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Research on the Agency of Foreign Language Learners in Higher Education Institutions within Technology-Integrated Environments

Xiaoquan Pan

Xingzhi College, Zhejiang Normal University, Jinhua, China
pxq@zjnu.cn

Abstract: *This study focuses on the issue of learner agency in higher education foreign language learning within technology-integrated environments. Emerging technologies such as artificial intelligence and big data have profoundly reshaped the foreign language teaching ecosystem. While providing robust support for language learning autonomy through personalized recommendations and learning analytics, these technologies also carry risks of passive adaptation, excessive reliance on external guidance, and learners being swept along by technological rhythms. Drawing upon social cognitive theory, self-determination theory, and activity theory frameworks, this study systematically examines the dialectical relationship between technology and learner agency: technological empowerment may enhance core competencies in goal setting, process management, and monitoring/adjustment, yet may also suppress deep planning and critical thinking due to fragmented interactions and platform design flaws. Current research faces critical challenges including ambiguous theoretical definitions, insufficient empirical evidence on enabling/inhibiting mechanisms, lack of multidimensional dynamic assessment, and ethical concerns. This study advocates constructing an integrated "tool-subject-context" co-construction model, developing a dynamic evaluation system, and embedding a learner-centered ethical framework. This approach aims to optimize technology-enabled pathways, propel foreign language learners from passive adaptation to active creation, and advance high-quality foreign language education.*

Keywords—educational technology integration; higher education; foreign language instruction; learner agency; technology empowerment

1. INTRODUCTION

Driven by emerging technologies such as artificial intelligence, big data, and 5G communications, "Internet Plus Education" has entered a phase of deep integration and innovation. Educational environments are evolving toward intelligence and ubiquity, continuously reshaping the foreign language ecosystem in higher education (Cheung et al., 2021). Traditional classroom boundaries are being dismantled, with learning occurring seamlessly across physical and virtual spaces (Teschers et al., 2024). Digital learning resources leverage intelligent platforms to achieve precise content matching and diverse presentation formats (Tan et al., 2025). Technology-supported teaching interactions and evaluation feedback are becoming personalized and instantaneous. Intelligent learning assistants provide learners with pronunciation correction and grammar rewriting suggestions; language acquisition models push customized content and construct personalized learning paths based on dynamically captured individual learning characteristics; learning analytics technology provides the basis for optimizing teaching adjustments (Yin et al., 2024). The deep integration of technology, on one hand, provides a solid foundation for the "personalization" and "autonomy" of foreign language learning through its powerful information processing, resource aggregation, and intelligent interaction capabilities. On the other hand, it also places higher demands on learners' ability to navigate the technological environment and proactively plan and implement their learning. Against this backdrop, learner agency becomes the key to integrating technology-empowered language teaching.

In recent years, foreign language education theory has shifted from a "teacher-centered" to a "learner-centered" approach, placing learner agency at the core of research. Agency refers to an individual's capacity to proactively initiate and regulate their own learning actions within a specific environment to achieve goals. Compared to traditional foreign language teaching, learner agency in technology-integrated contexts faces new contextual characteristics and evolving connotations. The essence of technology-enabled learning lies in liberating and amplifying learner agency itself (Wu, 2024). However, if technological tools are simplistically viewed as solutions to replace traditional teaching rather than as empowering designs embedded within competency development frameworks, they may foster passive adaptation tendencies among learners. These include superficial interactions, excessive reliance on external guidance, and learning rhythms dictated by technology. Therefore, against the backdrop of technology-driven instructional innovation, examining the actual state of learner agency in higher education foreign language settings and exploring pathways for its optimization holds significant theoretical and practical value for achieving high-quality educational development.

2. LITERATURE REVIEW

2.1 Defining Core Concepts

The essence of learner agency lies in emphasizing the learner's capacity to proactively initiate, plan, control, and reflect upon the learning process as the central subject. It encompasses not only the independence, sense of responsibility, and use of learning strategies traditionally associated with "autonomy," but also places greater emphasis on the learner's potential and inclination to actively engage and effect change within a sociocultural context. Technologically, agency manifests as: Can learners proactively set challenging learning goals? Can they autonomously manage their learning process based on resources and needs? Do they effectively leverage technology to facilitate active communication and interaction? Are they capable of self-monitoring and optimizing adjustments based on data feedback? An educational technology-integrated environment refers to a system deeply embedded throughout the entire foreign language teaching process, built upon multiple technologies such as artificial intelligence, learning analytics, networked interaction, and multimedia content delivery (Rojas & Chiappe, 2024). This encompasses online learning management systems, adaptive learning platforms, mobile language learning applications, real-time online interaction tools, intelligent assessment feedback systems, and novel blended learning spaces constructed through these technologies, embodying the efficient integration of physical spaces, digital environments, and social resources.

2.2 Theoretical Foundations

Bandura (2001)'s Social Cognitive Theory identifies "self-efficacy" as the core motivational mechanism driving agency. Technological environments provide learners with extensive information exchange portals, facilitating observation of others' linguistic behaviors and enabling learners to establish more concrete and efficient social learning channels through virtual interactions. Simultaneously, the clarity with which technological environments communicate tool value and operational pathways directly influences learners' sense of efficacy and confidence in goal setting.

Ryan and Deci (2017)'s Self-Determination Theory emphasizes that intrinsic needs—autonomy, competence, and relatedness—drive agency development, providing a framework for designing how technology environments can enhance motivation. Technology should serve as a means to expand autonomy; provide appropriate challenges and timely feedback to enhance competence; and foster supportive online learning communities that satisfy interpersonal connection and belonging needs. This enables learners to pursue higher-level self-actualization motivation within technology-integrated environments, rather than relying solely on external control.

Vygotsky (1978)'s Activity Theory positions technology as a crucial "mediating tool," whose value is activated only when embedded within goal-oriented activity systems. Technology platforms must not only support language input/output training but also facilitate core linguistic activities like meaning negotiation, problem-solving, and identity construction. Technological environments should be designed to serve higher-order activity goals, supporting learners' sociocultural participation and identity transformation needs.

2.3 The Conceptual Framework of Learner Agency in Technology-Integrated Environments

Within the new ecosystem of deep integration between educational technology and foreign language teaching, learner agency in higher education has been endowed with a rich meaning that transcends traditional interpretations. Its core lies in learners' capacity for self-regulation, goal-driven motivation, and contextual interaction within complex technology-mediated environments. In this context, agency is not merely synonymous with proactivity but derives from the concept of human agency in social cognitive theory. It emphasizes learners' capacity to actively, intentionally, and responsibly construct learning goals, select strategies, adjust methods, monitor progress, evaluate outcomes, and adapt to environments—all within frameworks of social interaction (with teachers, peers, and technological tools) and technology-enabled structures. This is achieved through self-beliefs, including foreign language self-efficacy and perceived usefulness of technology. to proactively, purposefully, and responsibly construct learning objectives, select strategies, adjust methods, monitor progress, evaluate outcomes, and adapt to the environment (Bandura, 2001; Reeve, 2013). These are specifically manifested as: (1) Autonomous exploration and decision-making in immersive environments: Learners can critically filter vast online and explicit resources (e.g., corpora, learning platforms, virtual environments), conducting personalized information retrieval, integration, and application based on individual learning styles and needs; (2) Goal-oriented adaptive regulatory ability: Within blended online/offline learning pathways, learners demonstrate strong goal-setting, metacognitive monitoring, task strategy adjustment, and frustration management capabilities, effectively managing time and cognitive resources; (3) Intrinsically driven agentic engagement: Based on Self-Determination Theory (Ryan & Deci, 2017), technological tools enhance learners' autonomy and competence through cognitive support, process feedback, and real-time interaction. This fosters stronger intrinsic motivation and deep engagement that transcends minimal requirements (Reeve & Tseng, 2011); (4) Subjectivity Generation in Diverse Collaborative Environments: Through social media, online forums, and collaborative projects (e.g., online PBL), learners proactively initiate interactions, contribute perspectives, and construct shared meaning. Technology inherently serves as an affordance enabling learners to exercise subjectivity, construct "Learner Space", and achieve "identity expansion", rather than merely functioning as a passive conduit for information reception (Van Lier, 2010). Thus, the integration of technology and educational environments significantly amplifies learners' three-dimensional active roles as "Self-Regulators", "Strategic Users", and "Contextual Co-Constructors". This implies a

resilient power—a collection of empowered agency and responsibility—that emerges within techno-human contexts. Supported by these environments, learners proactively engage resources, regulate internal and external processes, and continuously co-construct with interactive environments (including algorithms, interfaces, and communities) to achieve effective language use and interpersonal communication goals (Hemmler & Ifenthaler, 2024). actively mobilizing resources, regulating internal and external processes, and continuously co-constructing with interactive environments (including algorithms, interfaces, and communities). This constitutes a resilient set of empowerment and responsibility.

2.4 Current Research on the Relationship Between Educational Technology and Learner Agency

Research has accumulated positive evidence regarding how technology integration influences the agency of language learning. The study of Spirina et al. (2025) indicates that project-based learning using web-based tools enhances participants' willingness to set personalized goals and manage their progress. Adaptive learning platforms provide customized content through algorithmic analysis, making it easier for learners to develop a sense of task mastery while boosting their motivation and persistence in language learning. Big data-driven learning dashboards significantly enhance metacognitive monitoring efficacy through real-time visual feedback. However, research on the risks of technology integration undermining learner agency also warrants attention. The simplicity of technological tools may lead learners to prioritize superficial interaction forms over deep content production and language reflection processes; Overly structured adaptive learning paths, while reducing choice difficulty, may also suppress learners' independent planning abilities and metajudgment; Frequent fragmented interactions can disrupt the development of deep language thinking skills; Platform design flaws (such as delayed feedback or unfriendly operations) hinder learners' expression of initiative and goal attainment. Whether technological tools ultimately become a vital support for shaping learner agency largely depends on instructional design support strategies and the intrinsic value orientation of the tools themselves.

Research on the agency of foreign language learners in higher education under technology-enhanced learning environments exhibits a multidimensional deepening trend. Its theoretical framework has progressively expanded from individual autonomy (Benson, 2011) to technology-mediated sociocultural practices, forming a triadic research paradigm of "tool-subject-context" mutual construction (Sulis, 2022). At the conceptual level, Ghamoushi et al. (2022) proposed an "ecological agency framework" emphasizing how technological environments reconfigure learners' mechanisms for expressing intent. Liaw et al. (2023) used fNIRS brain imaging to validate that self-directed task setting reduces cognitive load ($\beta = -0.53$, $p < .001$). Core findings reveal that technology-enabled learning exhibits nonlinear threshold effects, while active behaviors within collaborative platforms reshape social power structures. Current research faces three challenges: intelligent feedback causes misalignment between learner ability and self-efficacy; micro-agency expressions in informal settings remain unmodeled; and cross-cultural technological negotiation behaviors lack effective decoding frameworks (Zheng et al., 2025). Urgent development of culturally adaptive models for technology-mediated agency is needed to achieve theoretical breakthroughs.

3. Current Research on Learner Agency in SLA

Within the field of Second Language Acquisition (SLA) research, learner agency has evolved from a peripheral concept into a central dimension for understanding the complexity of language learning. Its conceptual framework has become deeply integrated with perspectives such as Sociocultural Theory and Complex Dynamic Systems Theory. Agency is broadly defined as the learner's capacity to intentionally initiate and execute learning practices, make choices, assume responsibility, and influence their learning trajectory within specific sociocultural contexts (Ahearn, 2001). Within the SLA framework, researchers focus on exploring the dynamic interplay between agency and both the process and outcomes of language learning. Core research directions encompass: how learners strategically leverage social and cognitive resources (e.g., native language, metacognitive knowledge) and mediating tools (e.g., dictionaries, learning software) to achieve learning goals, with agency manifested in specific strategy selection and learning management practices (Oxford, 2017); The dialectical relationship between learner identity and agency—where agency drives identity investment and (re)negotiation, while existing identity positions provide resources and constraints for agency, giving meaning and direction to learning motivation (Darvin & Norton, 2015); The learning environment functions as a space where structural and enabling resources intertwine. Factors such as teacher involvement, peer interaction patterns, task design characteristics, and assessment systems collectively shape the opportunities and boundaries for learners' agency expression. Notably, research on "digital agency" (Ågerfalk, 2020) has gained prominence in digital learning environments. This focus examines how learners strategically leverage technological tools to proactively expand language input and output pathways, construct online identity communities for participation, and creatively self-manage multi-platform learning experiences—revealing new dimensions of agency within emerging technological contexts. Nevertheless, agency research in SLA faces persistent challenges: conceptualization remains fraught with interpretive tensions; methodologically, capturing agency's real-time, micro-dynamic processes still relies heavily on in-depth qualitative tracking (e.g., narrative analysis, ethnography), leaving substantial room for large-scale empirical studies integrated with complex theoretical modeling; and the distinct operational mechanisms of agency across different foreign language contexts (e.g., EFL, ESL, EMI) and its long-term effects on language development efficacy remain incompletely revealed (Lai et al., 2015). In short, agency research has enriched our understanding of

individual initiative in SLA. Future work should deepen contextual and process-oriented analyses while strengthening methodological innovation to more precisely delineate its operational mechanisms and value efficacy.

4. Urgent Issues in Addressing Foreign Language Learners' Agency

Although the integration of educational technology has opened new pathways for enhancing agency among university foreign language learners and yielded significant outcomes, current research and practice still face several deep-seated contradictions and critical challenges that require urgent resolution: Firstly, the theoretical framework suffers from notable deficiencies in unity and explanatory power. The concept of agency draws from multiple sources (e.g., sociocultural theory, ecological perspectives, complex dynamic systems theory), and its operational definitions and core dimensions (e.g., self-regulation, subjectivity, environmental interaction capacity) often remain ambiguous or overlap in technology-mediated contexts. This ambiguity hinders systematic, contextualized, and precise explanations of how technology specifically mediates or reshapes agency. Secondly, empirical research on the mechanisms of technological empowerment remains weak and contradictory. While extensive practice demonstrates that digital tools (e.g., mobile learning platforms, virtual simulation environments) may enhance learners' autonomy in choice and task control (García Botero et al., 2018), technology may also induce "covert discipline" through algorithmic recommendations, preset pathways, or data monitoring, thereby undermining learners' critical awareness and long-term decision-making capabilities. The complex causal chains underpinning agency formation through technological mediation and the dynamic processes of multimodal environmental interaction require in-depth exploration through rigorous mixed-method research. Thirdly, the absence of an agency assessment framework creates a methodological impasse. Existing research predominantly relies on self-reported scales or retrospective interviews to gather agency perception data, struggling to capture the contextual, embodied, and time-evolving forms of agency within technological environments. There is a lack of dynamic, multidimensional assessment frameworks integrating behavioral log analysis, eye-tracking, discourse semantic mining, and physiological feedback technologies (Cardozo-Gaibisso et al., 2024). Finally, ethical interpretations of technology and agency development require urgent reinforcement. Ethical discussions and policy safeguards remain inadequate regarding latent data privacy risks in technology-driven agency practices, structural injustices stemming from the digital divide, and the tendency of technological environments to oversimplify human-computer interaction complexities (Pool et al., 2024). Addressing these challenges collaboratively requires future research to construct integrated conceptual models across disciplinary perspectives, develop methodological frameworks combining ecological validity with micro-level analytical power, and embed learner-centered ethical frameworks within technological design. Such approaches will effectively support the practical demands for high-quality foreign language education in the global digital era.

5. Conclusion

This study demonstrates that within an educational technology environment characterized by the deep integration of artificial intelligence, big data, and ubiquitous networks, the active engagement of foreign language learners in higher education has become a core driver for transforming teaching paradigms and enhancing learning effectiveness. On one hand, deep technological integration empowers learners through intelligent recommendations, precise feedback, and learning analytics, enabling them to autonomously set goals, manage progress, utilize support tools, and implement monitoring adjustments with unprecedented potential. On the other hand, technology also carries risks such as path dependence, superficial interaction, and implicit algorithmic conditioning, potentially suppressing learners' deep critical thinking and independent planning abilities when effective instructional design is lacking. Current research faces significant challenges in defining theoretical concepts, identifying the dynamic causal chains of technology's enabling/inhibiting mechanisms, developing multidimensional evaluation methods that capture embodied contextual performance, and addressing new ethical dilemmas arising from technology adoption. These challenges profoundly reveal the complex dialectic and practical dilemmas between technology integration and the development of agency.

To fully leverage technology's potential in liberating and amplifying learner agency, and to advance high-quality foreign language education in the digital era, it is imperative to construct an integrated "tool-subject-context" co-construction model that synthesizes multidisciplinary perspectives including sociocultural theory, complex systems theory, and learning science. This will deepen our granular understanding of technology-mediated processes. Future research should accelerate the development of an ecological dynamic assessment system that integrates multimodal learning behavior data (e.g., eye-tracking, discourse analysis) to authentically depict the emergence and evolution of learner agency within open technological environments. Crucially, intelligent system design and instructional strategy implementation must systematically embed an ethics framework centered on learner development—ensuring algorithmic transparency and interpretability, guaranteeing technological equity and accessibility, respecting learner data sovereignty, and maintaining profoundly harmonious human-machine interaction. Only thus can technology's enabling power be fully unleashed, supporting learners' transformative leap from passive adaptation to active creation.

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