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〔特別寄稿〕

Mediating Japanese Language Learning
――A Brief History of Technology in JSL/JFL Education――

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1. Introduction

Over the past four decades, technological developments have profoundly reshaped the teaching and learning of Japanese as a second or foreign language (JSL/JFL). From analogue cassette-based materials and drill-oriented software to mobile applications, artificial intelligence, and immersive environments, technologies have increasingly mediated how learners access linguistic input, participate in interaction, and develop communicative competence. While existing research has documented the pedagogical affordances of particular tools, less attention has been paid to how these technologies can be understood historically through a coherent theoretical lens that also accounts for practitioner experience. This paper addresses this gap by examining the development of technology in JSL/JFL education over the last 40 years through a sociocultural theoretical perspective, informed by the author's dual positioning as both a learner and a teacher of Japanese.

Drawing on Vygotsky's (1978) sociocultural theory (SCT), the paper conceptualizes language learning as a socially mediated and culturally situated activity. Central to this framework are the concepts of mediation, scaffolding, and the zone of proximal development (ZPD), which foreground the role of interaction with others and with cultural tools in development. From this perspective, educational technologies are not neutral instructional aids but mediational means that reorganize learning activity, redistribute expertise, and shape the forms of assistance available to learners. As technologies evolve, they alter not only what learners can do, but how support is provided, withdrawn,

and internalized.

The focus on Japanese is particularly warranted given the linguistic and cultural demands the language places on learners. The integration of multiple writing systems, the centrality of kanji knowledge, and the pragmatic complexity of honorifics and context-sensitive interaction frequently require sustained mediation and guided participation. As a learner of Japanese, the author has experienced firsthand how tools such as multimedia databases, world wide web resources, and social media networks have functioned as mediational supports at different stages of development. As a teacher and researcher, the author has also incorporated successive generations of technologies into classroom practice and empirical inquiry, observing how learners' engagement within their ZPD has been reshaped by changes in available tools.

Accordingly, this paper asks: How have evolving educational technologies functioned as mediational tools in JSL/JFL education, and in what ways have they reshaped learners' zones of proximal development and the nature of scaffolding? By integrating historical analysis, SCT, and practitioner narrative, the paper aims to provide a theoretically grounded and reflexively informed account of technological development in Japanese language education, with implications for research and pedagogical design.

2. Sociocultural Theory and Language Learning

SCT, grounded in the work of Vygotsky (1978), conceptualizes learning as a fundamentally social and mediated process. Rather than viewing development as the internal accumulation of knowledge, SCT emphasizes that higher mental functions emerge through participation in socially organized activity and are shaped by the cultural, historical, and material conditions in which learning occurs. Language learning, from this perspective, is inseparable from interaction with others and with the symbolic and material tools that mediate human action.

A central construct in SCT is mediation, which refers to the way human

cognition is shaped and transformed through tools and signs. These mediational means may be symbolic, such as language and writing systems, or material, such as physical artifacts and technological tools (Vygotsky, 1978). In second language learning, mediation operates through instructional discourse, interactional feedback, and the use of artifacts that support learners' engagement with linguistic forms and meanings. Importantly, tools do not simply assist cognition; they reorganize activity by making certain actions possible while constraining others.

Closely related to mediation is the concept of the ZPD, defined as the distance between what a learner can accomplish independently and what they can achieve with guidance or collaboration (Vygotsky, 1978). The ZPD foregrounds learning potential rather than static ability and emphasizes development as a process that unfolds through social interaction. In language classrooms, the ZPD is enacted through dialogic activity, collaborative tasks, and guided participation in communicative practices that exceed learners' current level of control.

Scaffolding describes the contingent, temporary support that enables learners to operate within their ZPD (Wood et al., 1976). Although not originally a Vygotskian term, scaffolding has been widely adopted in SCT-informed second language research to describe graduated assistance that is responsive to learner needs and progressively withdrawn as control is internalized. Empirical studies in SLA have shown how scaffolding emerges through interactional feedback, collaborative dialogue, and teacher–learner negotiation of meaning (Donato, 1994).

SCT has been applied extensively in second language acquisition research to examine interaction, collaboration, and guided participation as drivers of development. Studies have documented how learners co-construct knowledge through peer interaction, how expert–novice relationships shape language use, and how instructional activity can be designed to promote development rather than mere performance (Lantolf & Thorne, 2006; Ohta, 2001). From this

perspective, instruction is most effective when it is attuned to learners' ZPD and when support is dynamically adjusted through interaction.

Within an SCT framework, educational technologies are best understood as mediational means—cultural artifacts that participate in and reshape learning activity. Rather than serving solely as channels for content delivery, technologies reorganize the distribution of expertise, the timing and nature of scaffolding, and the spaces in which interaction occurs. As technologies have evolved over the past four decades, they have increasingly enabled new forms of mediation, ranging from fixed instructional support to adaptive, socially distributed, and AI-mediated scaffolding. This reconceptualization provides a theoretical basis for examining technological change in JSL/JFL education not as a series of tools, but as shifts in the conditions for mediated development.

3. 1980s: Early Technologies, Limited Mediation and Fixed Scaffolding

The earliest applications of technology in Japanese second/foreign language (JSL/JFL) education during the 1980s were shaped primarily by analogue audiovisual materials such as cassette based language courses. From a sociocultural perspective, these technologies functioned as mediational tools that supported access to linguistic input and form-focused practice, but offered limited opportunities for interaction, contingent scaffolding, or collaborative meaning-making.

My own early engagement with technology, as a learner of Japanese, was mediated through cassette tapes, paper-based flashcards, and institutional language laboratories. Cassette recordings provided repeated exposure to native-speaker pronunciation and intonation, enabling controlled listening and shadowing practice. However, this mediation was largely unidirectional and self-regulated, with feedback limited to self-monitoring rather than dialogic interaction.

Language laboratories played a central role during my study abroad year at

Osaka University of Foreign Studies, where structured listening and repetition tasks were integrated into formal instruction. These environments afforded increased exposure to authentic spoken Japanese but continued to rely on predetermined sequences of activity. From an SCT perspective, the scaffolding embedded in these technologies remained fixed rather than contingent, as instructional support was not dynamically adjusted through interaction with instructors or peers during technology use. Mediation occurred through artifacts rather than through socially co-constructed activity.

My experience with early Japanese word-processing technologies further illustrates the nature of mediation during this period. Dedicated Japanese word processor hardware and later NEC personal computers enabled the production of written Japanese for academic purposes, including reports and a graduation thesis. These tools mediated access to Japanese orthography by supporting kana–kanji conversion and text composition, effectively externalizing complex cognitive processes involved in writing. At the same time, the mediation they provided was primarily technical rather than pedagogical; while they made writing possible, they did not offer linguistic feedback or scaffold higher-order rhetorical or pragmatic choices.

From a sociocultural standpoint, these early technologies positioned learning as an individual activity mediated by tools rather than as a socially distributed process. Teachers continued to play a central role in providing explanation and feedback, but this mediation occurred largely outside the technological environment itself. Consequently, learners' engagement within the ZPD depended heavily on teacher intervention and peer interaction beyond the technology, rather than being embedded within it.

While these early technologies effectively mediated foundational skills such as listening comprehension, kana recognition, and basic written production, they were less capable of supporting the development of pragmatic competence, sociolinguistic awareness, and context-sensitive language use. Nevertheless, these

tools constituted an important phase in the technological mediation of JSL/JFL learning, laying the groundwork for later developments by externalizing key linguistic processes and expanding opportunities for independent engagement with the language.

4. 1990-2002: Expansion of CALL

4-1 1990-1994: Emerging Interactive Mediation

The mid-1990s marked a significant shift in computer-assisted language learning (CALL) for Japanese, characterized by the emergence of multimedia computing and early internet connectivity. From a sociocultural perspective, this period represents a transition from largely unidirectional mediation and fixed scaffolding toward more interactive forms of mediated activity that supported meaning-making across multiple semiotic resources. Audio, text, and visual elements could now be integrated within a single learning environment, enabling learners to coordinate form, meaning, and use in ways that had previously been difficult to achieve (Chapelle, 2001; Plass & Jones, 2005). Multimedia authoring tools such as HyperCard played a central role in this transition.

As a teacher during this period, I developed instructional materials using Hypercard, for kanji learning that combined written forms, stroke-order animations, example sentences, and audio support. These materials provided richer mediational affordances than earlier drill-based software by allowing learners to navigate content non-linearly and to access multiple forms of representation. While scaffolding remained largely pre-designed, multimedia environments supported greater learner agency and enabled more meaningful engagement with kanji as functional linguistic resources rather than isolated forms (Chapelle, 2001).

The introduction of email and networked communication tools further transformed the sociocultural conditions of learning. Email-based writing projects with partner universities in Japan created opportunities for sustained interaction between learners and more proficient Japanese users. Research on computer-

mediated communication has shown that such exchanges support collaborative scaffolding, negotiation of meaning, and intercultural learning (Belz, 2003; Kern, 1996; Warschauer, 1996). From an SCT perspective, these interactions enabled learners to engage in communicative practices that extended beyond their independent capabilities, effectively expanding their ZPD through dialogic mediation (Donato, 1994; Lantolf & Thorne, 2006).

Early use of the World Wide Web also began to reshape reading and interpretation practices in JSL/JFL classrooms. Access to authentic Japanese texts—such as news articles, institutional webpages, and cultural materials—allowed learners to engage with language in its sociocultural context rather than through pedagogically simplified input. Although these materials were not designed for language learners, teachers increasingly assumed the role of mediators who selected, sequenced, and scaffolded engagement with authentic content.

I gradually began introducing this new technology into my teaching practice, e-mail and authentic web-based materials were incorporated into reading tasks that emphasized strategy use, collaborative interpretation, and guided discussion, consistent with research on task-based and project-based CALL (Warschauer, 1996).

4-2. 1994-2002: Networked multimedia and synchronous communication

Building on these developments, the period from the mid-1990s to early 2000s saw further expansion in the use of networked multimedia and synchronous communication tools.

During my time at the University of Melbourne, 1994–1998, I created multimedia software using advanced Hypercard techniques, to support listening comprehension by integrating audio, visual cues, transcripts, and learner-controlled playback (Harrison, 1997).

Such environments have been shown to function as mediational means that externalize listening strategies and enable learners to regulate engagement with spoken input (Chapelle, 2001; Plass & Jones, 2005). Importantly, learners were encouraged to collaboratively interpret listening texts, with scaffolding distributed across software design, peer interaction, and task structure.

At the same time, I developed collaborative, project-based learning using email, chat systems, and the expanding access to the World Wide Web. Students engaged in group projects to design and publish home pages in Japanese, requiring them to make linguistic, pragmatic, and rhetorical choices for real audiences. Research on project-based CALL highlights how such activities position learners as legitimate language users and promote guided participation in socially meaningful practices (Warschauer, 1996; Dooly, 2009). I also incorporated early video conferencing tools to facilitate interaction between students in Melbourne and Japanese students at Tohoku University, Japan. Despite technological constraints, synchronous exchanges enabled real-time negotiation of meaning and pragmatic adjustment, processes central to sociocultural accounts of language development (Wang, 2006).

During my work at the Japan Foundation Kansai International Center and Nagoya University, 1998–2002, task-based, web-mediated learning were further developed through the adaptation of WebQuest principles (Larke & Harrison, 2000). Learners investigated real-world topics, synthesized information from Japanese-language sources, and created web pages for practical purposes. WebQuest-based activities have been shown to scaffold inquiry and collaboration while foregrounding purposeful language use (Dodge, 1995; González-Lloret & Ortega, 2014). Within an SCT framework, these tasks exemplify mediated action distributed across technological tools, peer interaction, and instructional design, enabling learners to operate within a socially and technologically expanded ZPD (Donato, 1994; Lantolf & Thorne, 2006).

I also experimented with Virtual Reality environments, using a system called

Activeworlds, that allowed students and teachers to interact on a virtual campus that I created. The main mode of communication was through synchronous chat, which was in turn used as data for analysis of student interaction in Japanese (Toyoda & Harrison 2002).

Together, these experiences illustrate a maturation of CALL during the mid-1990s to early 2000s, as technologies increasingly supported interaction, collaboration, and authentic language use. This period marks a clear departure from earlier fixed scaffolding models and anticipates later developments in Web 2.0 and mobile learning environments, where mediation becomes further distributed and learner agency increasingly foregrounded.

5. 2000-2010: Web 2.0 and Networked Collaboration: Distributed Mediation and Learner Identity

The emergence of Web 2.0 technologies in the late 2000s marked a further shift in the sociocultural conditions of Japanese second/foreign language (JSL/JFL) learning. Unlike earlier CALL environments that were primarily designed for instructional purposes, Web 2.0 platforms emphasized user-generated content, social networking, and participatory interaction. From a sociocultural perspective, these technologies extended mediation beyond task completion to encompass identity construction, community participation, and sustained social engagement, thereby reshaping both scaffolding practices and learners' ZPD (Harrison, 2004; Lantolf & Thorne, 2006; Thorne & Reinhardt, 2008). Social networking sites designed for language learning, such as Livemocha, exemplify this shift.

I introduced Livemocha into my teaching, not only as a platform for linguistic practice but also as a site for examining learner identity formation (Harrison & Thomas, 2009). The major finding of the research was that learners constructed profiles, publicly displayed their linguistic repertoires, and interacted with a global community of users. Research on language learner identity highlights how such positioning practices are central to language learning, as learners negotiate

legitimacy, expertise, and affiliation through participation (Harrison, 2011). From an SCT perspective, profiles, peer feedback, and interactional exchanges functioned as mediational means that shaped how learners understood themselves and others within the learning community (Harrison, 2013).

Interaction on social networking platforms also enabled distributed scaffolding, as assistance and feedback were provided by peers with varying levels of proficiency rather than exclusively by teachers. This aligns with sociocultural research on collective scaffolding, which emphasizes that support can emerge through collaborative activity and is not restricted to expert–novice dyads (Donato, 1994). Learners operated within overlapping ZPDs that were co-constructed through asynchronous interaction, reciprocal correction, and shared participation in communicative practices (Lantolf & Thorne, 2006). In parallel, collaborative productivity tools such as Google Workspace introduced new possibilities for mediated activity within institutional learning contexts.

I explored how shared documents and presentation tools were used to support collaborative writing and project-based learning in bilingual environments (Kuroda & Harrison, 2021). These tools mediated not only linguistic production but also the organization of joint activity, making the processes of drafting, negotiation, and revision visible to all participants. Research on collaborative writing has shown that such environments support language development by enabling learners to co-construct meaning and provide mutual scaffolding in real time (Storch, 2013; Warschauer, 2010).

Importantly, Google Workspace environments facilitated purposeful use of learners' first language(s) alongside Japanese. Bilingual drafting, peer explanation, and metalinguistic discussion were treated as legitimate mediational practices rather than as pedagogical obstacles. From a sociocultural perspective, these practices reflect the deployment of multiple semiotic resources to mediate cognition and learning activity, supporting learners' movement toward greater self-regulation (Swain, 2006; Lantolf & Thorne, 2006). Such translanguaging

practices also align with research emphasizing the role of learners' full linguistic repertoires in socially situated learning.

The adoption of Web 2.0 technologies prompted a further reconfiguration of the teacher's role. Rather than designing tightly sequenced instructional content, the teacher increasingly functioned as a mediator of participation frameworks and a curator of social interaction. Instruction focused on establishing norms for collaboration, guiding reflection on participation and identity, and supporting learners in navigating complex social learning spaces. This shift is consistent with sociocultural views of teaching as the orchestration of mediated activity rather than the transmission of knowledge (Van Lier, 2004).

In sociocultural terms, the Web 2.0 phase represents a move toward learning environments in which mediation, scaffolding, and ZPDs are socially distributed across networks of participants and tools.

The author's experiences using social networking platforms and collaborative workspaces illustrate how technologies can support not only linguistic development but also learner identity formation and participation in meaningful social activity. These developments provide a critical bridge to more recent AI-driven and data-intensive technologies, which further complicate questions of mediation, agency, and expertise in JSL/JFL learning.

6. 2010 - present: AI-Mediated Learning: Adaptive Mediation and the Reconfiguration of Scaffolding

Since the mid-2010s, advances in artificial intelligence (AI) have introduced new forms of mediation into Japanese second/foreign language (JSL/JFL) education, particularly in the areas of writing support, feedback, and task design. Unlike earlier technologies that provided either fixed or socially distributed scaffolding, AI-driven tools offer the possibility of adaptive mediation that responds dynamically to learner performance. From a sociocultural perspective, this development raises important questions about how mediation, scaffolding, and

the ZPD are conceptualized when assistance is partially automated.

In the author's teaching practice, since 2015, Google Workspace has continued to function as a central mediational environment for collaborative writing. Shared documents enable learners to co-construct texts, negotiate meaning through comments and revisions, and make the writing process visible over time (Kuroda & Harrison, 2021). These affordances support collective scaffolding and guided participation, as learners draw on peers' contributions and teacher feedback to refine their writing (Storch, 2013; Warschauer, 2010). Within an SCT framework, such environments externalize the processes of planning, drafting, and revising, allowing learners to operate within an expanded ZPD through socially mediated activity.

More recently, I have experimented with the integration of generative AI tools to further expand the nature of mediation in writing instruction classroom practice. AI has been used both to support the assessment of student writing and to assist in the design of writing tasks calibrated to learners' developmental levels. Automated analysis of linguistic features, coherence, and error patterns enables the teacher to identify emerging competencies and areas requiring support, the ZPD of the learner, informing decisions about task sequencing and scaffolding. From a sociocultural perspective, this use of AI positions technology as a mediational means that augments teacher judgment rather than replacing it.

Generative AI has also been employed to create writing prompts and tasks that are sensitive to learners' ZPD. By adjusting lexical density, syntactic complexity, and discourse demands, AI-assisted task design enables learners to engage in writing activities that stretch their current abilities while remaining achievable with appropriate support. This aligns with sociocultural research emphasizing that effective instruction targets learning potential rather than current performance (Vygotsky, 1978; Lantolf & Poehner, 2014). When used in this way, AI functions as a tool for designing mediated learning environments rather than as an autonomous instructional agent.

At the same time, the use of AI in writing assessment and feedback raises critical sociocultural concerns. Scaffolding in SCT is inherently dialogic and contingent, emerging through interaction between participants. Automated feedback, while efficient and consistent, lacks the intersubjectivity that characterizes human mediation. Research has cautioned that AI-generated feedback may prioritize formal accuracy over communicative intent or pragmatic appropriateness, aspects that are central to Japanese writing (Hyland & Hyland, 2006; Bibauw et al., 2022). Consequently, in the author's practice, AI-mediated feedback is embedded within broader cycles of peer review and teacher-led discussion, ensuring that mediation remains socially grounded.

The introduction of AI also reconfigures the teacher's role once again. Rather than serving as the primary source of feedback or task generation, the teacher increasingly functions as an orchestrator of mediational resources, determining how and when AI should be integrated into learning activity. This aligns with sociocultural views of teaching as the regulation of mediation and the management of learners' engagement within the ZPD (van Lier, 2004). Learners, in turn, are guided to critically interpret AI output, developing awareness of its affordances and limitations.

In sociocultural terms, AI-mediated technologies represent a new phase in the evolution of JSL/JFL learning environments, characterized by adaptive but non-human mediation. The author's experiences illustrate that when AI is positioned as a supplementary mediational tool—embedded within collaborative activity and guided by pedagogical intent—it can support more responsive scaffolding and more precisely targeted task design. At the same time, the reliance on AI foregrounds enduring questions about agency, expertise, and the social nature of language learning, underscoring the continued relevance of SCT for understanding technological change.

7. Discussion: Technology, Mediation, and Development Across Four Decades

Viewed through a sociocultural theoretical lens, the development of technology

in Japanese second/foreign language (JSL/JFL) education over the past forty years reveals a clear trajectory in how mediation, scaffolding, and learners' ZPD have been conceptualized and enacted. Across successive technological periods, the central change has not been the presence of technology per se, but the evolving ways in which tools have mediated activity, distributed expertise, and reshaped the social organization of learning. Table 1 illustrates how educational technologies used in JSL/JFL over the past four decades can be interpreted through core SCT constructs, focusing on mediation, ZPD and Teacher.

Early technologies of the 1980s and early 1990s provided essential but limited forms of mediation. Cassette tapes, language laboratories, and early drill-based CALL externalized aspects of linguistic input and memory, yet offered largely fixed scaffolding and minimal interaction. From an SCT perspective, these tools supported performance but rarely facilitated development within an expanded ZPD, as mediation was not contingent on learner activity and remained largely disconnected from social interaction. Learning was positioned as an individual process mediated by artifacts rather than as a socially co-constructed activity.

The expansion of CALL in the mid-1990s marked a critical shift toward interactive mediation. Multimedia tools, email exchanges, web-based projects, and early video conferencing enabled learners to participate in collaborative activity that extended beyond classroom boundaries. These technologies supported collective scaffolding and dialogic mediation, allowing learners to engage in communicative practices previously inaccessible without expert guidance. The author's experiences as a teacher during this period illustrate how the ZPD became increasingly distributed across peers, interlocutors, and task design, while the teacher's role evolved from information provider to mediator of activity.

Period	Dominant Technologies	Nature of Mediation	Relationship to Learner ZPD	Role of Teacher	Key References
1980s	Cassette tapes, language labs, paper-based materials	Unidirectional, symbolic mediation (input delivery)	Narrow ZPD engagement; assistance not contingent	External instructor; mediation outside technology	Vygotsky (1978)
Early–mid 1990s	Standalone CALL, word processors, multimedia CD-ROMs	Fixed scaffolding embedded in software	Limited ZPD expansion; pre-scripted support	Teacher supplements technological mediation	Wood et al. (1976); Levy (1997); Chapelle (2001)
Mid–late 1990s	Email, early WWW, telecollaboration	Dialogic mediation through interaction	ZPD expanded via peer/expert interaction	Teacher as facilitator and task designer	Warschauer (1996); Toyoda & Harrison (2002)
2000s	WebQuests, LMS, collaborative web authoring	Distributed mediation across tools and participants	Shared ZPDs emerge through collaboration	Teacher as mediator of activity systems	Lantolf & Thorne (2006); Larke & Harrison (2000)
2010s	Social networking sites, cloud-based collaboration	Identity-mediated participation in communities	ZPD shaped by trajectories of participation	Teacher orchestrates learning ecologies	Harrison & Thomas (2009); Lamy & Zourou (2013)
2020s	AI-assisted writing tools, generative AI	Adaptive, algorithmic mediation	Potentially fine-grained ZPD alignment; affective limits	Teacher as ethical and pedagogical mediator	Lantolf & Poehner (2014)

Table 1 Changes in Mediational Forms in JSL/JFL Technology Use (1980s–2020s)

The emergence of Web 2.0 technologies further transformed the sociocultural landscape of JSL/JFL learning by foregrounding participation, identity, and community membership. Social networking platforms and collaborative workspaces enabled learners to construct identities as legitimate users of Japanese and to engage in sustained interaction within global communities. Scaffolding became increasingly decentralized, emerging through peer feedback, shared authorship, and participation in authentic social practices. From an SCT perspective, this period highlights the importance of learner agency and identity in development, as mediation extended beyond instructional tasks to encompass

broader forms of social engagement.

More recent AI-mediated technologies represent both a continuation and a disruption of these trends. On the one hand, generative AI offers new possibilities for adaptive mediation, particularly in writing assessment and task design. By supporting the identification of emerging competencies and enabling the creation of developmentally appropriate tasks, AI can assist teachers in targeting learners' ZPD more precisely.

Taken together, this historical analysis suggests that technological development in JSL/JFL education has progressively expanded the possibilities for mediated learning, while simultaneously reaffirming the centrality of social interaction and human mediation. Technologies have increasingly enabled distributed scaffolding and expanded ZPDs, but they have not displaced the need for emotionally attuned, context-sensitive mediation. From a sociocultural perspective, the challenge for future pedagogical design lies not in replacing human teachers with increasingly sophisticated tools, but in integrating emerging technologies in ways that enhance, rather than constrain, the fundamentally social nature of language development.

8. Conclusion: Future Directions

This paper has traced the development of technology in Japanese second/foreign language (JSL/JFL) education over the past four decades, as experienced by the author as both a learner and teacher, through the lens of SCT, foregrounding mediation, scaffolding, and the ZPD as unifying analytical constructs. Across successive technological phases—from early analog tools to generative AI—the central insight has been that technologies do not determine learning outcomes in themselves; rather, they reorganize the social, cultural, and interactional conditions under which learning occurs. When understood as mediational means embedded in activity systems, technologies can expand learners' ZPDs, redistribute expertise, and support participation in increasingly authentic language practices.

Looking ahead, future developments in language education technology are likely to further blur boundaries between human and non-human mediation. Advances in AI-driven analytics, multimodal interaction, and immersive environments promise increasingly responsive learning systems capable of adapting to learner performance in real time. From an SCT perspective, the pedagogical value of such systems will depend on how they are integrated into socially mediated learning activity. Technologies that support collaboration, reflection, and guided participation are more likely to foster development than those that position learners as isolated users interacting primarily with automated systems. SCT foregrounds the fundamentally social, dialogic, and affective nature of mediation —dimensions that current AI systems cannot fully replicate.

For example, a key limitation of generative AI as a mediator lies in its lack of emotional intelligence and intersubjectivity. SCT emphasizes that effective scaffolding is contingent, responsive, and grounded in shared understanding between participants. Human mediators draw on emotional cues, relational histories, and contextual knowledge to regulate assistance and to support learners' confidence, motivation, and identity. AI-generated feedback, while linguistically sophisticated, lacks access to learners' emotional states and cannot engage in genuine intersubjective meaning-making. As a result, AI mediation risks reducing scaffolding to formal accuracy and surface-level performance, particularly in a language such as Japanese, where pragmatic sensitivity and affective nuance are central.

Furthermore, SCT highlights that mediation is inseparable from agency and responsibility. When AI assumes roles traditionally associated with teachers— such as assessment or feedback—there is a danger that learners may orient toward AI output as authoritative, potentially undermining opportunities for negotiation, reflection, and collaborative meaning-making. The author's practice demonstrates that AI is most pedagogically productive when embedded within socially mediated activity, where learners critically engage with AI feedback alongside peer and teacher interaction.

For Japanese language education in particular, future directions should prioritize technologies that support pragmatic competence, interactional sensitivity, and identity development alongside linguistic accuracy. Given the sociocultural and affective demands of Japanese communication, instructional design must ensure that learners continue to engage in meaningful social interaction with human interlocutors. AI and other emerging tools should therefore be positioned as supportive mediational resources that enhance teacher and peer interaction, rather than as substitutes for them.

In conclusion, the future of technology in JSL/JFL education lies not in the pursuit of increasingly autonomous instructional systems, but in the thoughtful integration of emerging tools within socially and ethically grounded pedagogical frameworks. SCT offers a powerful lens for guiding this integration, reminding educators and policymakers alike that language learning is fundamentally a human, relational, and culturally situated process. By foregrounding mediation, collaboration, and ethical responsibility, future technological innovation can contribute to more equitable, meaningful, and developmentally appropriate language education.

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〔特別寄稿〕

日本語学習の媒介
―JSL／JFL教育におけるテクノロジーの簡史―

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本論文は、日本語第二言語教育（JSL）と外国語教育（JFL）における教育工学の発展を、過去40年間にわたり社会文化理論（Sociocultural Theory: SCT）の枠組みから再検討することを目的とする。とりわけ、ヴィゴツキーが提唱した媒介（mediation）、発達の最近接領域（Zone of Proximal Development: ZPD）、および足場かけ（scaffolding）の概念を理論的基盤として、教育工学が学習過程および学習環境の構造をいかに変容させてきたかを分析する。

1980年代におけるカセット教材やLL教室などの初期技術は、主としてインプットを提供する一方向的媒介として機能し、学習者のZPDへの働きかけは限定的であった。これに対し、1990年代中期以降、電子メール、WWW、遠隔共同学習の普及により、学習者間および母語話者との対話的相互作用が促進され、協働的かつ動的な足場かけが可能となった。

さらに2000年代には、WebQuestや学習管理システムの導入により、複数のツールおよび参加者が関与する分散的媒介が形成され、学習活動は目的志向的かつ協働的な活動体系として再構成された。2010年代には、ソーシャル・ネットワーキング・サービス（SNS）やクラウド型協働環境の普及に伴い、学習者のアイデンティティ形成や参加軌跡が学習過程に深く関与するようになった。近年では、生成AIの導入により、学習者の発達段階に応じた適応的支援の可能性が拡大している一方で、情意的理解や社会的関係性の媒介に関する課題も指摘されている。

本研究は、これらの技術的変遷を通して、教育工学が言語学習における社会的実践を媒介する文化的人工物として果たしてきた役割を理論的に考察し、今後の日本語教育における教育実践および教育政策への示唆を提示する。