



THE APPLICATION OF AI IN THE DEVELOPMENT OF LANGUAGE TEACHING RESOURCES

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ANNOTATION

The rapid advancement of artificial intelligence (AI) has significantly influenced the development of language teaching resources. AI technologies provide innovative tools for creating adaptive learning materials, personalized feedback systems, automated assessment, and interactive digital content. These tools enhance students' engagement, autonomy, and communicative competence. AI-driven platforms support teachers in designing differentiated materials tailored to learners' proficiency levels and professional needs. Furthermore, natural language processing enables intelligent tutoring systems and real-time language correction. The integration of AI in language education contributes to efficiency, accessibility, and inclusivity while transforming traditional pedagogical approaches into learner-centered digital environments. The study highlights the transformative potential of AI not only in streamlining resource creation but also in enhancing learner engagement, autonomy, and differentiated instruction. AI-driven tools enable dynamic content adaptation, real-time corrective feedback, and multimodal learning experiences, supporting diverse learner needs and professional contexts. Furthermore, the research underscores the importance of ethical and pedagogical considerations, including bias mitigation, data privacy, and teacher mediation, to ensure that AI functions as a collaborative partner rather than a replacement for instructional expertise. By integrating AI within structured, outcome-oriented workflows, language educators can optimize both resource quality and learner outcomes, contributing to more inclusive and effective language teaching environments.

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KEYWORDS

Artificial Intelligence, Language Teaching, Educational Technology, Digital Resources, Personalized Learning, Adaptive Systems, Natural Language Processing, Automated Assessment

Introduction. Artificial intelligence (AI) has moved from a niche educational technology to a mainstream infrastructure for designing, adapting, and distributing language teaching resources. In language education, “resources” include syllabi, lesson plans, tasks, texts, multimedia input, assessment instruments, and feedback tools that together shape what learners do with language. The recent diffusion of generative AI, large language models, and natural language processing (NLP) has expanded what can be produced quickly (e.g., graded readers, dialogue scripts, vocabulary sets, role-plays, and scenario-based ESP materials), how materials can be tailored (e.g., proficiency-level adaptation, needs-based content for specific professions), and how learning can be supported (e.g., automated feedback, formative analytics, and conversational tutoring). At the same time, research and policy communities emphasize that the value of AI depends on pedagogy: AI should amplify human expertise, not replace it, and should be implemented with attention to transparency, privacy, bias, accessibility, and academic integrity¹.

The topic is timely for several reasons. First, empirical studies published in 2023–2024 show a rapid growth of classroom experimentation with generative AI for language learning and teaching, including uses for materials design, feedback, and learner support². Second, international organizations have released guidance urging education systems to adopt human-centered governance, build teacher capacity, and set safeguards for generative AI in education and research³. Third, the language classroom is uniquely sensitive to AI's strengths and weaknesses: language learning requires abundant input, meaningful interaction, and feedback, yet also demands the development of critical thinking, creativity, and ethical communication—areas where over-reliance on automated generation may be counterproductive. Finally, AI-based authoring can support inclusive education by generating multimodal materials, simplifying texts, providing alternative explanations, and enabling flexible pacing for diverse learners, but only if accessibility standards and quality checks are built into the workflow⁴.

This paper examines how AI is applied to the development of language teaching resources and what pedagogical, methodological, and ethical considerations arise. The focus is on three practical resource-

development pathways: (a) teacher-facing tools for rapid authoring and adaptation of tasks and texts; (b) learner-facing resources that personalize practice through adaptive pathways and feedback; and (c) assessment resources, including automated writing evaluation and rubric-aligned feedback. The study synthesizes recent research trends, identifies recurring challenges (quality assurance, hallucination, bias, and data governance), and discusses hybrid “teacher + AI” workflows as a realistic model for sustainable innovation. Ultimately, the paper argues that AI-enabled resource development is most effective when anchored in outcomes (e.g., CEFR-aligned competences), supported by validated prompts and rubrics, and embedded in reflective, learner-centered instructional design that keeps teachers accountable for final pedagogical decisions. In this way, AI becomes a design partner for iterative improvement, while teachers curate authenticity, cultural appropriacy, and meaningful classroom use across contexts and learner groups.

Literature review. Recent literature on AI for language teaching resources clusters around three intersecting strands: (1) generative AI as a tool for classroom materials authoring; (2) AI-mediated feedback and assessment resources; and (3) governance, ethics, and teacher professional competence.

Large-scale reviews indicate that research interest accelerated sharply after the public release of powerful generative AI tools. A systematic review of empirical studies on generative AI in the language classroom (covering January 2023–December 2024) reports that higher education and English dominate the evidence base, with many studies relying on self-reported perceptions rather than robust learning outcome measures. Complementing this, a PRISMA-guided review of 144 peer-reviewed articles (2023–2024) maps shifts in research priorities toward prompt design, academic integrity, and classroom integration models, suggesting the field is moving from novelty-oriented demonstrations to more pedagogically grounded experimentation⁵. Within resource development, the most frequent teacher uses include rapid generation of reading texts, speaking prompts, grammar explanations, and vocabulary practice; however, the reviews stress the need for alignment with

¹ Miao F., Holmes W. Guidance for generative AI in education and research. – UNESCO, 2023.

² Li B., Tan Y. L., Wang C., Lowell V. Two years of innovation: A systematic review of empirical generative AI research in language learning and teaching // Computers and Education: Artificial Intelligence. – 2025. – Vol. 9.

³ Miao F., Holmes W. Guidance for generative AI in education and research. – UNESCO, 2023.

⁴ Artificial Intelligence and Education. – Council of Europe. – <https://www.coe.int/en/web/education/artificial-intelligence>.

⁵ Lee S., Choe H., Zou D., Jeon J. Generative AI (GenAI) in the language classroom: A systematic review // Interactive Learning Environments. – 2025.

curricular outcomes and explicit quality control to avoid factual errors, inappropriate register, and cultural mismatch⁶.

A substantial sub-literature focuses on AI-driven feedback and automated assessment resources, especially writing. Empirical work on AI-generated, rubric-aligned feedback shows that AI can produce largely accurate comments on strengths and weaknesses, but feedback may be generic and may lack concrete examples unless prompts and rubrics are carefully engineered⁷. This aligns with broader discussions in automated writing evaluation: AI tools often improve surface-level accuracy and fluency, while evidence for higher-order gains (argumentation, criticality, rhetorical effectiveness) is less consistent, raising concerns about “false mastery” if teachers delegate too much judgement to the system. Recent quasi-experimental research comparing AI-generated feedback with teacher feedback in EFL writing likewise suggests potential for improvement, but highlights the importance of teacher mediation, feedback literacy, and transparent criteria so learners can act on feedback rather than simply accept it⁸. For resource developers, these findings support a “human-in-the-loop” approach: AI drafts feedback banks, exemplars, and practice items, while teachers validate, contextualize, and teach learners how to use feedback productively.

Governance-oriented publications frame how AI should be introduced into educational ecosystems. UNESCO’s global guidance emphasizes a human-centred vision, recommending capacity building for educators, safeguards for data protection, and policy responses to bias, transparency, and intellectual property concerns⁹. European initiatives similarly foreground ethical and effective practice, positioning AI as a means to support inclusive and equitable education through personalization and real-time feedback, while cautioning against uncritical adoption¹⁰. Council of Europe publications, including a preparatory study for regulating AI systems in education, frame AI adoption through human-rights principles and highlight transparency, accountability, and evidence requirements¹¹ for learners, teachers, and institutions. Together, these sources shift the literature from “what AI can generate” to “how AI-generated resources function in learning,” recommending design principles such as outcome alignment, traceable sources for factual content, bias checks, and assessment integrity measures.

Methodology. This study employs a qualitative-analytical approach to examine the application of AI in language teaching resource development. Data sources include recent empirical studies, systematic reviews, and policy reports published between 2023 and 2025. The analysis focuses on three key areas: AI-assisted materials authoring, AI-mediated feedback and assessment, and governance and ethical considerations.

Information was synthesized thematically, identifying patterns of effectiveness, pedagogical implications, and recurrent challenges such as bias, factual inaccuracy, and digital inequity. Hybrid intelligence workflows—where AI drafts resources and teachers validate and contextualize them—were analyzed as the primary model of effective implementation. The methodology emphasizes outcome-aligned evaluation, transparency of AI prompts, and cross-study comparison to ensure reliability and relevance for diverse language teaching contexts.

Results. The analysis of recent empirical studies and classroom-based implementations indicates that AI-supported resource development demonstrates measurable pedagogical advantages when integrated within structured instructional design. The findings reveal

three major outcome dimensions: efficiency of materials production, learner performance improvement, and increased personalization.

The first observable outcome concerns instructional efficiency. Teachers reported significant reductions in preparation time when using generative AI tools for drafting lesson materials, including graded reading texts, vocabulary exercises, dialogue simulations, and ESP-oriented tasks. AI-assisted drafting enabled rapid generation of multiple task variations aligned with proficiency levels and communicative objectives. However, the results also show that quality assurance processes—such as fact-checking, register adjustment, and cultural validation—remain necessary before classroom implementation.

The second outcome dimension relates to learner performance. Studies analyzing AI-mediated feedback in EFL writing contexts demonstrate improvements in grammatical accuracy, lexical variety, and textual cohesion after exposure to AI-generated formative comments. Automated rubric-aligned feedback contributed to clearer task completion and structural organization. Nevertheless, gains in higher-order skills—argument development, critical reasoning, and rhetorical stance—were more substantial when teacher feedback supplemented AI comments. This confirms that AI feedback is most effective as a first-layer support mechanism rather than a replacement for expert pedagogical judgement.

The third major finding involves personalization and adaptive learning pathways. AI-driven systems enabled differentiated task assignment based on learners’ proficiency levels and specific professional needs (e.g., ESP contexts). Adaptive difficulty adjustment and immediate corrective feedback increased learner autonomy and sustained engagement. Students reported greater confidence in independent practice, particularly in vocabulary consolidation and grammar revision tasks. At the same time, disparities in digital literacy and access to advanced AI tools influenced the degree of benefit among learners.

Across the reviewed implementations, hybrid “teacher + AI” workflows produced the most stable outcomes. When teachers defined learning objectives, designed structured prompts, and curated AI outputs before classroom use, instructional coherence and communicative relevance improved significantly. In contrast, unmoderated reliance on default AI outputs occasionally resulted in superficial task design or limited discourse authenticity.

The results suggest that AI integration enhances resource development speed, supports formative assessment processes, and enables adaptive learning environments. However, pedagogical impact depends on human mediation, alignment with CEFR-based outcomes, and institutional guidelines ensuring ethical and quality standards.

Discussion. AI can increase the speed and variability of resource production and enable personalization, but educational value depends on instructional design, teacher expertise, and responsible governance. The evidence base is expanding rapidly, yet still needs more longitudinal classroom studies, transparent reporting of prompts and workflows, and evaluation of transfer to real communicative performance. In materials adaptation, studies increasingly discuss AI-assisted simplification, translation, and multimodal generation as ways to broaden access to input, yet warn that outputs require domain checking, especially in ESP. Reviews also call for mixed-method designs that combine analytics with classroom observation to explain how learners use AI resources¹² and how teachers orchestrate them.

AI in Language Teaching Resources

Strand	Key Focus	Reported Benefits	Reported Risks	Pedagogical Implication
Generative AI for Materials Authoring	Prompt-based task creation, text generation, differentiation	Faster lesson preparation; scalable practice items; adaptive difficulty	Factual errors; register mismatch; cultural bias; surface-level alignment	Requires curriculum alignment + human validation
AI-Mediated Feedback & Assessment	Automated writing feedback; rubric alignment	Timely formative feedback; grammar/fluency improvement	Generic comments; limited higher-order feedback; risk of false mastery	Human-in-the-loop moderation essential

⁶ Li B., Tan Y. L., Wang C., Lowell V. Two years of innovation: A systematic review of empirical generative AI research in language learning and teaching // *Computers and Education: Artificial Intelligence*. – 2025. – Vol. 9.

⁷ Artificial Intelligence and Education . – Council of Europe. – <https://www.coe.int/en/web/education/artificial-intelligence>.

⁸ Alnemrat A. et al. AI vs. teacher feedback on EFL argumentative writing: a quantitative study // *Frontiers in Education*. – 2025

⁹ Miao F., Holmes W. Guidance for generative AI in education and research. – UNESCO, 2023.

¹⁰ Artificial Intelligence and Education . – Council of Europe. – <https://www.coe.int/en/web/education/artificial-intelligence>; Havinga B., Holmes W., Persson J. Regulating the use of artificial intelligence systems in education: Preparatory study on the development of a legal instrument. – Council of Europe, October 2024.

¹¹ Lee S., Choe H., Zou D., Jeon J. Generative AI (GenAI) in the language classroom: A systematic review // *Interactive Learning Environments*. – 2025.

¹² Li B., Tan Y. L., Wang C., Lowell V. Two years of innovation: A systematic review of empirical generative AI research in language learning and teaching // *Computers and Education: Artificial Intelligence*. – 2025. – Vol. 9.

Governance & Ethics	Policy frameworks; teacher AI competence; data protection	Equity, personalization, inclusive access	Bias, privacy risks, intellectual property issues	Institutional AI guidelines + training required
Materials Adaptation & ESP	Simplification, translation, multimodal input	Broader access; differentiated ESP content	Domain inaccuracy; oversimplification	Domain expert review mandatory
Hybrid Intelligence Workflow	AI as co-author; teacher as editor	Creative prototyping; multiple task versions	Template teaching; reduced authenticity	Iterative design model recommended

Discussion in recent scholarship increasingly centres on “hybrid intelligence” workflows—designing language resources with AI as a co-author and the teacher as editor, validator, and pedagogical decision-maker. Systematic reviews note that many studies celebrate efficiency gains (faster lesson preparation, quick differentiation, abundant practice items), but fewer evaluate whether AI-produced resources improve communicative performance beyond short-term tasks¹³. This gap matters because resource quality is not only linguistic accuracy; it includes authenticity, discourse appropriacy, cognitive challenge, intercultural sensitivity, and alignment with assessment constructs.

A recurring debate concerns standardization versus creativity. AI can generate large quantities of similar exercises, which may lead to “template teaching” and reduced opportunities for authentic interaction if teachers rely on default outputs. At the same time, when teachers use AI to prototype multiple versions of a task and then select or remix the best, creativity may increase. The difference is the workflow: (1) define outcomes and constraints (level, genre, topic, ethical boundaries); (2) prompt for drafts and alternatives; (3) apply quality checks (facts, register, bias, plagiarism risk); and (4) pilot in class and revise. UNESCO’s guidance supports this iterative, human-centred approach and highlights the need to build teacher capacity to understand AI limitations and protect learners’ data¹⁴.

Another debate focuses on feedback and assessment. Studies of AI-driven feedback show potential benefits for timely formative guidance, yet also report generic comments and occasional inaccuracies if prompts and rubrics are weak¹⁵. This supports a two-layer model: AI provides first-pass feedback on observable criteria (grammar, cohesion markers, task completion), while teachers focus on higher-order goals (argument quality, stance, audience awareness) and teach learners to critically interpret AI feedback. Such feedback literacy is essential to

avoid passive acceptance and to maintain academic integrity, a concern repeatedly raised across reviews¹⁶.

Finally, equity and inclusion are double-edged. Personalised resources can support learners who need additional practice or alternative explanations, and recent systematic reviews emphasise ethical, effective classroom integration¹⁷ in diverse educational settings. Yet unequal access to devices, paid tools, or stable internet can widen gaps, and biased training data may reproduce stereotypes in generated texts. Therefore, responsible adoption requires institutional policies on tool selection, transparency to learners, and periodic auditing of materials for bias and cultural appropriacy¹⁸. A further implication is documentation: record prompts, model settings, and edits so materials are reproducible and can be shared as versioned resources within departments and across teacher communities globally.

Conclusion. AI is rapidly reshaping how language teaching resources are created, adapted, and delivered. Recent research shows strong potential for AI to accelerate materials authoring, support differentiation, and provide timely feedback—especially for writing—when tools are aligned with learning outcomes and embedded in teacher-guided pedagogy. At the same time, policy guidance stresses that adoption must be human-centred, with safeguards for privacy, transparency, bias, and intellectual property. The most defensible model is therefore “teacher + AI”: AI generates drafts, variations, and first-pass feedback, while teachers validate accuracy, ensure cultural and discourse appropriacy, teach feedback literacy, and design meaningful interaction around the resources. Future work should prioritise longitudinal classroom studies, transparent reporting of prompts and workflows, and evaluation of transfer to real communicative performance. In this balance, AI becomes a catalyst for quality and inclusion rather than a shortcut. Well-designed institutional policies and training will determine sustainable, ethical impact overall.

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¹³ Havinga B., Holmes W., Persson J. Regulating the use of artificial intelligence systems in education: Preparatory study on the development of a legal instrument. – Council of Europe, October 2024.

¹⁴ Miao F., Holmes W. Guidance for generative AI in education and research. – UNESCO, 2023.

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¹⁶ Lee S., Choe H., Zou D., Jeon J. Generative AI (GenAI) in the language classroom: A systematic review // *Interactive Learning Environments*. – 2025.

¹⁷ Garzón J., Patiño E., Marulanda C. Systematic Review of Artificial Intelligence in Education: Trends, Benefits, and Challenges // *Multimodal Technologies and Interaction*. – 2025. – Vol. 9, № 8

¹⁸ Artificial Intelligence and Education. – Council of Europe. – <https://www.coe.int/en/web/education/artificial-intelligence>.