

Designing AI-Supported Multimodal Russian Language Learning: A Conceptual Framework for Learner Autonomy, Critical AI Literacy, and Intercultural Competence

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Abstract

The rapid expansion of generative artificial intelligence (GenAI) is changing the conditions under which foreign languages are taught and learned. In Russian language education, AI-based conversational systems, automated feedback, adaptive content generation, and multimodal digital resources create new possibilities for individualized practice and contextualized communication. At the same time, the availability of these technologies raises pedagogical questions concerning learner autonomy, critical evaluation of machine-generated information, cognitive overload, cultural interpretation, and the changing role of the teacher. This conceptual article develops a framework for AI-supported multimodal Russian language learning that connects technological affordances with learner development rather than treating technology as an educational outcome in itself. The proposed framework is organized around five mutually dependent dimensions: AI-supported personalization, multimodal task design, learner autonomy, critical AI literacy, and intercultural communicative competence. The framework argues that AI becomes educationally productive when learners actively select, evaluate, adapt, and reflect on digital resources within purposeful pedagogical sequences. Multimodal learning is therefore treated not as the simple accumulation of text, audio, image, video, and dialogue, but as the coordinated use of modes to construct meaning and support linguistic action. The article further proposes that critical AI literacy should be integrated into Russian language instruction so that learners can recognize uncertainty, detect inappropriate or biased outputs, and compare AI responses with reliable linguistic and cultural sources. The resulting framework provides a conceptual basis for curriculum planning, teacher mediation, assessment design, and future empirical research in Russian as a foreign language.

Keywords: *Artificial Intelligence; Russian as a Foreign Language; Multimodal Learning; Learner Autonomy; Critical AI Literacy; Intercultural Communicative Competence*

1. Introduction

Artificial intelligence has moved rapidly from a specialized technological field into everyday educational practice. In language education, this change is visible in systems that generate explanations and exercises, simulate dialogue, provide immediate feedback, adapt materials to learner performance, and support access to digital resources. Earlier computer-assisted language learning environments often relied on predetermined sequences and limited forms of interaction. Contemporary AI systems can generate context-sensitive responses and can participate in open-ended exchanges, creating a learning environment that is more flexible but also more difficult to control pedagogically (Chapelle, 2021; Kasneci et al., 2023; Kohnke et al., 2023).

The emergence of these technologies is particularly important for Russian as a foreign language. Russian combines a rich inflectional system, aspectual distinctions, flexible word order, complex agreement patterns, and culturally embedded lexical and pragmatic choices. Learners therefore need opportunities not only to practice forms but also to interpret context, compare communicative alternatives, and understand how linguistic choices operate in authentic situations. Multimodal environments can contribute to this process because language is encountered through combinations of written text, speech, images, video, and interaction rather than through isolated sentences. Research on multimodality emphasizes that meaning is constructed across several modes, while multimedia learning research highlights the importance of coordinating verbal and visual information without creating unnecessary cognitive load (Kress, 2010; Mayer, 2009; Sweller et al., 2011).

The educational promise of AI, however, should not be equated with automatic improvement. Technology can increase the number of available resources while simultaneously creating new forms of dependence. Learners may accept generated answers without verification, use translation or correction functions without reflection, or mistake fluent output for accurate output. AI systems can also reproduce incomplete or culturally narrow representations. Consequently, AI-supported language education requires a pedagogy that develops both productive use and critical distance (Selwyn, 2022; Williamson & Eynon, 2020; UNESCO, 2023).

A second issue concerns the learner's role. Foreign language development is not simply the accumulation of teacher-provided input. Learners make choices, establish priorities, monitor progress, and develop beliefs about what it means to learn a language successfully. Learner autonomy and agency are therefore relevant to the design of AI-supported environments because personalization is meaningful only when learners participate actively in decisions about goals, strategies, resources, and performance (Ahearn, 2001; Bandura, 2006; Benson, 2013). Technology may create more choices, but it does not by itself produce autonomous learning behavior.

A third issue concerns intercultural communication. Language learning increasingly requires the ability to interpret meanings from different cultural perspectives, recognize pragmatic variation, and interact appropriately across cultural boundaries. Intercultural competence therefore extends the

purpose of language instruction beyond grammatical accuracy (Byram, 1997; Deardorff, 2006; Liddicoat & Scarino, 2013). AI and multimodal technologies can widen access to cultural materials and simulated encounters, but exposure alone is insufficient. Learners need structured opportunities to interpret, compare, question, and reflect.

The present article addresses these issues by proposing a conceptual framework specifically oriented toward Russian language learning. Rather than reproducing a technology-centered model, it treats AI as an enabling layer within a broader pedagogical ecology. The framework places learner autonomy and critical AI literacy between technological affordances and intercultural outcomes. Its central research question is: How can AI-supported multimodal learning be designed in Russian as a foreign language so that technological personalization strengthens learner autonomy, critical AI literacy, and intercultural communicative competence?

The article has four objectives. First, it synthesizes relevant perspectives on AI-supported language education, multimodality, autonomy, beliefs, and intercultural competence. Second, it specifies the pedagogical conditions under which AI affordances can become meaningful learning opportunities in Russian. Third, it proposes a coherent framework linking technology, multimodal design, learner development, and intercultural interpretation. Fourth, it identifies implications for curriculum design and future empirical research.

2. Conceptual Foundations

2.1 AI-Supported Foreign Language Learning

Artificial intelligence in education refers broadly to computational systems that perform functions associated with pattern recognition, prediction, language processing, interaction, and adaptive decision-making. In language education, these functions can support feedback, learner profiling, content generation, conversation practice, and resource recommendation (Zawacki-Richter et al., 2019; Chapelle, 2021). Contemporary GenAI systems extend these possibilities because they can produce language dynamically rather than relying only on fixed answer banks.

For Russian language learning, AI support can be conceptualized at three levels. At the first level, AI can assist with linguistic form: explanations of grammar, examples of vocabulary use, transformations of sentences, and feedback on written or spoken production. At the second level, AI can assist with task adaptation: adjusting difficulty, generating alternative prompts, or providing additional practice when a learner encounters difficulty. At the third level, AI can support interaction and interpretation through role-play, scenario-based dialogue, and comparative tasks.

These possibilities should be treated as affordances rather than guarantees. An AI response can be linguistically plausible while still being incomplete, contextually unsuitable, or culturally misleading. Ethical and pedagogical concerns also include privacy, unequal access, bias, and excessive reliance on automated systems (Holmes et al., 2022; Selwyn, 2022; UNESCO, 2021). The teacher therefore

remains responsible for establishing the purposes and boundaries of AI use, while learners need strategies for verification and reflection.

2.2 Multimodality and Meaning Construction

Multimodal learning assumes that communication and meaning-making involve several semiotic resources. Written language, speech, visual representation, gesture, spatial organization, and digital interaction can work together to support understanding (Jewitt, 2021; Kress, 2010). Multimedia learning research similarly suggests that meaningful learning involves selecting, organizing, and integrating information across verbal and visual channels (Mayer, 2009, 2021).

In Russian language education, multimodality is valuable because many linguistic forms are better understood when connected to context. A written dialogue can establish grammatical patterns, an audio recording can provide pronunciation and intonation, an image sequence can clarify a communicative situation, and a short video can reveal pragmatic or cultural information. The value of combining these modes lies in the relationship among them.

A common problem is the assumption that adding more media necessarily improves learning. When visual, auditory, and textual materials repeat information without a clear pedagogical function, cognitive demands may increase rather than decrease (Sweller et al., 2011). The framework proposed here therefore uses a principle of functional multimodality: each mode should make a distinct contribution to the learning task or should help learners integrate meaning across modes.

AI can strengthen functional multimodality by helping teachers generate variants of materials and by adapting tasks to learner needs. Yet AI should not determine the pedagogical sequence. Curriculum objectives and the communicative purpose of the task remain primary.

2.3 Learner Autonomy and Agency

Learner autonomy concerns the capacity to take responsibility for learning decisions, including the selection of goals, strategies, resources, and forms of evaluation (Benson, 2013). Agency emphasizes purposeful action and the capacity to influence one's learning activity through intentional choices and self-regulation (Ahearn, 2001; Bandura, 2006). From a sociocultural perspective, such capacities are shaped by interaction, cultural tools, and the social organization of learning (Vygotsky, 1978).

AI-supported environments may expand the space of learner choice. A learner can ask for additional examples, request a simpler explanation, compare alternative formulations, or practice a conversation repeatedly. These options can strengthen autonomy when learners understand why they are using them and when they can evaluate the results. The same options can weaken autonomy when the learner delegates decision-making to the system.

For this reason, autonomy in the proposed framework is not defined as unrestricted access to AI. It is defined as guided capacity to make informed choices. A learner who can explain why a particular AI prompt was selected, compare multiple outputs, reject an unsuitable suggestion, and modify a task demonstrates a stronger form of autonomy than a learner who simply accepts the first response.

2.4 Language Learning Beliefs

Beliefs about language learning influence how learners interpret difficulty, success, strategy use, and their own capabilities (Horwitz, 1988; Barcelos & Kalaja, 2011). Beliefs are relevant to AI-supported learning because technological systems can shape expectations about what learning should look like. Immediate automated correction, for example, can encourage the expectation that every error should be eliminated instantly. Conversely, repeated opportunities for revision can reinforce the idea that language development is gradual.

Beliefs can also influence attitudes toward effort and responsibility. When learners perceive AI as a shortcut that can complete tasks for them, effort may be displaced by delegation. When learners perceive AI as a resource for rehearsal, experimentation, and feedback, the same technology may support persistence. Recent work on agency and technology similarly suggests that productive relationships with digital tools depend on how learners position themselves in relation to those tools (Räsänen, 2025).

The framework therefore treats learning beliefs as part of the learner-development environment rather than as a separate psychological variable. Teachers can make beliefs visible by asking learners to articulate expectations, evaluate their progress, and reflect on how AI has changed their strategies.

2.5 Critical AI Literacy

Critical AI literacy is introduced here as a distinct construct because access to AI output is not equivalent to the ability to interpret it responsibly. Learners need to recognize that generated text is probabilistic, that confidence of expression does not guarantee accuracy, and that outputs may reflect limitations in data and system design. Ethical research on AI in education has repeatedly emphasized concerns about bias, transparency, privacy, and responsible use (Holmes et al., 2022; UNESCO, 2021, 2023).

In language education, critical AI literacy has a direct relationship with linguistic learning. Learners should be able to compare an AI-generated explanation with a grammar reference, consult a dictionary or corpus when appropriate, and identify where the system's response is uncertain. They should also distinguish between a correction of form and an evaluation of appropriateness in context.

For Russian, critical AI literacy can be incorporated through verification tasks. Learners may be asked to generate two explanations of a grammatical phenomenon, identify differences, verify claims against a trusted source, and explain which parts of the AI response should not be accepted without modification. Such activities make evaluation itself part of language learning.

2.6 Intercultural Communicative Competence

Intercultural competence involves attitudes of openness, knowledge, skills of interpreting and relating, skills of discovery and interaction, and critical cultural awareness (Byram, 1997). Deardorff (2006) likewise emphasizes that intercultural competence involves a process of attitudes, knowledge, skills, internal outcomes, and interactional outcomes.

AI and multimodal resources can provide access to interviews, visual materials, short documentaries, digital texts, simulated conversations, and other forms of cultural representation. They can also generate alternative scenarios in which the learner must negotiate meaning. Nevertheless, intercultural development cannot be reduced to exposure. Learners need to examine how a cultural practice is represented, compare perspectives, and reflect on possible stereotypes.

Liddicoat and Scarino (2013) emphasize an approach in which language and culture are taught together. The proposed framework follows this principle by embedding intercultural interpretation within ordinary language tasks rather than treating culture as an additional topic.

3. Methodological Approach

The article uses a conceptual research design based on integrative synthesis and framework development rather than primary empirical data collection. Conceptual framework development can provide a structured account of relationships among constructs when the literature is fragmented or when a field is undergoing rapid change (Jaakkola, 2020).

The framework was developed through four analytic steps. First, core constructs were identified from research on AI in education, computer-assisted language learning, multimodality, learner autonomy, beliefs, and intercultural competence. Second, the constructs were examined for complementary functions in Russian language learning. Third, possible relationships among them were organized around the distinction between technological affordances, pedagogical mediation, learner processes, and educational outcomes. Fourth, the resulting model was refined to avoid treating AI as a direct cause of language-learning success.

The model is theoretical and should not be interpreted as an empirically validated causal model. Its purpose is to generate testable propositions and design principles for future studies.

4. The Proposed Framework for AI-Supported Multimodal Russian Language Learning

4.1 Structure of the Framework

The framework consists of five dimensions:

1. AI-supported personalization

2. Functional multimodal task design

3. Learner autonomy and reflective agency

4. Critical AI literacy

5. Intercultural communicative competence

These dimensions are arranged as a developmental system rather than a linear sequence. AI-supported personalization provides possibilities for adaptation; multimodal design organizes those possibilities into pedagogically meaningful tasks; learner autonomy determines how opportunities are selected and used; critical AI literacy regulates evaluation and verification; and intercultural competence represents a major communicative outcome of sustained engagement with language, context, and cultural perspectives.

The framework can be represented conceptually as follows:

AI affordances → pedagogically designed multimodal tasks → learner choice and self-regulation
↔ critical AI evaluation → linguistic and intercultural development

The arrows indicate influence rather than deterministic causality. The interaction is recursive: learner performance can inform subsequent AI adaptation, while learner reflection can alter future choices and strategies.

4.2 AI-Supported Personalization

Personalization includes adaptation of difficulty, examples, practice frequency, feedback type, and interactional support. In Russian instruction, personalization can be especially useful because learners may progress unevenly across pronunciation, vocabulary, grammar, reading, and speaking.

A pedagogically responsible personalization process should begin with a learning objective. For example, a teacher may define a task aimed at improving case selection in communicative contexts. AI can then generate additional examples or provide corrective prompts, but the learner is expected to compare examples and explain the pattern. The system thus supports the process without replacing the learner's reasoning.

Personalization should also remain transparent. Learners need to know why a task is being adapted and what evidence is being used to justify the adaptation. This principle can reduce the risk that personalization becomes an opaque form of automated control.

4.3 Functional Multimodal Task Design

The second dimension converts technological capacity into instructional sequences. A multimodal task should be designed around a communicative or interpretive objective. Text, audio, image, video, and AI dialogue can then be assigned complementary roles.

A Russian lesson might, for example, begin with a short written exchange, continue with an audio version to focus on pronunciation and intonation, introduce a visual context to support interpretation, and conclude with an AI-mediated role-play. The learner's final task is not merely to consume the materials but to use them to make a communicative decision.

This design encourages integration across modes. It also allows teachers to identify whether difficulties arise from linguistic form, comprehension of context, or cultural interpretation.

4.4 Learner Autonomy and Reflective Agency

The third dimension emphasizes learner decision-making. AI-supported Russian learning can include learner-selected practice, optional explanations, self-recorded speech, alternative task pathways, and personalized revision cycles. However, each choice should be connected to a stated goal.

Reflection is critical. After using an AI system, learners can be asked: What did I request? Why did I request it? Which answer did I use? How did I verify it? What would I do differently next time? These questions turn AI use into an object of metacognitive awareness.

The framework also distinguishes autonomy from isolation. Teacher mediation remains necessary, particularly when learners encounter conflicting information or ambiguous cultural interpretations. Guided autonomy allows learners to make decisions within a structured environment.

4.5 Critical AI Literacy as a Regulatory Layer

Critical AI literacy operates across the whole framework. It is not a final unit added after language instruction. Learners should repeatedly practice verification, source comparison, and uncertainty recognition.

Three procedures are especially relevant. First, comparison: learners compare AI output with authoritative references. Second, justification: learners explain why an output is appropriate, incomplete, or questionable. Third, revision: learners modify the original AI response using evidence.

This approach changes the pedagogical meaning of AI error. A problematic output becomes not merely a defect but a learning opportunity when learners are taught to detect and correct it. Such activity can strengthen both linguistic awareness and digital judgment.

4.6 Intercultural Competence through Simulated and Authentic Encounters

The fifth dimension concerns intercultural learning. AI can create role-play scenarios in which learners interact with speakers in formal and informal settings, request clarification, negotiate disagreement, or respond to culturally embedded situations. Multimodal resources can supplement these scenarios with authentic texts, visual materials, and audio or video recordings.

The educational target is not memorization of cultural facts. Learners should identify perspectives, infer possible meanings, consider alternative interpretations, and select language appropriate to the situation. When AI generates a stereotypical or oversimplified description, learners can analyze the problem and compare it with other sources.

Such tasks connect language form with social meaning. They also make intercultural competence visible as an interpretive and interactional process rather than as a collection of facts.

4.7 Teacher Mediation

The teacher occupies a central mediating role in the framework. AI can generate content rapidly, but teachers remain responsible for pedagogical sequencing, source selection, cultural contextualization, assessment, and ethical boundaries.

Teacher mediation has at least four functions. Teachers establish objectives; curate or validate materials; design activities that require active learner response; and interpret learner performance. In this sense, the AI-supported classroom is not teacherless. Instead, the teacher's role shifts toward orchestration and critical mediation.

This point is especially important because AI-generated language can appear authoritative. Teachers provide the social and disciplinary context needed to distinguish useful assistance from unsupported information.

5. Pedagogical Applications in Russian as a Foreign Language

The framework can be translated into several practical classroom configurations.

5.1 Vocabulary and Lexical Context

AI can generate vocabulary sets at different difficulty levels and embed target words in dialogues, narratives, and visual scenarios. Rather than asking learners to memorize isolated items, the teacher can require them to compare meanings across contexts and explain why one lexical choice is more appropriate than another.

5.2 Grammar through Contextualized Dialogue

Russian grammar can be taught through simulated communication rather than decontextualized drills. Learners can ask an AI system to produce short dialogues containing a target grammatical feature and then annotate the examples, identify patterns, and test their own sentences. The key

instructional move is that learners must explain the pattern rather than simply consume generated examples.

5.3 Pronunciation and Oral Interaction

AI-supported conversation can increase opportunities for repeated speaking practice. A learner can rehearse a scenario several times, modify the level of formality, or request alternative prompts. Audio and visual materials can then be used to compare pronunciation, intonation, and communicative context. Teacher assessment remains important because automated feedback may not capture every relevant feature of spoken performance.

5.4 Reading and Multimodal Interpretation

A short Russian text can be paired with an image, audio reading, and short contextual information. Learners can ask the AI system for an alternative explanation, then compare it with the source text. This process supports reading comprehension while also training learners to distinguish textual evidence from generated interpretation.

5.5 Intercultural Scenario Work

Learners can examine a formal meeting, university discussion, service encounter, or social interaction represented through video and AI simulation. They can identify possible communication problems, propose alternative formulations, and explain how cultural expectations may influence interpretation. The objective is to connect language choice, context, and perspective.

6. Assessment Implications

Assessment in AI-supported language education should measure more than final linguistic accuracy. The framework suggests at least four domains of evidence: linguistic performance, strategic use of AI, critical evaluation, and intercultural interpretation.

Learners can be assessed on whether they formulate effective prompts, verify information, revise AI-generated material, explain their decisions, and transfer what they learned to a new communicative situation. Portfolio-based assessment may be particularly appropriate because it can document successive drafts, reflections, and evidence of independent decision-making.

Assessment criteria should not reward the volume of AI use. Instead, they should reward purposeful use. A learner who uses AI briefly and critically may demonstrate stronger learning behavior than a learner who uses it extensively without verification.

7. Ethical and Practical Considerations

AI-supported language education introduces several challenges. First, privacy requires careful handling of learner data and personal information. Second, access may be unequal because devices,

connectivity, and paid tools differ across learners. Third, generated content may contain bias or inaccuracies. Fourth, excessive dependence may weaken opportunities for independent reasoning.

For Russian language education, cultural representation deserves particular attention. Any AI-generated depiction of a social group, region, historical event, or communicative practice should be treated as a representation that may require checking. Teachers can reduce risk by combining AI activities with established linguistic and cultural sources.

The framework therefore recommends a principle of bounded AI use: the teacher defines what the technology is allowed to do, the learner is responsible for evaluating the result, and authoritative sources remain available for verification.

8. Theoretical and Research Implications

The proposed framework contributes to theory in three ways. First, it places AI within a pedagogical ecology instead of treating technological capability as an independent educational variable. Second, it introduces critical AI literacy as a regulatory construct linking technology use with learner autonomy. Third, it positions intercultural communicative competence as a substantive outcome of language learning rather than an optional supplement.

The framework also generates testable questions. Future quantitative research can examine relationships among AI-supported personalization, autonomy, AI literacy, and intercultural competence. Qualitative studies can investigate how Russian-language learners interpret AI feedback and negotiate disagreement with machine-generated explanations. Longitudinal work can explore whether repeated critical use of AI changes learner beliefs, self-regulation, and patterns of dependence.

Research should also account for differences across learner levels, institutional settings, and forms of AI access. Results from one educational context should not automatically be generalized to all Russian-language learners.

9. Conclusion

Artificial intelligence is changing the resources available for foreign language education, but its educational significance depends on how those resources are integrated into human learning processes. This article proposed a conceptual framework for AI-supported multimodal Russian language learning centered on five dimensions: AI-supported personalization, functional multimodal design, learner autonomy, critical AI literacy, and intercultural communicative competence.

The framework rejects a direct technology-to-achievement model. AI creates opportunities, but pedagogical design determines how those opportunities are organized; learners determine how they are interpreted and used; critical AI literacy regulates their evaluation; and teachers provide mediation and

contextual judgment. Multimodality becomes meaningful when different modes contribute to a shared learning objective rather than merely increasing the number of digital materials.

For Russian as a foreign language, this approach opens possibilities for more contextualized grammar practice, repeated oral interaction, adaptive vocabulary learning, multimodal reading, and intercultural scenario work. At the same time, it requires learners to develop a disciplined relationship with AI: asking purposeful questions, verifying answers, recognizing uncertainty, and revising machine-generated material when evidence demands it.

The framework remains conceptual and requires empirical validation. Nevertheless, it offers a coherent basis for designing and studying Russian language education in an environment where AI is increasingly present. The central pedagogical principle is simple: technology should enlarge the learner's capacity to think, communicate, interpret, and act—not substitute for those capacities.

References

- Ahearn, L. M. (2001). Language and agency. *Annual Review of Anthropology*, 30, 109–137. <https://doi.org/10.1146/annurev.anthro.30.1.109>
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1–26. <https://doi.org/10.1146/annurev.psych.52.1.1>
- Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Psychological Science*, 1(2), 164–180. <https://doi.org/10.1111/j.1745-6916.2006.00011.x>
- Barcelos, A. M. F., & Kalaja, P. (2011). Introduction to beliefs about SLA revisited. *System*, 39(3), 281–289.
- Benson, P. (2013). *Teaching and researching autonomy* (2nd ed.). Routledge.
- Byram, M. (1997). Teaching and assessing intercultural communicative competence. *Multilingual Matters*.
- Chapelle, C. A. (2021). Computer-assisted language learning: Current perspectives and future directions. *Language Teaching*, 54(3), 307–322.
- Deardorff, D. K. (2006). Identification and assessment of intercultural competence as a student outcome of internationalization. *Journal of Studies in International Education*, 10(3), 241–266. <https://doi.org/10.1177/1028315306287002>
- Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., et al. (2022). Ethics of AI in education: Towards a community-wide framework. *International Journal of Artificial Intelligence in Education*, 32, 504–526. <https://doi.org/10.1007/s40593-021-00239-1>
- Horwitz, E. K. (1988). The beliefs about language learning of beginning university foreign language students. *Modern Language Journal*, 72(3), 283–294. <https://doi.org/10.1111/j.1540-4781.1988.tb04190.x>
- Jaakkola, E. (2020). Designing conceptual articles: Four approaches. *AMS Review*, 10, 18–26.
- Jewitt, C. (2021). *The Routledge handbook of multimodal analysis* (3rd ed.). Routledge.
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., et al. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kohnke, L., Moorhouse, B. L., & Zou, D. (2023). ChatGPT for language teaching and learning. *RELJ Journal*, 54(2), 537–550. <https://doi.org/10.1177/00336882231162868>
- Kress, G. (2010). *Multimodality: A social semiotic approach to contemporary communication*. Routledge.
- Liddicoat, A. J., & Scarino, A. (2013). *Intercultural language teaching and learning*. Wiley-Blackwell.
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). Cambridge University Press.

- Mayer, R. E. (2021). Multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (3rd ed.). Cambridge University Press.
- Räsänen, E. (2025). Learner agency and symbiotic agency with technology in language learning with digital applications. *European Journal of Applied Linguistics*, 14(1), 231–259.
- Selwyn, N. (2022). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury Academic.
- Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory*. Springer.
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. UNESCO.
- UNESCO. (2023). *Guidance for generative AI in education and research*. UNESCO.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Williamson, B., & Eynon, R. (2020). Historical threads, missing links, and future directions in AI in education. *Learning, Media and Technology*, 45(3), 223–235.
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education*, 16, Article 39. <https://doi.org/10.1186/s41239-019-0171-0>

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