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ORIGINAL ARTICLE

AI-Generated Instructional Materials for Enhancing Educator Resilience and Sustainability in Distance Language Education

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ABSTRACT

The integration of generative AI into education offers new possibilities for instructional materials, yet questions persist regarding its impact on the human dimensions of teaching. This study aims to synthesize research on language teacher resilience, instructor presence in video-based learning, and educational sustainability to derive teacher-centred design principles for using AI-generated materials in distance language education. Through a narrative review, the analysis identifies convergence points across these strands. The synthesis reveals that generative AI is most effective when it reduces routine tasks, allowing instructors to focus on dialogic feedback and mentoring. Proposed design principles operate at micro (course), meso (professional communities), and macro (institutional) levels, with evidence drawn from diverse global contexts. The synthesis indicates comparable learning outcomes for machine versus human-produced videos but emphasizes the importance of perceived instructor authenticity. The study cautions that without workload safeguards, efficiency gains may become invisible labour. It concludes that AI's educational promise is realized when it enhances teacher visibility and when institutional policies prioritize pedagogical care alongside technological speed.

Keywords: AI-generated instructional materials, teacher resilience, distance language education, sustainability, instructor presence, communities of practice, ecological model

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INTRODUCTION

Three pressures have converged in recent years to place distance language education at the center of a consequential conversation. Artificial intelligence has moved from research laboratories into daily pedagogical practices, and at the same time, a renewed and evidence-based focus has emerged on the well-being and professional longevity of language teachers across different national contexts; moreover, international policy increasingly demands that educational services not only be effective but also sustainable. The materials that teachers produce, curate, and deliver sit at the intersection of all three pressures. Text, audio, and video assets can now be drafted, captioned, translated, and versioned in minutes rather than weeks. What determines their educational worth, however, is not production speed alone but whether they strengthen the human conditions on which good teaching depends: presence, professional judgment, cultural attunement, and the resilient capacity to sustain high-quality work across cohorts and modalities.

So framed, intelligent production tools are best understood not as substitutes for the educator but as catalysts for design decisions that protect teacher agency while widening equitable access to language learning. This study aims to synthesize research on language teacher resilience, instructor presence in video-based learning, and educational sustainability to derive teacher-centered design principles for using AI-generated materials in distance language education. This study adopts an educator-first stance. It defines AI-generated instructional materials (hereafter AIGIMs) as resources produced or co-produced by generative systems such as large language models, text-to-speech engines, and text-to-video platforms, and subsequently curated by teachers for pedagogical fit. Curation, in this framework, is the locus of professional agency: the point at which teachers shape intent, adjust register, embed cultural nuance, and decide what not to automate (Holmes et al., 2021; Zawacki-Richter et al., 2019).

Although much of the empirical evidence reviewed in this study concerns AI-generated instructional video—where the largest body of comparative research currently exists (Netland et al., 2025; Xu et al., 2025; Hai et al., 2025)—the design principles developed here are intended to apply more broadly to AIGIMs across modalities. Video-based research is treated as a theoretically instructive case: findings on instructor presence, social presence, and cognitive load generalize to other AI-generated formats (e.g., automated captions, leveled reading passages, LLM-drafted exemplars) insofar as those formats similarly afford the redistribution of routine production work while requiring teacher curation for cultural and relational fit. Where evidence specific to non-video AIGIMs remains nascent, the principles derived from video research are offered as provisional and in need of domain-specific validation.

The argument is deliberately international in scope and attentive to contextual diversity, consistent with the editorial priorities of global handbooks. Evidence is drawn from Europe, East and Southeast Asia, the Middle East, Sub-Saharan Africa, and the Americas. Language-teacher psychology is connected with emerging findings on instructional video, synthetic media, and human-centered sustainability. The overarching aim is to show how AI-mediated production can be aligned with resilience and sustainability rather than pursued at their expense.

1.1. The Resilience Imperative

Across applied linguistics and educational psychology, the concept of resilience has shifted from a fixed personality trait to a dynamic, ecological capacity distributed across individual, relational, and institutional layers (Beltman et al., 2011; Gu & Day, 2013; Mansfield et al., 2016). This ecological turn, which is detailed in Section 3.1, has yielded validated measurement instruments, structural models, and qualitative case studies that collectively establish language-teacher resilience as both measurable and designable: a legitimate target for technology-enhanced program design (Liu et al.,

2024; Liu & Chu, 2022; Duan et al., 2025). In Europe, mixed-methods research has linked resilience and well-being to the enjoyment derived from language teaching (Ergün & Dewaele, 2021), while longitudinal work with early-career world language teachers in North America traces how supportive leadership and peer networks stabilize identity during the formative years of practice (Davis & Borden, 2025). A recent study further shows that growth in mindset and resilience directly reduce burnout, with teaching motivation as a partial mediator (Shen & Guo, 2025). These findings, which are reviewed more fully in Section 3, ground the argument that AI-augmented workflows can be deliberately designed to protect the ecological resources on which resilient teaching depends.

1.2. The Video-Based Learning Evidence Base

A second strand of literature concerns learner-facing instructional media. Over the past decade, systematic reviews and meta-analyses have demonstrated that video reliably supports learning when it is segmented, signposted, and paced for cognitive load, and when a real instructor's voice and stance are perceptible. A large-scale systematic review of video in higher education confirmed that well-designed video reliably improves learning outcomes relative to business-as-usual instruction (Noetel et al., 2021). The instructor presence effect, whereby a visible or audible teacher shapes attention, motivation, and perceived learning, has been corroborated in a series of meta-analyses spanning affective, social, and cognitive outcomes (Beege et al., 2023). Additional meta-analytic and systematic-review evidence has clarified that, while instructor presence alone may not always produce significant gains in knowledge acquisition, it reliably boosts motivation and social presence; specific social cues such as gaze direction and gesture matter more than mere on-screen visibility (Alemdag, 2022; Polat, 2023).

Meanwhile, the production bottleneck that once limited video use has eased dramatically. Generative systems accelerate storyboard drafting, narration, captioning, and the creation of leveled examples. An important body of experimental work on machine-produced instructional videos emerged in 2024–2025. Netland et al. (2025), in a large-scale experiment with 447 participants, found no significant difference in learning outcomes between AI-generated and human-made teaching videos, although learners rated human-produced videos higher on perceived credibility and instructional clarity. Xu et al. (2025) reported that computationally generated instructional videos facilitated learning as effectively as recorded videos and, in an English language learning context, even triggered higher retention scores. A rapid review synthesizing 15 studies concluded that algorithmically produced videos yielded learning outcomes comparable to instructor-produced ones while offering substantially greater efficiency and scalability (Hai et al., 2025). A systematic literature review by Zhang and Shukor (2025) further corroborated these trends, concluding that AI-generated instructional videos can serve as viable alternatives to traditionally produced content while pointing to the need for empirical validation of long-term learning effects. A broad review of video characteristics, tools, and learning effectiveness confirmed that design features such as segmentation and instructor presence remain more consequential for learning than production format, reinforcing the case for principled integration of machine-produced media (Navarrete et al., 2025). Additionally, an empirical investigation of human-like digital instructors found that both visual and verbal human likeness in e-learning environments significantly enhanced learner satisfaction, suggesting that the degree to which synthetic instructors approximate human qualities shapes affective outcomes (Chu, 2025). These findings extend the foundational work of Leiker et al. (2023), whose early research on synthetic learning videos demonstrated that, when multimedia design principles are observed, short AI-generated segments can achieve short-term learning outcomes comparable to traditionally produced clips—while offering the added advantage of faster updates.

For distance language education, the practical lesson is not to replace human presence but to reserve it for moments carrying relational or intercultural weight, delegating to machines the production of repeatable elements that are costly in time yet low in professional judgment.

1.3. The Sustainability Framework

A third strand ties resilience to sustainable practice. Sustainability in education is too often collapsed into environmental metrics or device lifecycles. A human-centered view encompasses psychological endurance, social equity, and institutional viability (Sterling, 2021). In the teaching domain, that translates into limiting invisible work, protecting time for feedback and mentoring, ensuring transparent governance of data and authorship, and preventing the inequalities that arise when only some teachers have access to tools or curation time.

International studies converge on a consistent lesson: supportive environments and genuine professional autonomy correlate with lower burnout and stronger work commitment among language teachers, whereas heavy workloads and opaque institutional mandates erode both well-being and performance (Gu & Day, 2013; Johnson et al., 2014). Recent research with EFL teachers confirms that resilience and well-being serve as protective factors against burnout, with resilience often emerging as the stronger predictor (Ding et al., 2025). Research on psychological capital and mindfulness among Chinese EFL educators has further demonstrated that resilience, as a component of psychological capital, is inversely related to burnout, with mindfulness playing a mediating role, which points to the importance of reflective practice even in technology-mediated workflows (Liu & Du, 2024). Structural models of occupational stress, burnout, and resilience among Iranian EFL teachers reveal that lack of supervisory support drives occupational stress more powerfully than other contextual dimensions, highlighting the importance of administrative backing for any AI adoption initiative (Karimi & Bani Adam, 2023). These patterns recur across contexts as different as Japan, Indonesia, Iran, China, and Türkiye, and they intersect directly with the design choices embedded in AI projects (Stewart & Reinders, 2024; Rizqi, 2017; Aykut, 2025).

1.4. Generative AI in Language Education: Current Landscape

The integration of generative AI in language education has accelerated at a pace that outstrips many institutional responses. A systematic review of 144 empirical studies published between 2023 and 2024 documents exponential growth in research, with a notable shift from exploratory inquiries to more rigorous empirical investigations organized around six foci: perceptions and attitudes, psychological and cognitive aspects, teaching and learning strategies, language skills development, writing and feedback, and implementation and integration (Li et al., 2025). However, this rapid adoption raises legitimate concerns that deserve acknowledgment, including algorithmic bias, data privacy risks, the environmental cost of training and deploying large models, and the potential commodification of teaching as relational practice is displaced by automated content generation. Qualitative work with teachers in Australia cautions that the availability of algorithmically generated resources does not automatically improve instructional quality. What matters is the teacher's nuanced understanding of students and contexts, professional knowledge and judgment, and the capacity to orchestrate AI outputs with sound pedagogical decisions; indeed, some teachers deliberately conceal their AI use due to relational and contextual factors that frame it as a threat to the integrity of language learning (Barnes & Tour, 2025).

These findings reflect the curation imperative which has been emphasized throughout this study. Teachers do not merely consume machine-produced assets; they negotiate their use within specific epistemological beliefs, perceptions of professional agency, and broadly held educational values. When adoption is framed as augmentation that frees time for mentoring and intercultural work, teachers tend to report gains in agency and competence; when it is mandated as substitution, reports of anxiety and lost authorship follow, with adverse consequences for resilience (Stewart & Reinders, 2024).

1.5. International Relevance and Contextual Diversity

International relevance demands looking beyond affluent, well-resourced settings. In Sub-Saharan Africa, teacher associations in Cameroon, Côte d'Ivoire, and Rwanda have used low-bandwidth social media to build communities of practice that explicitly support individual and collective resilience. WhatsApp-based groups have widened access to resources and peer support for teachers in remote areas, though they have also introduced new workload challenges for moderators, which serves as a reminder that sustainability requires careful attention to human effort alongside connectivity (Motteram & Dawson, 2019). A longitudinal quasi-experiment in rural Côte d'Ivoire demonstrated that chatbot-facilitated virtual communities of practice enabled teachers to ask questions, share stories, and adapt their practices, suggesting promising avenues for AI-supported professional development in low-resource contexts (Cannanure et al., 2024). Survey data from these settings show high mobile phone access coupled with unreliable home Wi-Fi, a pattern that favors lightweight media and micro-content over heavy synchronous delivery, and that underscores the value of small, reusable, machine-generated assets able to travel across bandwidth constraints.

In Türkiye, recent research on ELT educators' resilience following the devastating February 2023 earthquakes illustrates how crisis contexts shape the relationship between professional resources and adaptive capacity, showing that resilience is forged not in abstraction but in lived adversity (Aykut, 2025). Ecological studies of language teachers' emotional well-being in Turkish private schools further confirm that cooperation and collegiality among language teachers allow them to cope with challenges and empower professional development, even amid precarious employment and volatile conditions (Irgin, 2025).

The case for integrating AI-driven tools into education as support for long-term, sustainable teaching is reinforced by the mutually reinforcing connection between educators' resilience and their students' academic success. Research employing structural models with EFL cohorts demonstrates that resilient teachers tend to foster classrooms characterized by greater student engagement and psychological flourishing, alongside reduced instances of anxiety and frustration. Critically, this resilience is itself nourished by two key factors: a belief in the malleability of ability and a clearly articulated, aspirational image of oneself as a proficient second-language user. In turn, this cultivated resilience fuels sustained effort and active involvement in learning activities (Zarrinabadi et al., 2022). On the teacher side, resilience and well-being predict the enjoyment educators derive from language teaching, a subjective outcome that correlates with attention to interaction and quality of feedback (Ergün & Dewaele, 2021). These bidirectional dynamics suggest strategies that reduce preventable workload and increase perceived effectiveness function as protective factors for both practitioners and programs (Ding et al., 2025).

The rationale for this study is straightforward. Distance language educators face genuine constraints of time, attention, and social presence unlikely to abate. Machine-produced instructional resources, when embedded in human-centered workflows and governed transparently, can relieve routine production loads, safeguard teacher presence, and

contribute to both psychological and organizational sustainability. The evidence base is strong enough to guide practice and humble enough to require careful, contextual experimentation.

METHOD

In this study, the role of AI-generated instructional materials in distance language education is examined through the lenses of educator resilience and sustainability. The chosen methodological approach was a narrative review of the literature. Unlike systematic reviews that adhere to rigid protocols, the narrative review proceeds by surveying the full corpus of relevant scholarship, identifying recurring themes and points of convergence, and weaving these disparate threads into an overarching, integrative account of the state of knowledge (Baumeister & Leary, 1997; Snyder, 2019). In this present study, three converging bodies of scholarship, namely ecological models of foreign language teacher resilience, research on instructor presence in video-based learning, and human-centered frameworks of educational sustainability, were first reviewed independently. Building on this conceptual foundation, six teacher-centered design principles were formulated at the micro, meso, and macro levels of educational practice. The implications of this synthesis were then discussed with attention to contextual diversity across international settings, and future research directions were proposed.

CONCEPTUAL BACKGROUND

Any credible account of computationally authored materials in distance language education must begin by clarifying three interlocking constructs, which are resilience, sustainability, and intelligent media, because the educational value of automation depends on the human and institutional ecologies in which it operates.

3.1. From Trait to Ecology: Resilience in Language Teaching

Resilience research in language education has shifted from personality-focused views to ecological models where adaptive capacity spans people, relationships, and systems. Early work emphasized stable traits; newer models highlight dynamic interactions among individual, social, and organizational factors (Beltman et al., 2011; Gu & Day, 2013; Mansfield et al., 2016). Large-scale studies in East Asia support this shift. Liu et al. (2024) validated a four-dimensional language teacher resilience scale with 3,992 Chinese EFL teachers, showing strong measurement invariance across career stages. Liu and Chu (2022) identified a three-factor structure—tenacity, optimism, and coping style—among Chinese high-school teachers, noting variation within one national context.

Qualitative longitudinal studies trace how autonomy, mentoring, and identity work affect early-career teachers' adaptive capacity (Davis & Borden, 2025). In Iran, research links resilience to reflective practice and collegial dialogue, aligning with collaborative review of AI outputs (Shirazizadeh & Abbaszadeh, 2023). Resilience and self-efficacy connections appear across Iranian and Indonesian EFL settings, aiding adaptation to challenges like new technologies (Razmjoo & Ayoobiyan, 2019; Rizqi, 2017). Drawing on Bronfenbrenner's ecological systems theory (1994), a 2025 study with vocational EFL teachers confirmed that resilience operates along three interrelated dimensions. Bronfenbrenner's model is particularly instructive here because it insists that individual development cannot be understood in isolation; rather, it is shaped by concentric layers of environmental influence from immediate interpersonal interactions to broader institutional and cultural forces. Applying this lens, the researchers framed resilience as a fluid, context-dependent process that facilitates long-term professional sustainability (Duan et al., 2025). When this body of evidence is viewed as a whole, resilience emerges as a practical objective for intentional

intervention. Programs can deliberately foster resilience by targeting four resource domains—professional knowledge, emotional stability, social belonging, and cultural adaptability—and technology-supported teaching tools offer one concrete avenue for providing the necessary structural support.

3.2. Sustainability as a Human-Centered Horizon

Sustainability provides the normative horizon for design. In education, it spans psychological endurance, social equity, and institutional viability, not just environmental concerns (Sterling, 2021). For teachers, this means reducing invisible work, protecting time for feedback and mentoring, and ensuring transparent governance.

Across diverse language programs, supportive environments and genuine autonomy correlate with lower burnout and stronger commitment, while excessive workloads and unclear mandates harm well-being and performance (Gu & Day, 2013; Johnson et al., 2014). Structural models with EFL teachers show resilience and well-being together predict reduced burnout, suggesting interventions that ease preventable burdens or boost effectiveness act as protective factors (Ding et al., 2025). Research on Chinese EFL educators indicates resilience relates inversely to burnout, with mindfulness as a mediator, highlighting reflective practice's role in sustaining well-being even amid technology-intensive work (Liu & Du, 2024). Meanwhile, educational AI research has tended to prioritize analytics and learner performance over teachers' daily labor and ethical responsibilities (Zawacki-Richter et al., 2019; Bozkurt et al., 2021). Centering sustainability on the educator begins to correct that imbalance.

3.3. Intelligent Media: From Production Bottleneck to Presence Amplifier

Against this human and organizational backdrop, intelligent media serve not as ends but as means to redistribute effort and attention. AIGIMs such as LLM-generated scripts, text-to-speech audio, text-to-video explanations, and automated captions offer three pedagogical benefits. They reduce routine production work like outlining and captioning that pulls teachers from relational engagement (Chen et al., 2020; Holmes et al., 2021). They enable finer differentiation through leveled tasks and parallel texts. And they make short, current media feasible, aligning with evidence that concise, segmented video with instructor presence boosts learning outcomes (Noetel et al., 2021; Henderson & Schroeder, 2021; Beege et al., 2023).

The evidence base for machine-produced instructional videos has grown substantially since 2023. Netland et al. (2025) found that AI-generated videos achieved learning outcomes equivalent to human-made ones, though learners preferred human videos for credibility. Xu et al. (2025) reported that computationally generated videos matched or exceeded recorded ones in retention for English learning. Hai et al. (2025) synthesized 15 studies showing that algorithmically produced videos yield comparable outcomes with greater efficiency. Field experiments confirmed visible instructors boost social presence (d = .85) and well-being (d = 1.01) in authentic university settings (Heidig et al., 2024). The implications essentially meant that human roles would be confined to tasks like setting the initial framework, offering evaluative feedback, and managing cross-cultural communication, while all repetitive, mass-production work would be delegated entirely to machines.

3.4. The Intersection: How Intelligent Media Relate to Resilience

A key question is how these media intersect with resilience. On the teacher side, studies connect resilient dispositions with meaningful outcomes. Italian data show resilience and well-being predict teaching enjoyment, which relates to interactive, feedback-rich practices often hard to sustain online (Ergün & Dewaele, 2021). Among students, structural

models indicate growth mindset and ideal L2 self-build resilience, feeding effort and participation while reducing negative affect—linking teacher resilience with learner engagement through task design and feedback tone (Zarrinabadi et al., 2022).

Presence bridges both sides. When AI tools reduce production burdens, teachers can reinvest time in dialogic feedback and culturally situated examples—activities that heighten social presence, stabilize identity, and support resilience's emotional and professional dimensions. This aligns with research embedding reflective practice and collegial dialogue in resilient EFL teacher behavior (Shirazizadeh & Abbaszadeh, 2023) and with regional studies linking resilience to self-efficacy (Razmjoo & Ayoobiyan, 2019).

3.5. Teacher Identity, Agency, and the Adoption Question

A conceptual background must address teacher identity and agency, as these shape whether intelligent tools are experienced as empowerment or erosion. The language-teacher-psychology tradition emphasizes identities negotiated across personal, relational, and policy layers; AI intensifies this by shifting the scale of everyday pedagogical decisions (Mercer & Kostoulas, 2018; Hiver & Dörnyei, 2017). Qualitative synthesis highlights resilience as a contextual process involving antecedents, appraisal, and action, making human reflection and collegial feedback essential (Stewart & Reinders, 2024). When adoption is framed as augmentation—freeing time for mentoring and cross-cultural work—teachers report agency and competence; when mandated as substitution, anxiety and loss of authorship follow (Barnes & Tour, 2025; Davis & Borden, 2025).

This study treats AIGIMs as affordances whose effects depend on design choices at three levels: micro (automate the repeatable, humanize the relational), meso (embed workflows in communities of practice), and macro (governance that formalizes curation time, clarifies data and authorship policies, and ensures equitable access). These levels structure the design principles that follow.

TEACHER-CENTERED DESIGN PRINCIPLES AND INSTITUTIONAL GOVERNANCE

This section translates the conceptual background into design principles and program-level arrangements. The fundamental question is practical, not technical: if intelligent tools now make it efficient to draft explanations, generate captions and translations, and assemble short videos, what patterns of use protect teacher presence, bolster resilience, and keep pedagogy sustainable over time? Table 1 provides an overview of the six principles, each of which is elaborated.

Table 1. An overview of the six principles

#	Principle	Level	Core Action
1	Automate the repeatable, humanize the relational	Micro	Use AI for drafts, captions, variants; keep teacher voice at threshold moments
2	Preserve agency through formalized curation time	Micro/Meso	Designate review windows in workload models; treat sign-off as a condition of use
3	Treat AI work as collective craft	Meso	Share prompt libraries, rotate peer review, build reusable-asset repositories
4	Design for equity and linguistic inclusion	Meso/Macro	Pair tool access with training; require dialect/register annotations;

			favor lightweight media
5	Embed transparency and provenance	Macro	Label synthetic assets; maintain model cards; store version histories
6	Measure both sides of the classroom	Macro	Track teacher resilience and time logs alongside student outcomes

Principle 1: Automate the Repeatable, Humanize the Relational

In distance language education, the most time-consuming tasks are often routine authoring and versioning. Text-to-speech can produce serviceable narration; text-to-video can assemble short micro-explanations following multimedia design principles. Those gains matter, however, only when the teacher's voice, stance, and local examples remain visible at moments carrying social or intercultural weight. A decade of research on video-based learning demonstrates that design features such as segmentation and signaling exert stronger effects on learning than production gloss, while instructor presence improves attention, affect, and perceived learning across settings (Henderson & Schroeder, 2021; Beege et al., 2023; Noetel et al., 2021). The recent experimental evidence that computationally generated videos match the learning outcomes of human-produced ones (Netland et al., 2025; Xu et al., 2025) strengthens the case for a mixed-economy approach: machines handle first-pass drafting, variant exercises, and captioning; teachers curate threshold moments in their own voice.

At the course level, the workflow is straightforward. Teachers create short, purpose-built clips introducing threshold concepts in their own voice, then interleave algorithmically generated segments for routine demonstrations. Captions, bilingual subtitles, and leveled practice sets are generated with AI assistance and reviewed for register and cultural appropriateness. The pattern lets instructors redirect time from mechanical production to dialogic feedback and mentoring, both of which are identified by the resilience literature as the human work sustaining motivation and learning (Ergün & Dewaele, 2021).

Principle 2: Preserve Agency Through Formalized Curation Time and Credit

Resilience in language teaching is an ecological capacity dependent on perceived control, collegial support, and feasible workloads (Liu et al., 2024; Duan et al., 2025). Quantitative studies with EFL teachers show that resilience and well-being are inversely related to burnout; interventions reducing avoidable load or increasing perceived efficacy protect both people and programs (Ding et al., 2025). If machine-produced assets land on teachers' desks without recognized review time, the result is more invisible work and diminished authorship. A sustainable policy, therefore, designates curation windows in the course calendar, acknowledges review in workload models, and treats human sign-off as a condition of use. By maintaining the professional and emotional resources necessary for high-quality instruction, these actions promote innovation rather than impede it.

Principle 3: Treat AI Work as Collective Craft

Communities of practice have long been a lifeline for teachers, especially in remote or resource-constrained contexts. In Sub-Saharan Africa, teacher associations have used WhatsApp groups to share materials and provide mutual support at minimal cost (Motteram & Dawson, 2019). A longitudinal quasi-experiment in rural Côte d'Ivoire demonstrated that chatbot-facilitated virtual communities of practice enabled teachers to share pedagogical strategies and adapt practices collectively, suggesting that intelligent tools can facilitate rather than replace collegial interaction (Cannanure et al., 2024). The same logic extends to AIGIM workflows: shared prompt libraries, peer review of scripts and media, and small

repositories of reusable assets convert individual effort into collective efficacy. Moderation and quality assurance are themselves forms of labor that should be recognized and rotated; when they are, the social dimension of resilience grows alongside the technical one.

Principle 4: Design for Equity and Linguistic Inclusion

Programs that provide AI licenses without training, or training without protected practice time, unwittingly widen gaps between instructors. Programs deploying synthetic media without dialect and register checks risk amplifying bias. A human-centered view of sustainability reminds us that educational progress includes psychological and social conditions, not only efficiency metrics (Sterling, 2021). Equitable adoption pairs access to tools with short, practice-based professional learning; aligns outputs to accessibility standards; and requires dialect and register annotations for all reusable language assets. In crisis contexts or low-connectivity settings where teachers report a mixture of ingenuity and constraint, equity also means preferring lightweight media and micro-content that travel through narrow bandwidth and can be localized without heavy software dependencies (Aykut, 2025). Ecological studies of language teachers in Türkiye confirm that cooperation and collegiality allow teachers to cope with systemic challenges, including precarious employment and unstable schedules, but only when institutional structures support rather than undermine these coping resources (Irgin, 2025).

Principle 5: Embed Transparency and Provenance

Language teaching is uniquely sensitive to provenance because meaning is inseparable from voice and context. Labeling synthetic assets, maintaining a simple model card for recurring workflows that records purpose, training-data disclosures from vendors, likely failure modes, and the name of the human reviewer, and storing version histories are practical steps that protect trust. AI-in-education scholarship has repeatedly noted that research and development agendas have centered on analytics and learner performance while giving insufficient attention to the teacher's daily work and ethical responsibilities (Zawacki-Richter et al., 2019; Holmes et al., 2021). A transparency norm begins to correct that imbalance while making it easier for teams to audit practices for unintentional dialect bias or exclusionary examples.

The ethical dimension extends beyond labeling. Three concerns deserve particular attention. First, copyright and intellectual property: when generative models produce text or audio trained on copyrighted corpora, the ownership status of resulting instructional assets remains legally ambiguous in many jurisdictions, and programs should document provenance and seek institutional legal guidance. Second, data privacy: if AI tools process student writing or speech for leveling or feedback, data-handling policies must specify what is stored, where, and for how long, in compliance with regulations such as the General Data Protection Regulation (GDPR) or The Law on the Protection of Personal Data (KVKK). Third, representational fairness: large language models carry well-documented biases toward majority dialects and cultural norms (Holmes et al., 2021); in multilingual or multicultural language classrooms, unchecked outputs risk marginalizing non-standard varieties or reinforcing stereotypes. A human-in-the-loop review explicitly targeting these three areas, namely provenance, privacy, and representational equity, transforms transparency from a bureaucratic exercise into a pedagogically meaningful safeguard.

Principle 6: Measure Both Sides of the Classroom

Tracking student outcomes after adoption is necessary but insufficient; the teacher's experience must also be visible.

Resilience scales developed for language teachers now allow programs to monitor professional, emotional, social, and cultural dimensions over time (Liu et al., 2024; Liu & Chu, 2022). When programs pair these instruments with simple time logs recording hours shifted from production to feedback, they can test the central claim of augmentation, namely that intelligent tools free time for the work only humans can do. On the student side, resilience-mediated engagement measures may validate this claim, while teacher satisfaction, which predicts interactive instructional behavior, may serve as a practical indicator that the design is functioning as intended (Zarrinabadi et al., 2022; Ergün & Dewaele, 2021).

Governance makes course-level practices durable. A concise program-level policy can specify acceptable AI use, data handling, attribution, and how curation is scheduled and credited. It can require synthetic media be labeled, human framing and feedback remain visible at key moments, and accessibility and dialect checks be documented before assets are reused. Instructors need not become ethicists or engineers to meet these requirements. The goal is to align rules with existing resilience and sustainability goals. Without alignment, efficiency gains risk hidden costs to well-being and equity; with it, teachers report greater confidence and authorship, and teams improve practice through iterative asset revision (Sterling, 2021; Holmes et al., 2021).

DISCUSSION AND IMPLICATIONS

At its core, this study claims that computationally authored instructional resources can strengthen distance language educators' work when they protect teacher presence, redistribute cognitive load toward high-impact human work, and are scaffolded by collegial and institutional structures. The discussion that follows integrates what is known about teacher resilience in foreign language education with research on instructional media, presence, and ethical sustainability, and considers how these strands play out across diverse contexts.

5.1. Intelligent Media and the Ecological Structure of Resilience

Empirical work confirms that teacher resilience is measurable and multidimensional, sensitive to the specific demands of language work (Liu et al., 2024; Duan et al., 2025). Machine-assisted workflows can significantly reduce the time spent producing recurrent assets like draft scripts, leveled exemplars, captions, and audio narration. This efficiency frees up valuable hours for educators. Those reclaimed hours can then be channeled into the very areas emphasized by the four-factor model: refining task design and feedback (professional), modulating tone to build trust (emotional), engaging in collaborative peer review and resource sharing (social), and selecting culturally appropriate materials (cultural). Technology does not produce resilience; it creates conditions under which resilience resources can be mobilized. The recent demonstration that growth mindset and resilience directly reduce burnout, with teaching motivation as mediator (Shen & Guo, 2025), implies that AI workflows preserving teachers' sense of competence and purpose should yield cascading benefits for motivation and sustainability alike.

5.2. Presence at Scale: Opportunities and Tensions

The alignment between technological relief and human presence matters because presence has demonstrable effects on learning and affects in video-rich courses. If machine-produced assets are deployed without the teacher's imprint, they risk thinning social presence; if they accelerate the repeatable while preserving authentic teacher cues at key junctures, they can raise the floor of quality without lowering the ceiling of connection (Noetel et al., 2021; Beege et al., 2023). The 2024–2025 experimental evidence strengthens this argument: Netland et al. (2025) and Xu et al. (2025)

show that computationally generated videos can match learning outcomes, yet learners continue to value human credibility and authenticity. Field experiments by Heidig et al. (2024) reveal meaningful effect sizes for social presence and well-being when personally known instructors appear in course-embedded videos. In distance language education, where pragmatics, register, and cultural nuance carry meaning, a human-in-the-loop design is a pedagogical condition, not a cosmetic afterthought.

A presence-first authoring principle, therefore, constrains AIGIM use: deploy machines for first-pass drafting, versioning, and captioning; retain the teacher's voice or brief on-camera segments at conceptual thresholds and in feedback; always reserve time for cultural and pragmatic review. This principle travels across settings, whether an Italian instructor in a university L2 course, a Chinese EFL teacher in senior high, or a Turkish instructor teaching through crisis, because it attaches to a generalizable cognitive and affective substrate while leaving space to localize examples, accents, and registers.

A counter-argument, however, deserves consideration. One might reasonably ask whether the "presence-first" framing overstates the indispensability of human cues. After all, Netland et al. (2025) found equivalent learning outcomes even when participants watched fully AI-generated videos. Could it be that presence matters less than assumed, especially for routine procedural content? The answer hinges on what we measure. Short-term knowledge acquisition may indeed be robust to the absence of a human instructor, but the affective, relational, and motivational dimensions that sustain engagement over a full course, such as social presence, perceived care, and trust in the instructor, are precisely where human cues prove most consequential (Heidig et al., 2024; Beege et al., 2023). In language education, where pragmatic competence, register sensitivity, and intercultural positioning are learning objectives in their own right, the case for strategically placed human presence remains strong. The argument is not that every frame must feature a teacher, but that the moments carrying relational weight should.

5.3. The Resilience–Engagement–Well-Being Nexus

Among Italian language teachers, resilience and well-being predict the enjoyment of foreign language teaching, providing a motivational rationale for adoption pathways that preserve teachers' initiative and satisfaction (Ergün & Dewaele, 2021). In China, confirmatory analyses conceptualize resilience as tenacity, optimism, and coping style, operationalizing individual resources that intelligent production tools can indirectly support by reducing routine cognitive strain (Liu & Chu, 2022). Research on psychological capital, mindfulness, and burnout reveals that resilience as a component of psychological capital significantly reduces burnout through mindfulness-mediated pathways, pointing to the importance of reflective practice in AI-augmented workflows (Liu & Du, 2024). On the learner side, a structural model with 300 EFL students shows that resilience predicts participation, effort, and flourishing while curbing negative affect, and that growth mindsets and an ideal L2 self are robust antecedents of resilience (Zarrinabadi et al., 2022). These converging findings imply that instructor-facing AI workflows should be judged not only by production efficiency but also by how they enable teachers to orchestrate activities that build learners' adaptive confidence.

5.4. Sustainability Beyond Efficiency

Educational sustainability increasingly encompasses human flourishing and equity alongside environmental stewardship (Sterling, 2021). Psychological and social sustainability mean capping invisible work and protecting time for feedback and design; institutional sustainability means governing provenance, authorship, and access. When organizations implement AIGIMs with clear policies on data processing, disclosure, and authorship, allocate hours for human review,

and provide equal access across course teams, they make adoption both ethical and durable (Holmes et al., 2021; Bozkurt et al., 2021).

A likely tension concerns speed and boundary management. Machine-assisted production enables rapid iteration, but without clearly defined review periods, it can increase invisible labor and blur work–life boundaries, particularly for conscientious educators who feel compelled to refresh materials constantly. Modeling with EFL teachers shows that resilience and well-being are protective factors associated with reduced burnout, with resilience generally the stronger predictor (Ding et al., 2025). The solution is governance linking time savings to time protection: for every hour saved by automated drafting, programs should reserve dedicated minutes for human contextualization and peer review. Responsibilities should rotate so that production does not become a hidden second shift for the most digitally fluent. Transparency practices, including lightweight model cards, clear labeling of synthetic media, and bias and accessibility checklists, are not only ethical; they reduce rework by catching issues upstream.

5.5. Contextual Diversity and Global Relevance

The evidence base is geographically plural. Italian data link resilience and well-being to instructional enjoyment, suggesting AI workflows that preserve presence can support motivation in European higher education (Ergün & Dewaele, 2021). Large-scale Chinese studies clarify teacher resilience's factorial structure and coping style interactions with system-level constraints, informing East Asian secondary contexts (Liu & Chu, 2022; Liu et al., 2024; Duan et al., 2025). Analyses among Iranian EFL teachers show that lack of supervisory support drives occupational stress most strongly, underscoring administrative backing for AI adoption (Karimi & Bani Adam, 2023). North American early-career teacher work foregrounds autonomy and collegial networks as drivers of sustained presence in hybrid and online models (Davis & Borden, 2025). In Sub-Saharan Africa, teacher networks using social media show that lightweight social infrastructure can lift practice and morale despite material constraints (Motteram & Dawson, 2019; Cannanure et al., 2024).

The throughline is consistent: intelligent production tools perform best when embedded in social and policy conditions that let local expertise guide technological speed. In bandwidth-constrained settings, compact, reusable assets support inclusion; heavy synthetic video may exclude. In multilingual classrooms, flexible exemplars widen access when teachers have time to localize and annotate; without curation time, cultural nuance flattens.

CONCLUSION AND FUTURE PERSPECTIVES

This study has argued that computationally authored instructional materials can help distance language educators do more of the human work that matters most. The reviewed literature suggests that when intelligent tools shorten routine production and versioning, teachers can reinvest time in presence, feedback, and intercultural mediation. The organizing thread is straightforward: automation should support, not supplant, the educator's voice and judgment. Where that condition holds, converging evidence points to gains in learning, well-being, and sustainability on both the teacher and student sides.

The ecological view of resilience clarifies why design choices about intelligent media matter. Language-teacher resilience is not a single trait but an interlocking set of professional, emotional, social, and cultural resources (Liu et al., 2024; Duan et al., 2025). Programs influence resilience every time they alter how teachers spend their time and how their work is recognized. According to the literature reviewed, when AI tools decrease the time spent on low-judgment

writing tasks and safeguard time for feedback and selection, they effectively reinforce the very assets that established resilience frameworks use as benchmarks. While these tools do not generate resilience themselves, they enable the circumstances under which it can be activated. This, in turn, offers a concrete embodiment of the ecological view that adaptive capacity arises from the interplay between teachers, peers, and institutional structures.

Presence is the second anchor. The syntheses of video-based learning consistently indicate that instructor presence shapes attention, affect, and perceived learning (Beege et al., 2023; Noetel et al., 2021; Henderson & Schroeder, 2021). The 2024–2025 experimental evidence on machine-produced instructional videos confirms that synthetic media can match learning outcomes of human-produced ones while also revealing that learners continue to value human credibility and authenticity (Netland et al., 2025; Xu et al., 2025; Hai et al., 2025). Let models help with first-pass scripts, captions, and leveled variants; keep the educator's voice and cues in the moments that count, especially at conceptual thresholds and in feedback. In foreign language courses, where pragmatics and intercultural framing carry meaning, this balance is a condition of pedagogical validity, not an optional embellishment.

A third anchor derives from converging evidence connecting teacher resilience to motivation and instructional climate. Presence-preserving AI workflows can foster climates in which both teachers and students perform better work (Ergün & Dewaele, 2021). At the same time, structural modeling shows that resilience and well-being are associated with lower burnout, with resilience often the stronger predictor (Ding et al., 2025). Institutions deploying intelligent tools without workload and authorship guardrails risk translating speed into invisible labor and boundary erosion; those pairing AI with time protection, credit for curation, and shared review routines convert the same technology into a buffer rather than a stressor.

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