UDC 372.881.111.1

PEDAGOGICAL FUNCTIONS OF ARTIFICIAL INTELLIGENCE IN FOREIGN LANGUAGE TEACHING: TOWARDS A FUNCTIONAL-DIDACTIC CLASSIFICATION

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The rapid diffusion of generative artificial intelligence into language classrooms has produced a large but fragmented body of research. Existing reviews typically organize this work by technology type or by language skill, which limits their value for methodologists, since neither axis corresponds to the categories through which teaching is actually designed. This article proposes an alternative organizing principle. Drawing on a content analysis of 42 sources published between 2020 and 2026, it identifies six recurring pedagogical functions performed by AI in foreign language teaching and maps these against the components of the didactic system - aims, content, methods, means, organizational forms, and assessment. The resulting two-dimensional classification shows that research concentrates heavily in a small number of cells while leaving others substantially unexamined. The classification offers methodologists a diagnostic instrument for locating research gaps and for designing pedagogically grounded, rather than technologically driven, applications of AI in language education.

Keywords: *foreign language teaching; artificial intelligence; linguodidactics; didactic system; corrective feedback; learner autonomy; content analysis; classification; educational technology; methodology of teaching English.*

CHET TILLARINI O‘QITISHDA SUN’IY INTELLEKTNING PEDAGOGIK FUNKSIYALARI VA ULARNING FUNKSIONAL-DIDAKTIK TASNIFI

Generativ sun’iy intellektning til o‘qitish amaliyotiga jadal kirib kelishi keng qamrovli, ammo tarqoq tadqiqotlar bazasini yuzaga keltirdi. Mavjud taqrizlar odatda ushbu ishlarni texnologiya turi yoki til ko‘nikmalari bo‘yicha guruhlaydi, bu esa metodistlar uchun ularning qadrini pasaytiradi, chunki bu o‘qlarning hech biri o‘qitishni amaliy loyihalashtirish toifalariga mos kelmaydi. Ushbu maqola muqobil guruhlash tamoyilini taklif etadi. 2020–2026-yillarda nashr etilgan 42 ta manbaning kontent-tahliliga asoslanib, chet tilini o‘qitishda sun’iy intellekt tomonidan bajariladigan oltita takrorlanuvchi pedagogik funksiyani aniqlaydi va ularni didaktik tizim tarkibiy qismlari - maqsad, mazmun, metod, vosita, tashkiliy shakl va nazorat (baholash) bilan o‘zaro bog‘laydi. Olingan ikki o‘lchovli tasnif shuni ko‘rsatadiki, tadqiqotlar asosan oz sonli sohalarda to‘plangan, boshqalari esa deyarli o‘rganilmagan. Ushbu tasnif metodistlarga tadqiqotlardagi bo‘shliqlarni aniqlash hamda til ta’limida sun’iy intellektni texnologik emas, balki pedagogik asoslangan holda qo‘llashni loyihalashtirish uchun diagnostik vositani taqdim etadi.

Kalit so‘zlar: *chet tilini o‘qitish, sun’iy intellekt, lingvodidaktika, didaktik tizim, tuzatuvchi qayta aloqa, o‘quvchi avtonomiyasi, kontent-tahlil, tasnif, ta’lim texnologiyalari, ingliz tilini o‘qitish metodikasi.*

ПЕДАГОГИЧЕСКИЕ ФУНКЦИИ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ОБУЧЕНИИ ИНОСТРАННОМУ ЯЗЫКУ: К ФУНКЦИОНАЛЬНО-ДИДАКТИЧЕСКОЙ КЛАССИФИКАЦИИ

Стремительное внедрение генеративного искусственного интеллекта в процесс изучения языков привело к появлению обширного, но фрагментированного массива исследований. Существующие обзоры, как правило, классифицируют эти работы по типу технологии или языковому навыку, что снижает их ценность для методистов, поскольку ни одна из этих осей не соответствует категориям, на основе которых фактически проектируется обучение. В данной статье предлагается альтернативный принцип систематизации. Опираясь на контент-анализ 42 источников, опубликованных в период с 2020 по 2026 год, в исследовании выделяются шесть повторяющихся педагогических функций, выполняемых ИИ в обучении иностранному языку, которые соотносятся с компонентами дидактической системы — целями, содержанием, методами,

средствами, организационными формами и контролем (оценкой). Полученная двумерная классификация показывает, что исследования в значительной степени сконцентрированы в небольшом количестве ячеек, в то время как другие остаются практически неизученными. Данная классификация предлагает методистам диагностический инструмент для выявления пробелов в исследованиях и для проектирования педагогически обоснованного, а не технологически обусловленного применения ИИ в языковом образовании.

Ключевые слова: *обучение иностранному языку, искусственный интеллект, лингводидактика, дидактическая система, корректирующая обратная связь, автономия учащегося, контент-анализ, классификация, образовательные технологии, методика преподавания английского языка.*

Introduction. The rapid diffusion of generative artificial intelligence (AI) and large language models into educational settings has generated a voluminous but conceptually fragmented body of research [1], [2]. Within the domain of foreign language teaching, empirical studies have predominantly framed these integrations either as descriptions of specific technology types - such as conversational chatbot architectures [3] or automated writing evaluation systems [4] - or as isolated trials testing their effectiveness on targeted language skills.

While this literature provides valuable insights into technological capabilities and specific learner outcomes, it presents a significant limitation for instructional design. For methodologists and language educators, neither a technology-centric nor a skill-centric organizational axis is conceptually sufficient. Existing frameworks frequently fail to answer the core operative question: which specific component of the teaching process is a given AI intervention acting upon, and through what pedagogical mechanism? Consequently, the volume of empirical research on AI in language teaching has grown significantly faster than its didactic conceptualization, leaving a critical gap in how these tools are systematically mapped to pedagogical practice.

The scientific novelty of this study lies in the development of a two-dimensional functional-didactic classification of artificial intelligence applications in foreign language teaching, in which the pedagogical functions of AI are correlated with the structural components of the didactic system, thereby permitting the systematic identification of under-researched areas. By establishing this framework, the classification offers a diagnostic instrument for locating research gaps and for designing pedagogically grounded, rather than technologically driven, applications of AI in language education.

Literature Review. The existing literature regarding educational technology and artificial intelligence in language teaching can be conceptually organized into four distinct strands, moving from the historical theoretical foundations to contemporary empirical and national scholarship.

From CALL to Intelligent CALL

The integration of technology into language learning has historically been evaluated through pedagogical rather than purely technological paradigms [5], [6]. Warschauer’s periodization of Computer-Assisted Language Learning (CALL) demonstrates an evolution from behaviorist structural drills to integrative, communicative environments [5]. Furthermore, Chapelle’s foundational criteria for CALL task evaluation emphasize language learning potential and learner fit over mere technical capability [6]. The current emergence of “Intelligent CALL” (ICALL) via generative AI represents a direct continuation of this trajectory, necessitating a rigorous pedagogical lens rather than an assumption of technological rupture.

Second Language Acquisition Theory as the Interpretive Frame

To systematically categorize AI applications, it is essential to ground their functions in established Second Language Acquisition (SLA) theories. The pedagogical utility of AI must be evaluated against core acquisition mechanisms: Krashen’s Input Hypothesis [7], Swain’s Output Hypothesis [8], and Long’s Interaction Hypothesis [9]. Additionally, Schmidt’s Noticing Hypothesis [10] provides the theoretical anchor for analyzing AI-generated corrective feedback. The socio-cultural dimensions of learning, notably Vygotsky’s Zone of Proximal Development (ZPD) and mediation [11], alongside Holec’s principles of learner autonomy [12], are critical for evaluating AI as a scaffolding and self-regulatory tool. Finally, Kumaravadivelu’s postmethod pedagogy [13] offers a necessary framework for understanding AI’s role in augmenting teacher cognition and methodological design.

Empirical Work on AI in Language Teaching

Recent systematic reviews highlight a rapidly expanding, yet imbalanced, body of empirical work on generative AI in language education [1], [14]. As noted in a comprehensive review within *Interactive Learning Environments*, the current literature predominantly focuses on higher-education settings, English as the target language, and writing acquisition, frequently relying on self-reported data [14].

Empirical studies generally coalesce around specific pedagogical functions. Research on AI as an *input provider* has demonstrated its capacity to generate proficiency-calibrated reading materials, though experimental effects often vary across different learner proficiency levels [15]. As an *interlocutor*, conversational AI chatbots have been tested for their impact on learners’ willingness to communicate and speaking anxiety [3]. While some controlled designs demonstrate significant gains in communicative competence [3], others report limited effects on trait anxiety, indicating that individual differences moderate the utility of these agents [16]. Studies examining AI as a *feedback agent* emphasize its role in automated written corrective feedback and investigate the optimal sequencing of AI- and teacher-generated evaluations [4], [17].

Notably, standalone research on AI strictly as an *assessor* remains sparse, frequently subsumed within feedback-oriented studies. Conversely, emerging literature increasingly investigates AI as an *autonomy scaffold*, establishing models where AI engagement enhances self-regulated learning behaviors [18]. Finally, recent intervention studies have begun examining AI as a *methodological assistant*, focusing on developing language teachers’ professional AI literacies and negotiating professional identities [19].

National Scholarship

Within the national academic context, scholarship on the digitalization of education has begun addressing AI’s role in foreign language methodologies. Recent studies have surveyed the potential of AI in analyzing text, pronunciation, listening, and translation within the study of foreign languages and literature [20]. Additionally, localized research has explored AI-based integrative teaching technologies specifically targeting the professional preparation of pre-service foreign language teachers [21].

However, a substantial empirical gap remains: the current literature globally lacks targeted investigations into AI-mediated language instruction specifically for Uzbek-L1 learners. The existing empirical base heavily concentrates on Chinese, Saudi, Turkish, Vietnamese, Japanese, and Iranian cohorts, leaving the localized linguistic and cultural context substantially unexamined.

The Research Gap

Despite the breadth of global and national research, a critical systemic gap persists. The reviewed literature does not provide an organizing framework that explicitly connects AI functionality to specific didactic structures. The absence of such an instrument impedes methodologists from designing pedagogically grounded interventions, creating an urgent need for a classification system that maps these technological tools directly onto the fundamental components of the teaching process.

Research Methodology. The present study employs a comparative-analytical content analysis of scholarly literature to systematically map the functional applications of AI in language education.

Corpus and Selection. The literature corpus was retrieved from major academic databases, including Scopus and Google Scholar, alongside national scientific publications recognized under the 13.00.00 pedagogical sciences classification. The systematic retrieval utilized the following Boolean search string:

(“generative AI” OR “artificial intelligence” OR “ChatGPT” OR “large language model”) AND (“language learning” OR “language teaching” OR “EFL” OR “ESL” OR “foreign language”).

The search was conducted in August, 2026. The temporal scope of the search was restricted to publications spanning the period 2020–2026, though foundational theoretical works cited to establish the didactic framework intentionally fall outside this search window by design. To ensure methodological rigor, the selection process strictly adhered to the following inclusion criteria:

– The study explicitly addresses the application of AI or generative language technologies within foreign or second language teaching.

– The research reports a clear pedagogical rationale, instructional intervention, or learning outcome, rather than a purely technical evaluation.

– The publication is a peer-reviewed scholarly article.

– The text is published in English, Uzbek, or Russian.

Conversely, exclusion criteria were applied to eliminate opinion pieces lacking empirical or theoretical grounding, as well as purely algorithmic or technical system evaluations (e.g., studies solely focused on computational translation quality) that lacked a direct connection to instructional methodologies. Following the application of these criteria, the final corpus comprised 42 peer-reviewed empirical sources.

Analytical Procedure. A two-stage coding procedure was implemented to construct the functional-didactic classification:

1. *Deductive Coding (Vertical Axis):* The vertical axis was derived deductively from established didactic theory, encompassing the core structural components of the teaching process: aims, content, methods, means, organizational forms, and assessment. For this analysis, *Aims* were operationalized to include all intended learner outcomes targeted by the intervention, encompassing both cognitive gains and

affective or psychological states such as motivation and technology acceptance. Furthermore, the category of *Means* was reserved exclusively for studies whose primary object of inquiry was the architectural design of the tool itself, rather than its pedagogical deployment in the classroom.

2. *Theoretical Validation (Horizontal Axis):* The six pedagogical functions of AI (F1–F6) were deductively derived from established SLA theory and systematically validated against the literature corpus until categorical stability was achieved.

Following the stabilization of both axes, each source within the corpus was assigned to its primary intersecting cell based on its core pedagogical intervention. The frequency of studies per cell was then tabulated to visually identify distinct research concentrations and empirical gaps across the didactic system.

Analysis and Results.

Six Pedagogical Functions of AI in Foreign Language Teaching

Through the inductive coding of the literature corpus, six distinct pedagogical functions (F1–F6) of artificial intelligence in language teaching were identified. Crucially, these functions are anchored in established Second Language Acquisition (SLA) theories rather than software capabilities, ensuring the classification operates as a didactic instrument rather than a mere product taxonomy.

Table 1 outlines these six functions, their theoretical bases, and the fundamental pedagogical questions they address.

Table 1. Pedagogical functions of generative AI in language education

№	Function	Theoretical basis	Operative question it answers
F1	**Input provider** - generation and adaptation of comprehensible target-language material	Input hypothesis	Can the learner access language slightly beyond current level?
F2	**Interlocutor** - dialogic partner enabling sustained production	Output hypothesis; Interaction hypothesis	Does the learner have someone to speak and write *to*?
F3	**Feedback agent** - corrective response to learner form and content	Noticing; focus on form	Does the learner become aware of the gap?
F4	**Assessor** - diagnostic and formative evaluation of performance	Dynamic assessment; ZPD	Is progress made visible and actionable?
F5	**Autonomy scaffold** - metacognitive and self-regulatory support	Learner autonomy; self-regulated learning	Does the learner direct their own learning?
F6	**Methodological assistant** - teacher-facing support for design of materials, tasks and lessons	Postmethod pedagogy; teacher cognition	Is the *teacher's* professional activity augmented?

The corpus reveals varying degrees of empirical realization across these functions. Notably, existing reviews typically restrict their unit of analysis exclusively to the learner, thereby omitting the critical role of AI in augmenting the teacher's professional and methodological activity. The inclusion of the *Methodological assistant* (F6) therefore represents a central conceptual expansion within this classification.

The Functional-Didactic Matrix.

To move beyond isolated functional identification, the six pedagogical functions were cross-tabulated against the structural components of the didactic system: aims, content, methods, means, organizational forms, and assessment. Table 2 presents the resulting two-dimensional functional-didactic matrix, populated with the frequency distribution of studies from the selected corpus (N = 42).

Table 2. Frequency distribution of AI interventions across the functional-didactic matrix

	Aims	Content	Methods	Means	Forms	Assessment
F1 Input provider	0	1	0	0	0	0
F2 Interlocutor	0	0	3	0	0	0
F3 Feedback agent	0	0	6	0	0	2
F4 Assessor	0	0	0	0	0	5
F5 Autonomy scaffold	14	0	2	0	4	0
F6 Methodological assistant	3	0	2	0	0	0

Distribution and Gaps

An analysis of the matrix distribution yields sharp quantitative insights into current research concentrations. The tabulated data indicates a massive empirical concentration within the intersection of F5 (Autonomy scaffold) and Aims (n=14). This reveals a profound disciplinary focus on evaluating learners' psychological states, affective responses, and technology acceptance (frequently employing TAM or UTAUT frameworks) rather than evaluating instructional interventions. A secondary cluster exists in F3/Methods (n=6), reflecting the dominance of automated written corrective feedback studies.

Conversely, critical didactic intersections remain radically sparse or entirely unexamined. The pedagogical category of Means recorded zero studies across all six functions, indicating that the field currently treats AI as an external variable rather than an integrated classroom tool. Furthermore, F1 (Input provider) is virtually absent (n=1), demonstrating that despite the generative capabilities of modern AI, its potential for designing proficiency-calibrated language content is being neglected in favor of assessment and evaluation. This distribution demonstrates factually that the application of AI in foreign language teaching currently addresses specific affective and evaluative nodes of the learning process while leaving foundational components of instructional design-specifically content generation and pedagogical means-substantially unsupported.

Conclusion and Recommendations.

Summary of Contribution

This study proposed a two-dimensional functional-didactic classification designed to systematically categorize the application of artificial intelligence in foreign language education. By mapping six SLA-grounded pedagogical functions (F1–F6) against the six foundational components of the didactic system (aims, content, methods, means, organizational forms, and assessment), the classification transitions the academic discourse away from isolated tool evaluations and toward an integrated pedagogical paradigm.

Principal Findings

The matrix distribution reveals that current empirical research is heavily clustered in specific operational nodes. The field concentrates overwhelmingly on learner autonomy and affective states (F5), comprising nearly half of the analyzed corpus (48%). A secondary concentration exists in the deployment of AI for automated written corrective feedback (F3, 19%).

Conversely, the role of AI as an input provider (F1)-generating and adapting comprehensible target-language material-remains nearly unexamined (n=1). This is a striking disparity, demonstrating that generative AI is barely studied for the specific pedagogical function it is objectively best equipped to perform: generating proficiency-calibrated input. This imbalance confirms that educational technology adoption in language teaching has developed unevenly, emphasizing learner affect and automated evaluation while leaving foundational didactic integration largely unaddressed.

Practical Recommendations

For instructional designers, methodologists, and language educators, the functional-didactic matrix serves as an operational decision-making filter:

– *Pedagogical Anchoring:* Before introducing an AI application into the curriculum, educators should explicitly identify the target cell in the didactic matrix to ensure the technology serves a defined instructional purpose rather than novelty.

– *Balanced Curriculum Integration:* Course designers should actively explore under-utilized cells. Rather than continuing to saturate the literature with learner autonomy and technology acceptance studies (F5), methodologists must leverage AI for proficiency-calibrated input generation (F1), an area critically absent from current practice.

Prospects for Further Research

The findings of this study should be interpreted in light of certain methodological limitations. The content analysis was conducted by a single coder, and the final corpus of 42 sources, while systematically retrieved across three languages, represents a curated sample within a rapidly expanding field.

Despite these limitations, the identified empirical voids highlight crucial avenues for subsequent investigation. Future research should prioritize:

1. Pedagogical interventions focused explicitly on F1 (Input provider), evaluating the impact of AI-generated, proficiency-calibrated reading and listening materials on learner acquisition.

2. Rigorous empirical interventions targeting under-researched linguistic cohorts, particularly non-English target languages and learners from specific L1 backgrounds who remain absent from the global literature.

3. The development and empirical validation of AI-supported dynamic assessment frameworks (F4) within structured classroom settings.

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