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Sociocultural Factors in Second Language Acquisition: A Multi-Theoretical Perspective in the Digital Age

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Abstract

Second Language Acquisition (SLA) is a multifaceted developmental process. Successful learners are required to balance their cognitive abilities with environmental demands. Sociocultural factors operate through mechanisms such as mediation, cognitive restructuring, and identity negotiation, and they play an active role in shaping the learner's linguistic development and enhancing their intercultural communicative effectiveness. Drawing upon foundational perspectives on sociocultural interaction, acculturation, and identity negotiation, this paper proposes a multi-theoretical framework tailored to the digital age. By integrating moderating variables such as native language background and learning duration, this paper discusses how cultural values and digital communication contexts affect motivation and pragmatic development. Finally, by integrating intercultural communication practices and digital technology, this paper proposes targeted pedagogical suggestions, offering a theoretical framework for exploring the role of sociocultural factors in SLA and informing intercultural communication teaching practices.

Keywords

Second Language Acquisition, Sociocultural Factors, Intercultural Communication, Digital Technology Integration, Moderating Variables

1. Introduction

As cross-cultural interaction becomes ubiquitous, SLA is no longer conceptualized solely as the acquisition of linguistic forms. It increasingly involves how learners make meaning and negotiate their identities in multicultural settings. Traditional SLA research has largely focused on cognitive aspects such as language

input and acquisition processes, thereby placing less emphasis on the significant influencing role of the sociocultural environment. Despite acquiring formal linguistic knowledge, learners often struggle to navigate the pragmatic demands of authentic intercultural interactions. This issue can be largely attributed to the underestimation of sociocultural factors.

The rise of Sociocultural Theory has provided a novel perspective for SLA research. This theory breaks through the individualistic limitations of traditional cognitivism, emphasizing that language acquisition is essentially a process of social interaction and cultural internalization. Concurrently, Giles et al.'s Accommodation Theory (1991) revealed the social motivations and identity expression functions of linguistic behavior in communication; Schumann's Acculturation Model (1986) elucidated the intrinsic correlation between SLA and cultural adaptation; and Peirce's Social Identity Theory (1995) focused on identity negotiation and power relations during the acquisition process. Together, these theories offer a useful framework for examining sociocultural influences in SLA. Since the 1990s, James P. Lantolf and his colleagues have been pivotal in applying Sociocultural Theory to SLA, and their systematic elaboration in Lantolf and Thorne (2006) established the theory's significant influence in international scholarly discourse. However, theoretical integration and localized application in this field require further deepening.

Recent digital innovations offer new opportunities to reexamine sociocultural frameworks in SLA. The deep integration of Sociocultural Theory with digital technology and the dynamic assessment of intercultural pragmatic competence have become frontier trends. Parmaxi (2023) notes that Virtual Reality acts as more than merely an instructional tool; it creates immersive environments that alter how learners engage with the target culture. By simulating social contexts, these technologies provide experiential learning opportunities that complement traditional methods, offering advantages in immersive practice. New scenarios, such as AI-assisted learning and online intercultural communication, have triggered a restructuring of the processes governing sociocultural factors. Kohnke et al. (2023) argue that generative AI tools like ChatGPT are evolving into sophisticated social mediators that can simulate complex sociocultural interactions, thereby expanding the traditional boundaries of the Zone of Proximal Development (ZPD). Simultaneously, it is becoming increasingly critical to focus on the differential effects of moderating variables, such as learners' native language backgrounds and instructional contexts, on acquisition outcomes. Nevertheless, existing research still lacks systematic theoretical integration. Based on this premise, this paper, adopting a multi-theoretical fusion perspective and considering the new characteristics of the digital age alongside moderating variables, aims to reexamine how sociocultural factors operate in SLA in the digital age and to clarify their potential pedagogical implications. This may offer valuable insights for promoting the development of SLA theory and pedagogical reform.

This paper aims to integrate Vygotsky's Sociocultural Theory, Giles et al.'s Accommodation Theory, Schumann's Acculturation Model, and Peirce's Social Identity Theory, enriching the research dimensions of sociocultural factors in SLA by incorporating digital-age theoretical insights. Through the introduction of moderating variables, the paper analyzes the differential impacts of sociocultural factors on diverse learner groups. By integrating new scenarios in the digital age, this study proposes practical pedagogical strategies to resolve pragmatic dilemmas in cross-cultural communication, thereby enhancing learners' language application abilities and cultural adaptability to address the demand for cross-cultural talent in a globalized, digitized context.

2. Theoretical Foundations and Expansions of Sociocultural Factors in SLA

2.1. Core Perspectives of Key Theories

2.1.1. Sociocultural Theory (Vygotsky, 1978)

Proposed by L.S. Vygotsky, Sociocultural Theory posits that higher mental functions originate from social interaction, with language acting as the primary symbolic mediator in cognitive development. Key concepts include Mediation, Internalization, ZPD, and Activity Theory, emphasizing that language acquisition is a joint process of social interaction and cultural internalization. When this theory is extended to the current era, the concept of "Digital Mediation" has become increasingly relevant. While rooted in Vygotsky's foundational concept of tool-mediated activity, this paper specifically recontextualizes Digital Mediation to address how emerging technologies have evolved from passive instruments into active social agents that may reshape the nature of scaffolding. This paper argues that digital tools such as Virtual Reality (VR) and Artificial Intelligence (AI) function as emerging symbolic mediators. Theoretically, these tools extend learners' ZPD by constructing immersive interactive scenarios. Recent empirical evidence from Huang et al. (2022) suggests that chatbot-assisted learning can reduce speaking anxiety and provide a safe social space for learners to practice, acting as a scaffold before they engage in high-stakes human interaction. It can be argued that AI-assisted interactive feedback facilitates the internalization of linguistic knowledge by providing immediate scaffolding, which is likely to have a particularly significant promoting effect on grammatical acquisition for novice learners who require explicit guidance. However, a potential downside to this Digital Mediation is the risk of cognitive offloading. Excessive reliance on immediate algorithmic scaffolding may hinder deep internalization if learners passively consume AI-generated solutions without engaging in the necessary struggle of meaning-making.

2.1.2. Accommodation Theory (Giles et al., 1991)

Proposed by Giles et al., this theory posits that interlocutors actively adjust their linguistic behavior (e.g., accent, speech rate, lexical choice) based on communicative goals, social distance, and identity to reduce or increase linguistic differences

with the interlocutor. This process is known as Accommodation. The impact of digital scenarios on accommodation behaviors presents a unique theoretical context. In online intercultural communication, due to the lack of non-verbal cues (such as gestures and facial expressions), learners tend to rely more heavily on lexical choice and syntactic simplification to achieve convergence. Drawing on Giles et al.'s framework, this study posits that AI language assistants function as simulated interlocutors that enable a safe space for convergence practice. While Giles et al. originally proposed Accommodation Theory to explain interpersonal social bonding, recent research in Human-Computer Interaction (HCI) suggests that learners treat AI agents as "social actors" (Nass & Reeves, 1996). When learners interact with AI, they experience a sense of "social presence". Consequently, they do not merely issue commands; they may gradually ajust their linguistic complexity and register to match the AI's output. This phenomenon extends Giles et al.'s concept of convergence into the digital realm, where the motivation shifts from "social approval" to "communicative alignment" and what may be described as "anthropomorphic projection". The immediate feedback loops provided by these tools may theoretically accelerate the optimization of convergence strategies, allowing learners to refine their linguistic choices before engaging in high-stakes human interaction. Nevertheless, this simulation is not without its limitations. The standardized nature of current AI output may present a sanitized linguistic reality, potentially depriving learners of the sociolinguistic variation (e.g., regional accents) required for full accommodation competence in authentic human contexts.

2.1.3. Acculturation Model (Schumann, 1986)

Schumann proposed that the essence of SLA is the learner's "Acculturation" to the target language culture. The acquisition effect depends on the social distance and psychological distance between the learner and the target language group. In the contemporary context, Schumann's Acculturation Model can be conceptually extended to incorporate a dimension termed "Digital Acculturation" (cf. Duff, 2015, on digital language socialization). Distinct from Schumann's original focus on physical proximity, Digital Acculturation is proposed here as a theoretical extension to explain how virtual immersion may allow learners to bridge cultural gaps without geographical relocation. As Barrot (2022) argues, social media platforms now serve as vital "digital ecological subsystems" where learners can navigate social distance and engage in acculturation processes without physical travel. This suggests that learners can reduce social distance through virtual interactions with target language groups via social media and online learning communities. From a developmental perspective, the influence of psychological distance may vary by learning duration; specifically, as learners progress from beginners to intermediate levels, their increased resilience might weaken the inhibitory effect of psychological distance on motivation.

2.1.4. Social Identity Theory (Peirce, 1995)

Peirce (1995) posited that the SLA process is one of Social Identity construction

and negotiation. The acquisition effect is closely related to the return on the learner's "Investment" in intercultural communication. Today, the digital age has further enriched the scenarios for identity construction. Building on this, Darvin and Norton (2015) expanded Peirce's Social Identity Theory to address investment in the digital era, arguing that learners must now navigate complex "ideological structures" online to claim the right to speak, making digital literacy a core component of identity construction. The concept of "Online Identity Negotiation" (informed by earlier foundational work on cyber identity, e.g., Turkle, 1995, 2011) is particularly relevant here, suggesting that learners can construct multiple temporary identities in virtual communities, potentially reducing identity anxiety. Furthermore, in the context of AI-assisted learning, the interaction between learners and AI assistants constitutes what may be conceptualized as "Human-Machine Collaborative Identity". This novel construct is introduced in this study to characterize the transitional identity state where learners validate their investment through non-judgmental algorithmic interaction, acting as a buffer against real-world social anxiety. Human–Machine Collaborative Identity, as a heuristic analytical construct, is intended to capture a transitional identity state in which learners temporarily negotiate investment through interaction with non-judgmental AI agents, rather than to replace established identity constructs in SLA. Positive identity feedback from AI may potentially encourage learners to continue investing in the learning process.

2.2. Definition and Dimensions of Sociocultural Factors

Sociocultural factors refer to the elements of the social and cultural environment that influence the process and effect of SLA, covering both traditional cultural elements and new elements of the digital age. These factors vary across contexts and operate at different social levels. The core boundaries and indicators of their three dimensions are as follows:

Macro-Cultural Dimension: This includes new "Digital Cultural Norms" (e.g., online communication etiquette, data privacy concepts) and "Ideology" sub-dimensions. The former influences online intercultural communication behaviors, while the latter indirectly regulates the goal orientation of SLA (e.g., the transformation from instrumental motivation to integrative motivation) by shaping educational policies and social values.

Meso-Interactional Dimension: This has expanded to "Offline Interaction + Online Interaction" dual scenarios. Offline interaction includes classroom teaching and face-to-face intercultural communication, while online interaction covers AI-assisted dialogue and virtual intercultural collaboration projects. These two types of scenarios affect the quality of language input through different interaction processes.

Micro-Individual Dimension: This includes new "Digital Literacy" and "Online Identity" sub-dimensions. Digital literacy affects learners' efficiency in using digital mediation tools, while online identity regulates learning investment and mo-

tivational persistence.

2.3. Correlations between Theories, Intercultural Communication, and Digital Technology

The cultivation of intercultural communicative competence is a central goal of SLA, and the intervention of digital technology has reconstructed its cultivation path. The Digital Mediation of Sociocultural Theory provides the cognitive basis for online intercultural communication; Accommodation Theory explains the adjustment strategies of linguistic behavior in online scenarios (e.g., lexical simplification, syntactic adaptation); the Acculturation Model's Digital Acculturation expands the path for cultural adaptation; and Social Identity Theory's Online Identity Negotiation reduces identity anxiety in intercultural communication. Liu et al. (2021) demonstrated that digital game-based learning can effectively raise English as a Foreign Language (EFL) learners' willingness to communicate (WTC), suggesting that virtual gaming environments offer a practical site for identity experimentation and social role negotiation, thereby aligning with and extending sociocultural and identity-investment frameworks.

3. Sociocultural Impacts on SLA in Digital Contexts

3.1. Impact on Cognitive Processes and Moderating Effects

Sociocultural factors influence the processing, storage, and retrieval of language input by shaping cognitive frameworks, interaction patterns, and adaptive states. This paper posits that these influences are significantly regulated by moderating variables. Regarding cognitive processing styles, it is commonly discussed in comparative cultural studies that differences in "Native Language Background", operationally defined here not merely by linguistic typology but also by the specific cultural contexts (high-context vs. low-context) and cognitive patterns (holistic vs. analytic) inherent to the learner's L1, may affect cognitive transfer. Crucially, such tendencies should be understood as context-dependent and variable, rather than fixed cultural traits. Learners influenced by high-context cultural traditions, such as those often found in East Asian contexts, may tend to employ a holistic cognitive style. Theoretically, these learners might draw upon this style to process implicit meanings more effectively. Conversely, learners accustomed to analytical processing, a style frequently emphasized in Western educational paradigms, may find explicit linguistic rules easier to master. However, it is crucial to note that these tendencies are not fixed and interact dynamically with individual learning experiences. In the meso-interactional dimension, Digital Mediation in online interaction scenarios, acting as active social agents, optimizes cognitive processing. From a cognitive perspective, AI-assisted tools may help activate target language schemas by providing immediate feedback. This scaffolding appears particularly beneficial for novice learners, who typically experience higher cognitive load and require external regulation. Research by Su, Lin, and Lai (2023) reveals that the collaboration between learners and AI extends beyond surface-level error correc-

tion. By requiring learners to actively assess and screen algorithmic suggestions, this mechanism may stimulate higher-order cognitive processing, effectively mirroring the dynamic of learning from a capable human partner.

3.2. Learning Motivation in Digital Scenarios

The type and intensity of learning motivation are regulated by the interaction among sociocultural factors, digital scenarios, and moderating variables. The impact of "Social Distance" in the macro-cultural dimension on motivation type is theoretically moderated by "Learning Duration", which serves as a temporal proxy for categorizing learners into distinct developmental stages (novice vs. advanced) and determining their accumulation of psychological resilience. When the social distance is large for novice learners, instrumental motivation typically dominates. However, advanced learners are better positioned to narrow social distance through Digital Acculturation, thereby stimulating integrative motivation. Lee, Xie, and Lee (2024) provide empirical support for this in the context of Informal Digital Learning of English (IDLE), demonstrating that frequent digital social interaction significantly predicts learners' WTC, which indirectly helps bridge the psychological gap between the learner and the target community.

Ideology, operationally defined as the learner's dominant cultural value orientation regarding the self-group relationship (specifically the spectrum between Individualism and Collectivism), may also regulate motivational persistence: collectivist-oriented learners are inclined to show more stable motivation in collaborative online projects, whereas individualist-oriented learners are likely more suited to AI-assisted personalized learning paths. "Online Identity Investment" in the micro-individual dimension has become a new mechanism for motivation regulation. Drawing from Peirce's theory, this paper argues that when learners receive positive identity feedback in AI-assisted learning, their willingness to invest in learning increases. This mechanism is particularly critical for learners with lower proficiency, as they often lack offline identity recognition and rely more heavily on online identity rewards to sustain motivation. Conversely, it is crucial to note that an over-dependence on such curated digital validation might create a "competence illusion", leading to potential "motivational dissonance" when learners eventually face the unpredictable friction and negative feedback inherent in face-to-face communication.

3.3. Pragmatic Competence and Digital Transformation

The development of pragmatic competence relies highly on the acquisition of sociocultural factors. Digital scenarios have given rise to the new dimension of "Online Pragmatic Competence".

Regarding traditional pragmatic competence, the degree of acculturation remains central. Cultural distance theory suggests that the effect is moderated by Native Language Background. Differences in cultural values imply that learners may face greater challenges in acquiring target language politeness principles, a gap that theoretically can be bridged through digital convergence accommoda-

tion. Convergence strategies in Accommodation Theory take new forms in digital scenarios, such as the use of emojis to mitigate pragmatic ambiguity. The effectiveness of these strategies likely depends on learning duration, where intermediate learners can use them proficiently while beginners may need explicit algorithmic guidance.

Online pragmatic competence has become a core component of pragmatic competence in the digital age. Its development is influenced by both Digital Cultural Norms and Digital Literacy. Target language online communication etiquette requires acquisition through Digital Acculturation. Learners with high digital literacy are likely to master these norms more quickly, as their proficiency in digital tools facilitates engagement with target language online contexts. "Instructional Context" also plays a moderating role: in non-target language environments, the cultivation of online pragmatic competence heavily depends on virtual scenario simulation to compensate for the lack of real-world exposure.

The "Pragmatic Identity Recognition" process of Social Identity Theory is more prominent in digital scenarios. This prominence arises because digital environments often mask physical markers of "foreignness" (e.g., ethnicity, phenotype), thus elevating linguistic performance's role in identity construction. For example, when learners use online politeness markers appropriately, such as hedging in professional text forums, and receive positive peer recognition, this validation strengthens their sense of being accepted as community members, which may, in some cases, facilitate a more rapid sense of social belonging than certain face-to-face interactions, particularly in contexts where visual bias or social anxiety is salient. Learners exhibit a propensity for engaging more actively with pragmatic rules when they gain recognition as competent pragmatic users in international online conferences. This process appears more significant for learners with a collectivist ideology, as they value the group's evaluation of their pragmatic identity more highly.

4. Pedagogical Implications in the Digital Age

The analyses in Section 3 suggest that sociocultural factors influence SLA through dynamic interactions among digital mediation, identity negotiation, and learner-specific moderating variables. These mechanisms imply that pedagogical design in the digital age should move beyond uniform instructional models and instead adopt differentiated, context-sensitive approaches. Building on this theoretical grounding, the following section elaborates on the proposed multi-theoretical framework into pedagogical implications that address both traditional and digitally mediated learning environments.

4.1. Constructing a Culture-Integrated Curriculum System Based on Multi-Theoretical Fusion

Based on a multi-theoretical fusion perspective, a comprehensive curriculum system integrating language, culture, identity, communication, and digital literacy

could be constructed to balance the teaching needs of both traditional and digital scenarios.

In terms of content design, surface culture teaching could incorporate a "Digital Cultural Etiquette" module (e.g., target language online communication norms, cross-cultural email writing). Specific activities may include analyzing cross-cultural email exchanges (e.g., comparing directness in English professional emails versus indirectness in Chinese ones) and role-playing the use of emojis in digital convergence strategies to soften requests in text-based intercultural chats. Deep culture teaching should incorporate "Ideology and Language Policy", explain Digital Acculturation strategies based on the Acculturation Model, and analyze how convergence strategies differ between online and offline contexts using case studies based on Accommodation Theory. Differentiated modules might be designed for different moderating variables. For example, integrating logical reasoning and explicit rule-based training can assist learners with holistic cognitive styles, such as Chinese L1 learners, in mastering the target language's analytical structure. For beginners, guidance on "psychological distance regulation" and "online identity construction" should be reinforced. For teaching in non-target language environments, the application of "digital mediation tools" could be integrated.

Regarding teaching materials, authentic online and offline corpora should be integrated. Online corpora include international academic forum dialogues, AI-assisted communication records, and interaction cases from cross-cultural social platforms. Offline corpora cover videos of business negotiations and daily communication segments. Dynamic corpus tools could be introduced to allow learners to independently analyze the pragmatic differences of learners with different native language backgrounds and learning durations, thereby understanding the influence of moderating variables. To make this feasible, learners should be guided by teachers rather than working entirely independently. For example, use tools like AntConc with scaffolding adjusted for moderating variables: provide pre-annotated examples for novices and encourage independent queries for advanced learners to compare pragmatic markers (e.g., hedges like "I think" versus "perhaps") across different L1 backgrounds and proficiency levels.

4.2. Adopting Interactive and Digital Teaching Methods to Reinforce Accommodation and Identity Negotiation

By combining digital technology and moderating variables, teachers can design differentiated teaching activities. In Task-Based Language Teaching (TBLT), tasks are designed according to the instructional context. This involves conducting offline cross-cultural collaboration projects in target language environments, while using VR cross-cultural communication simulations in non-target language environments, allowing learners to practice convergence strategies in immersive scenarios, effectively operationalizing Giles et al.'s theory by providing a low-stakes environment to experiment with linguistic convergence before real-world application. The design of such digital learning environments should intrinsically sup-

port self-determination, ensuring that learners feel a sense of autonomy and relatedness even when interacting with artificial agents. Graded tasks may be structured for learners with varying learning durations: beginners could complete "online pragmatic imitation" tasks, while advanced learners carry out "cross-cultural digital project planning".

Regarding Blended Collaborative Learning, a "Multicultural + Cross-Level" grouping model is recommended: this approach brings together learners with different native language backgrounds and proficiency levels. Learners are encouraged to use online collaboration platforms to complete cross-cultural tasks, promoting identity negotiation and the reciprocal use of accommodation strategies.

In terms of Digital Tool-Empowered Teaching, AI-assisted learning platforms can be utilized to provide personalized pragmatic feedback and accommodation strategy suggestions. "Prompts for pragmatic error correction" can be set for low-proficiency learners and "advanced pragmatic expression expansion" for high-proficiency learners. Additionally, to foster human-machine collaborative identity, learners are required to provide weekly reflections: "How did the AI feedback influence your confidence in your online pragmatic identity?" Teachers may use VR technology to construct virtual scenarios such as international conferences and business negotiations, allowing learners to develop pragmatic competence and identity negotiation skills in a safe environment.

Teachers could play the role of "Digital Mediators", providing targeted guidance for learners with different combinations of moderating variables based on the ZPD theory. For example, teachers may provide dual guidance on "logical thinking + pragmatic expression" for Chinese L1 beginners, and design "group identity recognition" tasks for collectivist-oriented learners.

Similarly, for individualist-oriented learners, teachers can design personalized AI paths with individualized feedback loops. For collectivist novices in non-target environments, incorporate group AI-mediated tasks where peers co-edit and discuss AI suggestions, reinforcing group identity recognition and reducing psychological distance.

4.3. Optimizing Learning Environments and Psychological Support Based on the Acculturation Model

In terms of environmental optimization, the creation of an "Offline-Online Integrated" intercultural atmosphere is beneficial. In offline contexts, native speakers could be invited for face-to-face exchanges; In online contexts, cross-cultural learning communities might be built to facilitate virtual interaction between learners and target language groups, thereby narrowing social distance. Teachers are advised to introduce diverse language varieties and digital cultures in the classroom to avoid target language cultural centrism. To address the limitations of non-target language environments, a "Digital Acculturation Support Repository" should be established.

Regarding psychological support, teachers could build a multi-level interven-

tion method guided by moderating variables. Questionnaires can be employed to identify learners' variable characteristics (e.g., native language background, learning duration). Group counseling sessions focusing on identity-related challenges could be offered to help highly anxious beginner learners develop emotional regulation strategies. Meanwhile, psychological counseling and pragmatic strategy guidance could be made to learners who encounter challenges with their online pragmatic identity.

4.4. Constructing a Multi-Dimensional Dynamic Assessment System

Future assessment systems should integrate moderating variables to form a holistic framework evaluating linguistic, cultural, and pragmatic competencies (covering both online and offline interactions), as well as identity development and digital literacy.

In terms of content, the assessment framework extends to include a Digital Acculturation dimension, evaluated via online cross-cultural tasks and assessments of digital etiquette. Pragmatic competence employs hybrid assessment scenarios, evaluating both virtual conference performance (including online interactions) and in-person interactions (including offline interactions). Digital acculturation can be evaluated through task performance logs (e.g., frequency and quality of engagement in virtual communities). Concurrently, identity development is assessed qualitatively via reflective journals and portfolios documenting the learne's digital identity journey.

Regarding methods, combining formative assessment with summative assessment is proposed. Formative assessment involves real-time monitoring of classroom interaction performance, digital tool application records, and group task participation. Multiple assessment subjects should be introduced, including teacher assessment, learner self-assessment, peer assessment, and AI-assisted assessment. Assessment weights may need to be adjusted. For example, teachers could increase the weight of formative assessment for low-proficiency learners and reinforce the proportion of digital literacy assessment for learners in non-target language environments.

These differentiated recommendations seek to operationalize the multi-theoretical framework and moderating effects discussed in Section 3, with the aim of bridging traditional and digital scenarios and potentially contributing to the enhancement of learners' pragmatic competence, cultural adaptability, and willingness to communicate across diverse sociocultural contexts.

5. Conclusion

The present study proposes a theoretical framework, which integrates Vygotsky's Mediation Theory, Schumann's Acculturation Model, Giles et al.'s Accommodation Theory, and Peirce's Social Identity Theory (with its core investment construct) within contemporary digital ecosystems. The model posits that digital me-

diation tools expand learners' ZPD, facilitate digital acculturation, enhance online identity investment, and potentially foster pragmatic competence and willingness to communicate, with convergence strategies serving as a key mediator and learner variables (L1 background, proficiency, digital literacy) acting as moderators. This paper offers three insights into the field. First, it extends traditional sociocultural theories into offline-online hybrid contexts by introducing constructs such as digital acculturation and "human-AI collaborative identity". Second, it highlights the under-examined role of moderating variables, seeking to move beyond one-size-fits-all approaches. Third, it offers concrete, theory-driven pedagogical recommendations that can be implemented in both target and foreign language environments.

Nevertheless, this study is subject to several limitations. The framework remains theoretical and awaits empirical validation. Additionally, the model was initially developed with English as the target language and Chinese L1 learners as a primary focus, with potential applicability to other learner groups pending validation; its applicability to typologically distant languages (e.g., Arabic, Korean) and other L1 groups remains untested. Future research would benefit from pursuing three directions: 1) large-scale data analysis across multiple L1 and target language combinations; 2) longitudinal qualitative studies examining how learners actually negotiate human-AI collaborative identities; and 3) classroom-based intervention studies comparing the effectiveness of VR-mediated versus traditional acculturation activities on pragmatic development. It is suggested that such systematic empirical scrutiny is needed to fully gauge the pedagogical potential of the proposed framework.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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