in IDLL, with perceived usefulness strongly related to their use. Their findings also highlighted prompt formulation as an important literacy through which learners accessed the tool's affordances. Similarly, Zhou et al.'s (2025) 16-week quasi-experiment with 67 Chinese tertiary EFL students reported listening gains associated with ChatGPT-4-supported IDLL, with learners identifying interactivity, personalization, and individualized feedback as important features of their experiences. Lower-achieving learners, however, experienced greater extraneous cognitive load, illustrating that technological affordances do not automatically translate into learning affordances.

This distinction becomes especially important as AI takes on roles previously associated primarily with human interlocutors and teachers. Unlike earlier digital resources that largely provided access to content or communication, generative AI can respond to learners, generate individualized materials, explain language, and modify its output through continued interaction (Jeon, 2025). These capabilities may change the nature of learner autonomy in IDLL. Learners increasingly make decisions not only about which resources to consume but also about what to ask, how to prompt, whether to trust generated responses, and how to evaluate and revise AI output. Understanding AI-mediated IDLL therefore requires attention to the literacies learners need to recognize and productively take up technological affordances.

Affordances also coexist with constraints. Learners using generative AI without teacher oversight may encounter inaccurate information, problematic linguistic feedback, or responses they are not equipped to evaluate critically (Meniado, 2026). AI systems may also reproduce dominant linguistic and cultural representations while inadequately representing marginalized languages and communities (Dovchin &

Marlina, 2025). Rather than treating affordances and constraints as separate properties, future research should examine how they interact in actual learner practices. A feature that benefits one learner may create cognitive, linguistic, or evaluative demands for another, while an affordance may become available only after learners develop the knowledge needed to recognize and use it.

Future research should therefore shift from cataloguing technological features to examining affordances-in-use. Studies can trace how learners actually interact with emerging technologies through prompts, screen activity, generated outputs, and subsequent learning actions, and examine how these practices develop as learners become more familiar with particular tools. Comparative research can also investigate how different technological configurations produce different forms of IDLL, rather than treating generative AI, mobile applications, social media, and other emerging technologies as interchangeable digital resources. As technologies continue to change, the more enduring research question is not which tool is most effective, but how relationships among technological capabilities, learner characteristics, and learning contexts generate particular opportunities and constraints for informal language learning.

Conclusion

As mobile and social media technologies and, more recently, generative AI expand what learners can do autonomously, language learning beyond the classroom has become an increasingly important dimension of contemporary language learning. IDLL can no longer be treated simply as a peripheral complement to formal education. Its growing prominence calls for stronger conceptual, theoretical, and empirical foundations that can account for how informal digital learning differs across learners, languages, technologies, and contexts.

The past decade has witnessed considerable progress in documenting the linguistic and non-linguistic outcomes associated with IDLL and in understanding learners' self-directed practices beyond the classroom. At the same time, the field remains fragmented and unevenly developed. Its evidence base is disproportionately English-centric, methodologically limited, and concentrated in relatively well-resourced settings. Rapid technological change, particularly the rise of generative AI, further complicates these issues by creating new possibilities for learning while raising questions about access, inequality, learner agency, and the changing relationship between informal and formal learning.

Against this backdrop, this paper has proposed seven research directions grounded in a six-dimensional conceptualization of language learning beyond the classroom. Together, these directions call for a broader and more critical understanding of IDLL: one that diversifies how it is studied, extends its linguistic and geographical scope, examines learner and structural differences, strengthens connections with formal instruction, and remains responsive to emerging technologies. We hope this research agenda provides a useful basis for consolidating IDLL as a field of inquiry while opening new questions about how, where, and under what conditions informal digital practices contribute to language learning.

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