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ARTIFICIAL INTELLIGENCE AND IMMERSIVE TECHNOLOGIES IN TEACHING RUSSIAN AS A FOREIGN LANGUAGE: INTEGRATION OPPORTUNITIES AND METHODOLOGICAL PERSPECTIVES

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Abstract: The article examines the possibilities of integrating artificial intelligence and immersive technologies into the teaching of Russian as a foreign language. The relevance of the study is determined by the transformation of language education, the development of generative AI, virtual and augmented reality, and the growing need to create authentic communicative environments outside the natural Russian-speaking context. The study analyses AI-based chatbots, voice assistants, adaptive systems, generative models, virtual reality, augmented reality, and metaverse environments from a linguodidactic perspective. A methodological model combining AI-based personalization with immersive situational communication is proposed. Particular attention is paid to the development of speaking, listening, pronunciation, vocabulary, sociocultural competence, and learner autonomy. The article also identifies methodological, ethical, technological, and cognitive risks associated with excessive automation and uncontrolled use of AI-generated content. The scientific novelty lies in substantiating an integrated "AI + immersive environment + teacher" model in which artificial intelligence performs adaptive and analytical functions, while immersive technologies create the spatial and situational conditions necessary for communicative practice.

Keywords: Russian as a foreign language, artificial intelligence, immersive technologies, virtual reality, augmented reality, generative AI, communicative competence, adaptive learning, digital language environment.

Annotatsiya. Maqolada rus tilini xorijiy til sifatida o‘qitishda sun’iy intellekt va immersiv texnologiyalarni integratsiya qilish imkoniyatlari o‘rganilgan. Tadqiqotning dolzarbligi generativ sun’iy intellekt, virtual va kengaytirilgan reallik vositalarining rivojlanishi hamda tabiiy rusiyzabon muhitdan tashqarida autentik kommunikativ sharoit yaratish ehtiyoji bilan belgilanadi. AI-chatbotlar, ovozli yordamchilar, adaptiv tizimlar, generativ modellar, VR, AR va metakoinot muhitining lingvodidaktik imkoniyatlari tahlil qilingan. Sun’iy intellekt asosidagi individuallashtirishni immersiv vaziyatli muloqot bilan birlashtiruvchi metodik model taklif etilgan. Gapirish, tinglab tushunish, talaffuz, lug‘at boyligi, sotsiomadaniy kompetensiya va ta’lim oluvchining mustaqilligini rivojlantirish imkoniyatlari asoslangan. Shu bilan birga, avtomatlashtirish, noto‘g‘ri AI-kontent va kognitiv yuklama bilan bog‘liq metodik xavflar aniqlangan. Tadqiqotning ilmiy yangiligi “sun’iy intellekt + immersiv muhit + o‘qituvchi” integrativ modelining asoslanishidan iborat.

Kalit so‘zlar: rus tili xorijiy til sifatida, sun’iy intellekt, immersiv texnologiyalar, virtual reallik, kengaytirilgan reallik, generativ AI, kommunikativ kompetensiya, adaptiv ta’lim.

Аннотация. В статье исследуются возможности интеграции искусственного интеллекта и иммерсивных технологий в преподавание русского языка как иностранного. Актуальность исследования связана с развитием генеративного искусственного интеллекта, виртуальной и дополненной реальности и необходимостью создания аутентичной

коммуникативной среды вне естественного русскоязычного окружения. Анализируются лингводидактические возможности чат-ботов, голосовых помощников, адаптивных систем, генеративных моделей, VR-, AR- и метавселенных технологий. Предложена методическая модель, объединяющая персонализацию обучения средствами искусственного интеллекта и ситуативное общение в иммерсивной среде. Особое внимание уделяется формированию навыков говорения, аудирования, произношения, лексической и социокультурной компетенции. Рассматриваются методические, этические, технологические и когнитивные риски цифровой интеграции. Научная новизна исследования заключается в обосновании интегративной модели «искусственный интеллект + иммерсивная среда + преподаватель».

Ключевые слова: русский язык как иностранный, искусственный интеллект, иммерсивные технологии, виртуальная реальность, дополненная реальность, генеративный ИИ, коммуникативная компетенция, адаптивное обучение.

INTRODUCTION

The rapid digital transformation of education has changed not only the technological tools used in language classrooms but also the principles according to which learning environments are designed. In the field of Russian as a Foreign Language (RFL), this transformation is particularly important because many learners study Russian outside a natural Russian-speaking environment and consequently have limited opportunities for spontaneous interaction, exposure to authentic speech, and participation in culturally meaningful situations. Artificial intelligence and immersive technologies offer two complementary solutions to this problem. AI can analyse learner performance, generate individualized materials, conduct dialogue, provide preliminary feedback, and adapt tasks to proficiency level, while virtual reality (VR), augmented reality (AR), 360-degree environments, and metaverse platforms can situate linguistic activity within simulated communicative contexts.

Contemporary research in RFL already demonstrates a transition from the use of isolated digital resources towards more complex human–technology interaction. P.V. Sysoyev and E.M. Filatov conceptualize the educational process involving AI through the relationship between the learner, artificial intelligence, and the teacher, emphasizing that AI tools can expand language practice, access to authentic materials, autonomous learning, and extracurricular communication [1]. Their approach is important because it prevents artificial intelligence from being interpreted merely as an electronic exercise generator. Instead, AI becomes a new participant in the educational system, whose functions must be methodologically regulated by the teacher.

LITERATURE REVIEW

Research on artificial intelligence in RFL has intensified considerably in recent years. Sysoyev and Filatov analyse chatbots, voice assistants, corpus technologies and generative AI tools and identify their potential for practising language aspects, developing speech activities, studying Russian culture, extending communication beyond the classroom and supporting learner autonomy [1]. The value of this framework lies in its balanced interpretation of AI: the technology can expand educational opportunities but should operate within the learner–AI–teacher triad rather than outside pedagogical supervision.

The immersive dimension of digital RFL education is represented in the work of E.G. Azimov, V.A. Zhiltsov and V.M. Filippova. Their analysis of metaverse language environments shows that multi-user virtual spaces can form artificial language environments in which learners communicate synchronously and experience a stronger sense of shared presence. The researchers conclude that such environments have considerable linguodidactic potential for communicative RFL instruction and may partially compensate for the absence of a natural Russian-speaking environment [2].

RESEARCH METHODOLOGY

The study is theoretical and methodological in nature. It employs critical literature analysis, comparative analysis, functional modelling, classification and pedagogical design. Publications devoted specifically to AI and immersive technologies in RFL were compared with recent systematic reviews of AI and immersive environments in foreign-language education. The comparison focused on the pedagogical functions attributed to each technology, the language skills targeted, the role of the teacher, the degree of learner autonomy, the nature of feedback and the relationship between simulated and authentic communication.

Functional modelling was used to develop an integrated methodological framework. Rather than beginning with a specific technological product, the model was constructed from pedagogical objectives. The central principle is functional complementarity: artificial intelligence should perform those functions in which data processing, personalization, content generation and rapid feedback provide an advantage, while immersive technology should provide spatial, situational and social conditions for communication. The teacher remains responsible for curriculum design, linguistic accuracy, cultural interpretation, ethical regulation and final assessment.

ANALYSIS AND RESULTS

The analysis indicates that AI and immersive technologies solve different but interconnected problems in RFL instruction. Artificial intelligence is particularly effective before and after the communicative event. Before interaction, AI can help diagnose proficiency, identify recurrent lexical or grammatical difficulties, adapt vocabulary, generate role cards, create variations of a scenario and prepare individualized support. During communication, conversational AI can act as an interlocutor whose responses are not completely predetermined. After communication, AI can assist with preliminary analysis of vocabulary, grammar, pronunciation, response time and recurrent mistakes. Immersive technology, by contrast, is most valuable in creating the environment in which these linguistic resources become functionally necessary.

This difference can be illustrated through a virtual situation entitled “At the Airport”. In a conventional exercise, learners read or reproduce a prepared dialogue. In an immersive environment, the learner sees check-in counters, signs, luggage, departure information and virtual passengers. AI can assign a specific problem: a changed flight, excess baggage, a missing document, an incorrect boarding gate or a request for special assistance. The learner must therefore understand information, ask questions, clarify details and react to unexpected responses in Russian. If the system generates a different problem during each attempt, repetition no longer means mechanical reproduction; it becomes repeated practice of the same communicative competence under changing conditions.

The combination of AI and immersion is particularly valuable for speaking. Language learners often possess sufficient passive vocabulary and grammatical knowledge but experience difficulties when they must select linguistic resources quickly in an unpredictable situation. Generative dialogue systems can increase response variability, while immersive environments provide visual and contextual cues. Together, they create conditions closer to spontaneous speech than traditional scripted dialogue. This does not make simulated conversation identical to natural communication, but it reduces the distance between classroom exercise and practical language use.

Vocabulary acquisition can benefit from contextual integration. A word learned in isolation is cognitively different from a lexical unit required to solve a practical problem. In an AR environment, a learner can point a device at objects and receive Russian-language labels, examples, audio or tasks. In VR, lexical units can become part of action: the student has to select an object, describe its location, compare alternatives or ask another participant to find it. AI can control lexical recurrence and generate new contexts in which previously learned words reappear. Such integration potentially combines spaced practice with contextualized use.

The most significant advantage, however, lies in the formation of communicative and sociocultural competence. Azimov, Zhiltsov and Filippova emphasize the potential of virtual language environments for communicative RFL learning [2], while immersive research more broadly points to the value of simulated contextual interaction [8]. A communicatively competent learner must know not only grammatically correct forms but also when and how they are appropriate. Requests, apologies, disagreement, introductions, forms of address, politeness and distance vary according to social context. An integrated AI–VR scenario can model not only "what to say" but also "to whom, where, why and with what communicative consequence".

Table 1. Integrated Functions of AI and Immersive Technologies in RFL Instruction

Learning stage	AI functions	Immersive technology functions	Expected learning outcome
Diagnostic stage	proficiency analysis, identification of recurrent errors, task adaptation	—	individualized learning trajectory
Preparatory stage	vocabulary selection, scenario generation, role cards, model expressions	visualization of place, objects and cultural context	situational readiness for communication
Interaction stage	dynamic interlocutor, variable responses, adaptive prompts	presence, spatial interaction, role-based environment	spontaneous speaking and listening
Feedback stage	preliminary error detection, speech analysis, individualized recommendations	replay of interaction, reconstruction of the situation	reflection and correction
Transfer stage	generation of new scenario variants	new communicative environments	flexible application of skills in unfamiliar contexts

The table illustrates that the methodological value of integration is based on the division of functions rather than technological duplication. AI does not need to simulate the entire environment, and VR does not need to perform complex linguistic analysis. The first technology can individualize and dynamically modify communication; the second can give communication situational and spatial meaning. The teacher connects both systems to curriculum objectives.

CONCLUSIONS AND RECOMMENDATIONS

The study demonstrates that artificial intelligence and immersive technologies have complementary functions in teaching Russian as a foreign language. AI is particularly valuable for personalization, dynamic content generation, conversational practice, preliminary language analysis and adaptive feedback. Immersive technologies are valuable for constructing spatially and socially meaningful situations in which linguistic knowledge is transformed into communicative action. Their integration therefore creates possibilities that neither technology fully provides independently.

For RFL instruction outside a natural Russian-speaking environment, this integration is particularly significant. Virtual environments can simulate locations and social contexts that learners may otherwise encounter only in textbooks, while AI can populate these environments with variable communicative tasks and adaptive interlocutors. Current RFL studies support the

linguodidactic potential of AI, VR and metaverse environments, although the evidence base is still developing and requires further empirical validation [1–5].

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