

Artificial intelligence technologies in teaching Russian as a foreign language

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ABSTRACT

The present study aims to investigate the impact of integrating artificial intelligence (AI) technologies into teaching Russian as a foreign language (RFL) from the perspective of educators. Employing a mixed-methods research design, the study utilized several methodologies, including a teacher survey, an analytical-descriptive approach to data interpretation, and the development and evaluation of AI-based interventions. The study sample comprised 120 RFL instructors from three public universities in Kazakhstan. Preliminary findings revealed a considerable awareness among teachers regarding various AI technologies, such as chatbots, voice assistants, the ChatGPT neural network, educational platforms, gaming applications, and task design tools. Nonetheless, the practical utilization of these technologies varied significantly, with only a subset of teachers incorporating them into their regular teaching practices. The study culminated in the development of a conceptual framework for AI-driven educational interventions, incorporating platforms such as Coursera, Moodle, Open EdX, and eFront; game-based applications including Duolingo, Talk2Russia, and Russian Verbs Pro; and task creation tools such as Kahoot! and Quizlet. Following the integration of these interventions into the curriculum, post-implementation evaluations indicated that teachers generally perceived the tools as effective, with the average effectiveness rating surpassing 4.0 out of 5.0 across all assessed categories. The findings of this study have practical applicability; they can be used to enhance professional development programs for teachers of the Russian language and to formulate strategies for the integration of AI technologies into language education within the Central Asian region.

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1. INTRODUCTION

Technological advancements continue to influence educational processes and outcomes, prompting many countries to invest substantially in technological support for teaching and learning. Among the latest innovations, artificial intelligence (AI) has garnered growing interest from researchers and practitioners, particularly for its potential to enhance the quality of education. While numerous definitions of AI exist, this

study adopts the following conceptualization: AI refers to a set of technologies capable of solving problems and performing tasks autonomously to achieve specific goals without explicit human instruction [1]. Leveraging AI has enabled the development of intelligent devices and applications that mimic human cognitive processes.

The evolution of specialized AI models, such as less complex algorithms like Siri, illustrates how data-driven, multilayered technologies have transitioned from a highly specialized field to a practical tool for educational applications, including language learning [2]. The proliferation of technological and digital platforms has significantly facilitated the teaching and learning of foreign languages [3]. Nonetheless, the development of AI-assisted foreign language classroom models must function collaboratively with teachers rather than replace them. The intersection of language and digital literacy presents an opportunity to foster global competence. AI integration into foreign language instruction represents one of the most tangible avenues through which educators can contribute to the development of global competencies among students [4]. Consequently, the reform of language education can be effectively advanced through machine learning, intelligent search technologies, and natural language processing. Against this backdrop, the present study seeks to explore the role of AI technologies in the instruction of Russian as a foreign language (RFL). Three aspects define the novelty of this research. In contrast to most publications on the topic, the present study focuses on the teacher's perspective. Specifically, the instructor is considered the driving force behind technological renewal. A model for implementing AI tools has been designed and empirically tested. The geographical scope of the study expands the scientific discourse beyond the context of English-speaking universities; it examines the practice of teaching RFL in Kazakhstani universities.

Moreover, emerging technologies exert a more profound impact on the educational system by blurring the boundaries between formal, school-based learning environments and informal, self-directed learning opportunities outside the classroom. Nevertheless, due to the inherent complexity of AI systems, the development of AI-based learning environments for foreign language acquisition remains in its early stages [5]. Although foreign language programs constitute a substantial segment of internet-based education and various types of computer-assisted language learning (CALL) software have been employed for decades, relatively few products currently incorporate sophisticated intelligent adaptive features [6]. Additionally, the widespread adoption of ChatGPT and other large language models (LLMs) has introduced notable challenges within education. Educators have expressed concerns regarding the diminishing reliance on traditional learning resources, the erosion of academic integrity, and the risks associated with excessive dependence on technological tools. Although AI-driven environments possess the potential to serve as powerful educational resources, their effectiveness hinges upon careful regulation and guidance by educators [7].

The purpose of this article is to critically examine the potential and challenges associated with the use of AI-based educational tools to enhance adaptive and intellectual practices within the RFL classroom. The article primarily focuses on the characteristics of intellectual practices in foreign language instruction, the opportunities afforded by AI technologies to create adaptive learning environments, and the attitudes of teachers in Kazakhstan toward the adoption of these technologies.

2. LITERATURE REVIEW

2.1. Developing AI-based technologies for foreign language learning

As educators increasingly leverage technology to enhance the effectiveness of foreign language instruction, one of the key areas of focus has been the application of natural language processing (NLP) technologies. NLP, a field that merges AI and linguistics, is concerned with the automated processing of human language [8]. Through NLP, new knowledge can be generated, and additional educational tasks can be stimulated.

Research indicates that AI applications have the potential to introduce innovative educational models in which language learning is integrated with related fields of knowledge [9]. For instance, chatbots designed for conversation practice, emotional support, and learning utilize NLP and machine learning technologies to facilitate more dynamic and personalized interactions [10]. Furthermore, language learning chatbots increasingly incorporate AI, augmented reality (AR), and gamification elements [11]. Some applications, such as Duolingo, combine AI with gamification, while others, like Mondly, integrate AR technologies to enhance the learning experience.

Consequently, educational technology companies have been developing virtual bots or agents capable of providing customized responses and evaluating students' work. Studies have demonstrated that these bots often employ multimedia interfaces, allowing learners to practice the target language through audio, video, and visual imagery via speech (through integrated speech recognition systems) or written communication with chatbots [12]. Such platforms offer flexible learning pathways tailored to individual learners' abilities and proficiency levels.

Moreover, NLP systems are increasingly utilized in the field of machine learning, where applications and software are programmed to optimize educational outcomes. Another significant branch of AI, deep learning, employs artificial neural networks—computational systems modeled after human brain structures—to analyze extensive datasets [13].

2.2. AI-based tools in foreign language education: opportunities and challenges

Some studies suggest that AI-based tools offer opportunities for more flexible, inclusive, and engaging learning experiences [14]. Within this context, narrow AI tools have demonstrated their effectiveness by supporting teachers and students [15]. These tools are generally categorized into three types: student-oriented tools, system-oriented tools, and teacher-oriented tools.

Student-centered AI tools are designed to enhance students' knowledge and skills through structured practice models, reflective feedback mechanisms, and behaviorally driven exercises. System-oriented AI tools, by contrast, primarily serve institutional administrators by processing and analyzing data, such as through software designed to calculate and monitor academic performance. Although debates persist regarding whether specific applications or software programs truly embody AI, these new technologies—marketed as AI-driven—are undoubtedly reshaping the educational landscape. The third category, teacher-oriented tools, aims to reduce educators' workloads by automating tasks such as grading, feedback provision, classroom management, and administrative duties. Research has indicated that AI is increasingly capable of improving or even replacing some tasks traditionally performed by foreign language teachers [16], including analyzing student progress, evaluating homework, grading assessments, and correcting linguistic errors.

Despite the considerable potential of AI to facilitate the learning of RFL, integrating new technologies into classroom instruction often presents challenges for teachers. Adapting to AI systems and embracing their widespread use to enhance teaching practices can be difficult. Furthermore, successful AI-enabled language instruction demands both teacher adoption and the creative design of lessons [17].

2.3. Advantages and limitations of CALL models

Research highlights that the significance of AI applications in education lies in their capacity to meet students' diverse needs and abilities, accommodate individual learning preferences, and effectively monitor learner progress [18]. One such study demonstrated that AI-based tools incorporate functions suitable for students across varying levels of proficiency, enhance their motivation to learn, and address issues related to diminished student attention spans [19]. Furthermore, well-designed interfaces ensure that the progression through lesson segments or topics follows a logical sequence, requiring students to master one section before advancing to the next. Within this integrated instructional process, teachers serve as mentors who provide guidance, scaffolding, and feedback. However, numerous studies have consistently affirmed that AI-based learning systems cannot replace human teachers at this stage [20], [21].

LLMs, developed through deep learning techniques and artificial neural networks, represent powerful AI models trained on massive datasets to generate human-like text and perform various language-related tasks. The adoption of ChatGPT in education has recently sparked considerable interest and debate worldwide. By extending the capabilities of language generation and enhancing the understanding of contextual cues, ChatGPT offers diverse forms of support for language learners. For instance, it can edit sentences for grammatical accuracy and clarity, provide targeted feedback, generate sample sentences, assist with translations, and simulate conversational exchanges [22]. Consequently, students are afforded an engaging and dynamic learning experience that can significantly enhance their abilities and comprehension of the target language [23], [24].

Despite the potential benefits of AI integration in education, significant challenges remain, most notably, issues surrounding data privacy. Another recurring problem associated with AI-based educational technologies is the occurrence of semantic inconsistencies, particularly during more complex conversations. In such cases, chatbots and applications often generate responses that lack coherence or fail to account for cultural nuances [25], [26].

2.4. Theoretical foundations for integrating technology into language education

The integration of technology into the pedagogical process is explained by several theoretical models. The technological pedagogical content knowledge (TPCK) framework was proposed by Mishra and Koehler [27]. This model describes the interplay between three core competencies of an instructor: technological knowledge, pedagogical knowledge, and content knowledge. Successful technological innovation in teaching requires a synthesis of all three components; mastery of any one in isolation is insufficient. Davis [28] introduced the technology acceptance model (TAM), which explains users' willingness to adopt innovations through two key variables: perceived usefulness and perceived ease of use. TAM has been applied to study factors influencing the readiness of educators to adopt AI [29].

2.5. Problem statement

The main objective of this study is to investigate the impact of integrating AI technologies into the process of teaching RFL from the perspective of educators. To achieve this objective, the following tasks were set: i) to evaluate the level of awareness and familiarity among teachers with various AI-powered educational technologies, including chatbots, educational platforms, gaming applications, and task development tools; ii) to develop a conceptual framework for the integration of AI technologies in the teaching and learning of RFL; and iii) to assess the effectiveness of AI-based educational tools in RFL instruction from the viewpoint of university teachers.

3. METHOD

3.1. Research design

This study employed a mixed-methods approach, combining both quantitative and qualitative methods of data collection and analysis. A mixed-methods approach [30] was chosen due to several reasons. The quantitative component ensures statistical generalizability and impact assessment, while the qualitative component highlights contextual factors influencing university teachers' attitudes toward technology. The study follows a sequential design, where the results of an initial survey form the foundation for the intervention model in subsequent stages. The research was conducted in several stages, as shown in Figure 1.

- Stage 1: An online survey was developed and administered to university teachers to gather baseline data regarding their experience with and understanding of AI technologies in education.
- Stage 2: The collected data were systematically analyzed using descriptive and analytical techniques. Based on the findings, a lesson plan was designed incorporating the AI tools considered most effective by the participants.
- Stage 3: The developed lesson plan was integrated into the educational process as a supplementary tool for RFL teachers.
- Stage 4: After three months of implementation, a follow-up survey was conducted to reassess teacher perceptions. The effectiveness of the intervention was evaluated using a Likert scale, and mean scores were calculated for each survey item.

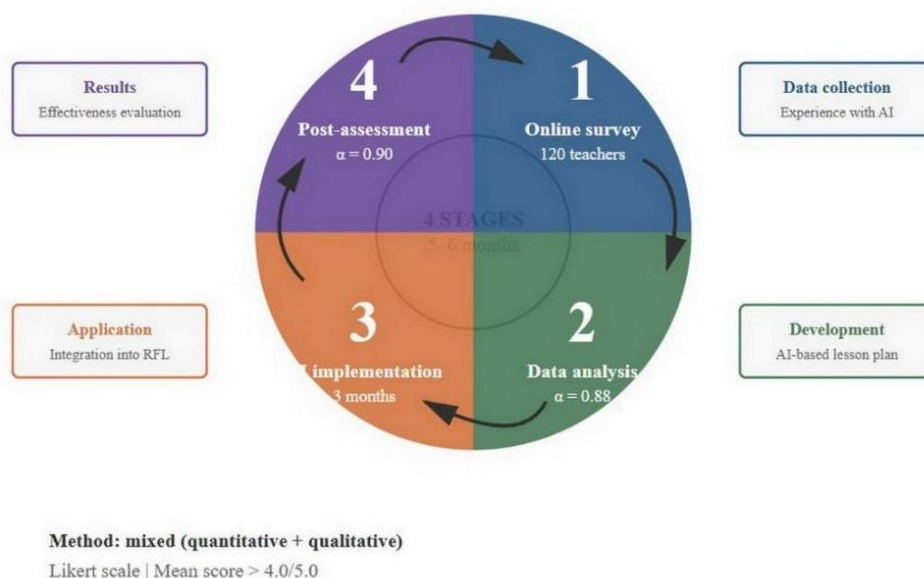


Figure 1. Research framework

3.2. Sample

The sample consisted of 120 RFL teachers employed at three state universities in Kazakhstan. The respective university administrations provided lists of teachers. Invitations to participate in the study were distributed via email. The email outlined the objectives and conditions of the study and requested informed consent. As a result, all 120 teachers agreed to participate.

3.3. Survey

The questionnaire was divided into two parts. The first part collected demographic information, while the second part assessed teachers' awareness of AI tools, the frequency of their use, and their evaluation within the context of RFL instruction (Appendix 1). The questionnaire included various questions: Likert-scale items, multiple-choice questions, and open-ended responses. It was adapted from the instrument [31], with modifications made to align with the specific goals of the present study, namely to explore RFL teachers' experiences with AI-based educational technologies. The online questionnaire was created using Google Forms and distributed to participants via email, containing a link to the survey. A second questionnaire was developed to evaluate the effectiveness of the proposed intervention model (Appendix 2). The researchers designed this questionnaire manually, and it was based entirely on the Likert scale.

Teachers were asked to evaluate various statements regarding the implementation of AI tools and their perceived impact on student engagement, motivation, and overall language proficiency. Responses were recorded on a 5-point scale, where: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. This questionnaire was likewise distributed via email to the same 120 participants. The quantitative components included closed-ended questionnaire items (Likert scales, multiple choice) and statistical processing (Cronbach's alpha, means), and a comparison of pre- and post-survey data. The qualitative components encompassed open-ended questions, descriptive analysis of responses, and interpretation of contextual factors. The data were integrated during the discussion phase, where quantitative metrics were complemented by qualitative interpretation.

3.4. Statistical processing

The data collected from the surveys were analyzed using StatPlus v.8 statistical software. The questionnaires' reliability was assessed by calculating Cronbach's alpha coefficient. Correlations between individual items and their respective subscales, as well as the overall instrument, were examined. The interpretation of Cronbach's alpha values was as: >0.9 (excellent), >0.8 (good), >0.7 (acceptable), >0.6 (questionable), and >0.5 (poor). The Cronbach's alpha coefficients for the two questionnaires were found to be 0.88 and 0.90, respectively, indicating a high level of internal consistency. Cronbach's alpha was also recalculated after the intervention to confirm the continued reliability of the instruments.

3.5. Research limitations

This study has several limitations that must be considered when interpreting its findings and implications. The sample is limited to a specific group of teachers from three universities in Kazakhstan. It may not fully represent the broader population of RFL instructors. Furthermore, variations in teachers' experience with technology may have influenced the survey results, potentially introducing bias into the findings.

3.6. Ethical issues

All procedures involving human participants in this study were conducted in accordance with established ethical research standards. Informed consent was obtained from all participants prior to their inclusion in the study, and no ethical standards were violated during the research process.

4. RESULTS AND DISCUSSION

4.1. Teachers' awareness of AI tools and their use in teaching Russian as a foreign language

The survey revealed varied levels of teaching experience among participants. Roughly one-quarter had less than a year in the classroom, while over a third reported between one and five years. About one-fifth had 6 to 10 years of experience, and the remainder were evenly split between those with 11 to 15 years and those exceeding 15 years, as seen in Figure 2.

In terms of student groups, most respondents taught undergraduates: two-fifths worked primarily with first-year students, nearly one-third with second- and third-year cohorts, and one-fifth with fourth-year students. Only a small proportion reported teaching postgraduate classes, as shown in Figure 3. Weekly teaching hours also varied. The largest share taught between five and ten hours of Russian language per week, followed by those teaching fewer than five hours. Smaller groups reported dedicating 11 to 15 hours, while the fewest taught 16 to 18 hours weekly, as seen in Figure 4.

The survey results indicated a relatively high level of awareness of AI tools among teachers. A majority reported familiarity with chatbots and voice assistants, with an even larger proportion recognizing the ChatGPT neural network. Awareness of educational platforms such as Coursera, Moodle, eFront, and Open EdX was highest, followed closely by knowledge of game-based applications like Duolingo, Talk2Russia, and Russian Verbs Pro. Task development tools, such as Kahoot!, were also well-known among

respondents. Overall, the findings suggest that most teachers are conversant with a wide range of AI-driven educational technologies, including platforms such as Quizlet, as presented in Figure 5.

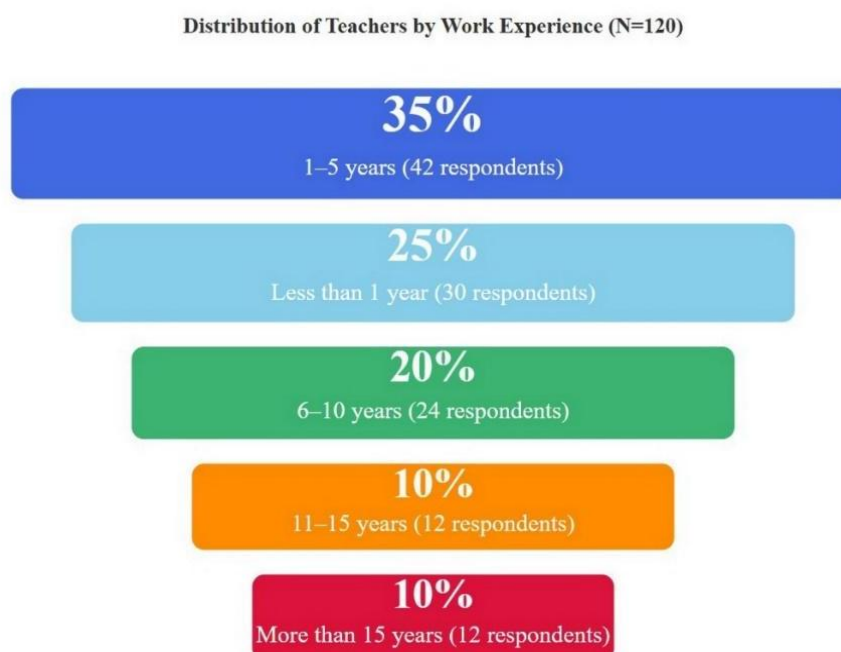


Figure 2. Distribution of teachers by work experience

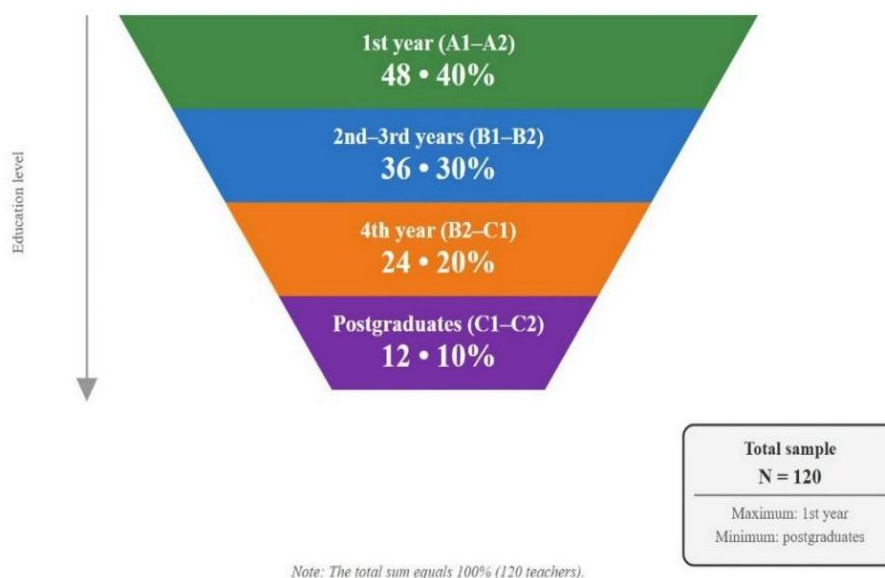


Figure 3. Distribution of teachers by student levels

Thus, most teachers demonstrated awareness of various AI-based educational technologies. However, while awareness levels are relatively high, practical experience with these tools varies significantly, suggesting that knowledge does not always translate into active integration into teaching practice. Nevertheless, the findings indicate that educators are at a stage where they may be prepared to incorporate these tools more actively into their instruction.

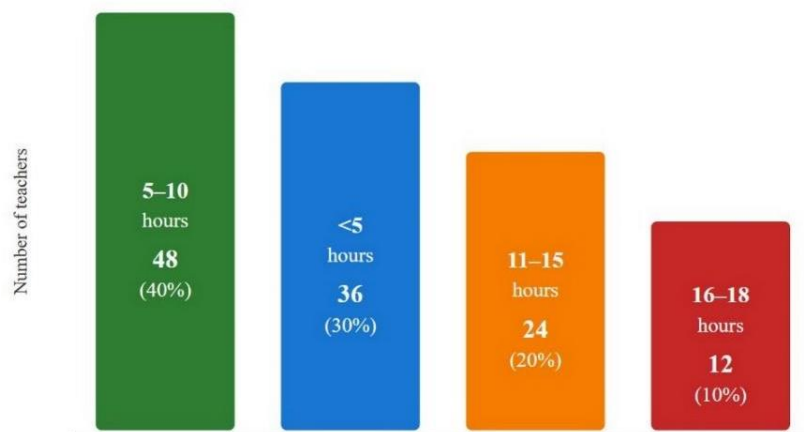


Figure 4. Distribution of teachers by weekly teaching workload

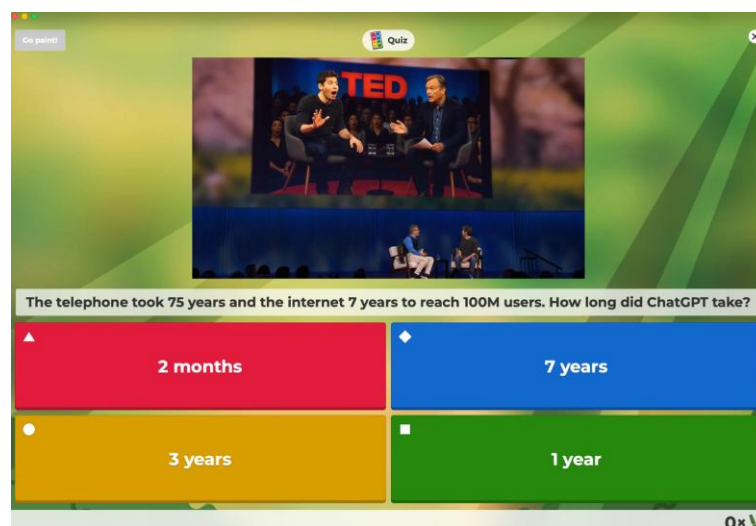


Figure 5. Example of work in Kahoot!

The frequency of AI tool usage among teachers varied considerably. Only 20% of respondents reported using chatbots and voice assistants regularly. Furthermore, approximately one-quarter of respondents reported regularly using the ChatGPT neural network, as illustrated in Figure 6.

This relatively low frequency of chatbot, voice assistant, and ChatGPT use suggests that although teachers know these technologies, they may lack confidence or readiness to integrate them consistently into their teaching practice. In contrast, educational platforms were used more frequently: 48 teachers (40%) reported using them often or always. Similarly, 42 teachers (35%) frequently utilized game applications, while 36 (30%) regularly engaged with task development tools.

These findings indicate that although teachers demonstrate initiative in adopting new technologies, there is a lack of structured institutional support. To enhance the effectiveness of AI tool usage in RFL instruction, it is essential for educational institutions to invest in comprehensive professional development programs tailored to teachers' needs, fostering collaboration and ongoing engagement with emerging technologies.

Teachers also evaluated the effectiveness of various AI tools in enhancing language learning outcomes, as shown in Figure 7. Chatbots and voice assistants received moderate effectiveness ratings, with an average score of 3 out of 5. The ChatGPT neural network was rated slightly higher, with an average of 3.5 points. Educational platforms and gaming applications were perceived as highly effective, each receiving an average rating of 4 points. Similarly, task development tools such as Kahoot! and Quizlet also achieved a high average score of 4 points.

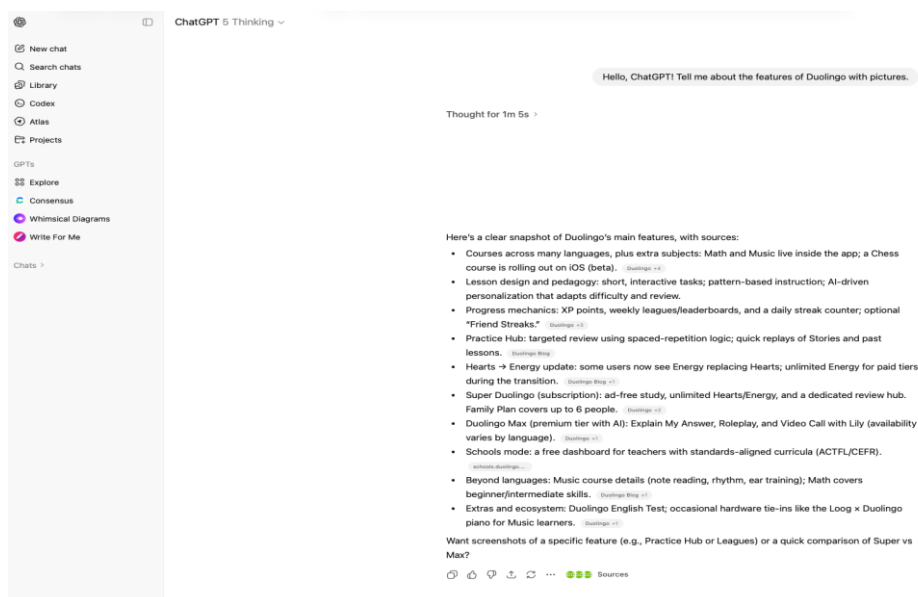


Figure 6. Example of work in ChatGPT



Figure 7. Teachers' evaluation of the effectiveness of AI tools

Teachers assessed the ease of integrating AI tools into their curricula with an average score of 3, suggesting moderate difficulty, as presented in Figure 8. This indicates that, although teachers are willing to integrate technology, they may lack sufficient knowledge or institutional support to do so seamlessly. Nevertheless, they believe that AI tools have a significant positive impact on student learning, as reflected by a high average score of 4 points for this item.

Moreover, a substantial majority of respondents (102 teachers, or 85%) agreed that AI tools are essential for modern language education, as seen in Figure 9. Meanwhile, 36 teachers (30%) expressed the belief that AI could eventually replace traditional teaching methods; however, 48 teachers (40%) disagreed, and 36 teachers (30%) reported being unsure.

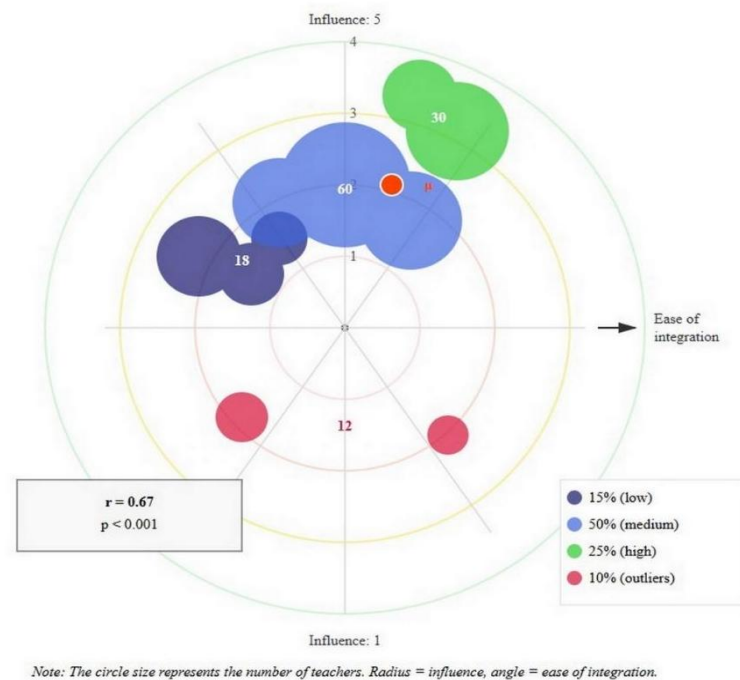


Figure 8. Radial map of the correlation between AI integration and its impact on teaching

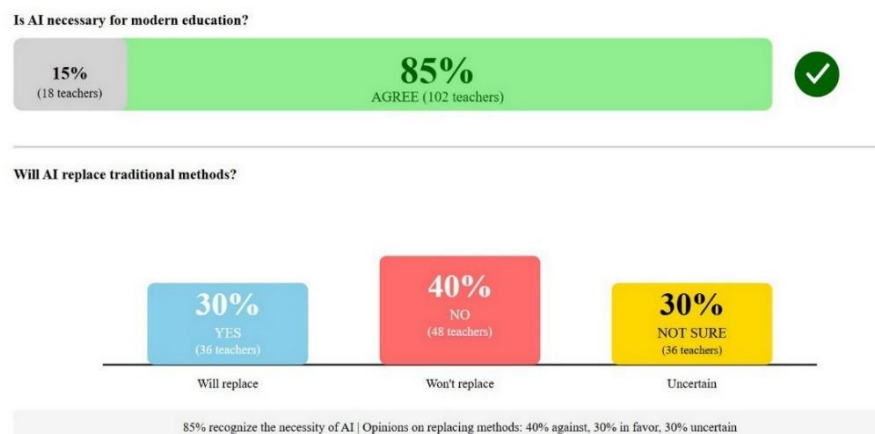


Figure 9. Teachers' perception of AI

Teachers identified several key issues regarding integrating AI tools into teaching practices, as displayed in Figure 10. The most commonly cited problem was the lack of sufficient training for educators, as 48 respondents (40%) reported. This finding highlights a significant gap in professional development related to the effective use of AI technologies. The emphasis on training needs suggests that many teachers feel insecure about their competencies, leading to hesitation or inconsistent application of AI tools in the classroom.

The second most frequently mentioned barrier was technical difficulties, cited by 36 teachers (30%). Addressing issues such as software malfunctions, inadequate technological infrastructure, and a lack of IT support is essential for creating a stable environment where AI tools can be integrated seamlessly into teaching and learning processes.

In terms of institutional support, 60 teachers (50%) indicated that their universities provide assistance with the use of AI tools, as presented in Figure 11. However, this also suggests that many teachers may still lack adequate institutional backing to fully implement technological innovations in their practice.

Regarding suggestions for improving AI learning tools, teachers recommended enhancing user interfaces, expanding the range of available educational resources, and developing more specialized features tailored to language learners, aiming to make these tools more engaging and effective.

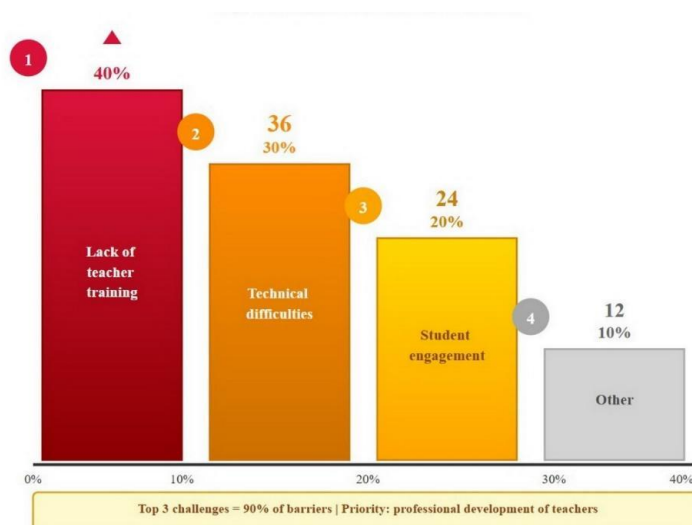


Figure 10. Key challenges in implementing AI tools

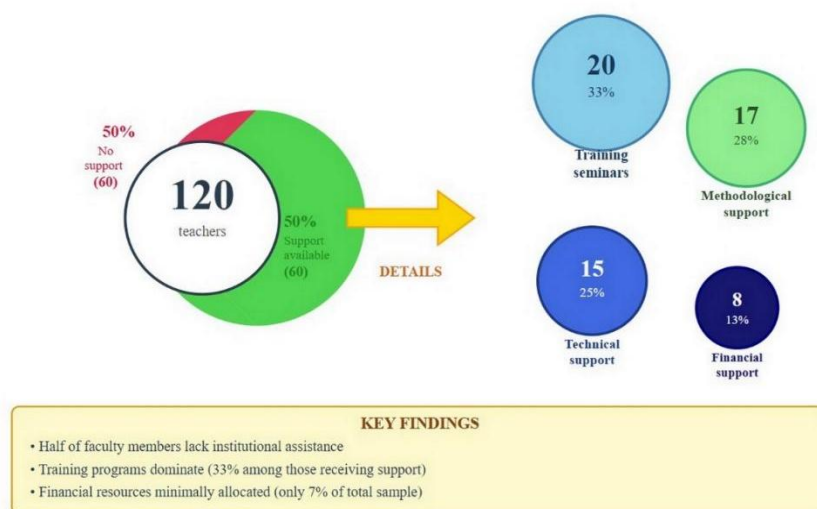


Figure 11. Institutional support for the use of AI tools

4.2. Development of the intervention

The selection of tools for the intervention model was based on the empirical findings from the primary stage. Educational platforms, gamified applications, and task-creation tools received the highest ratings from university teachers (average score ≥ 4.0 out of 5.0); consequently, these were incorporated into the model. This approach aligns with the principles of evidence-based pedagogy [32], whereby educational interventions are built upon an empirical foundation rather than relying on theory alone. The goal of the course was to enhance the learning outcomes of students studying RFL through a structured three-month program incorporating educational platforms, gaming applications, and assignment development tools.

The intervention aimed to improve students' language proficiency, engagement, and motivation. Since teachers were working with students from different academic years, their primary educational programs, approved by the university administrations, remained unchanged. However, AI tools were integrated into these programs as supplementary resources.

Each teacher was allowed to adapt the intervention to suit the specific needs and characteristics of their class, the students' proficiency levels, and the content of their academic modules. Furthermore, they were instructed that they could independently choose which tools to use from the following categories: Educational platforms (Coursera, Moodle, Open EdX, eFront); Gaming applications (Duolingo, Talk2Russia, Russian Verbs Pro); and Assignment development tools (Kahoot!, Quizlet). Thus, each teacher selected one AI tool from each category, thereby creating a unique set of technologies with which they felt confident and comfortable.

Before the intervention began, a training session was conducted for the teachers, where they practiced using the selected educational technologies. The training was facilitated by a curriculum developer with over five years of experience working with AI-based technologies. This coordinator provided technical support, guidance, and practical demonstrations of how to use the tools effectively. The two-hour training gave teachers sufficient time to familiarize themselves with unfamiliar tools, explore user interfaces, learn available features, and practice completing tasks within the platforms.

4.2.1. Implementation of educational platforms

After selecting one of the proposed educational platforms, teachers created dedicated courses organized into clear categories (modules/lessons) to facilitate navigation and accessibility. Teachers were required to send invitations to students and ensure that all students joined the class. Next, teachers developed course modules aligned with the learning objectives set for each month. Each module had to include: multimedia materials (including lectures and videos); a variety of assignments reinforcing the material covered in each module; and homework assignments and assessments.

Moreover, teachers were encouraged to utilize the platform's analytics tools to monitor student engagement and module completion progress. This allowed teachers to track module completion rates and test results, helping to identify students who might need additional support or resources.

4.2.2. Implementation of work with gaming applications

During each lesson, it was recommended to allocate 15–20 minutes for completing tasks using gaming applications. Depending on the specific features of the application, this could be organized in either group or individual formats. In addition, teachers were encouraged to motivate students to complete lessons independently outside the classroom.

4.2.3. Implementation of work with assignment development tools

These technologies were intended for conducting formative assessments and reinforcing the material covered in class. Teachers could either use ready-made assignments or create their own customized tasks. This approach allowed for an interactive assessment of students' knowledge, with automatic processing of results, thereby saving teachers' time and enhancing the efficiency of feedback.

4.3. Assessment of the effectiveness of the intervention

The results of the second survey indicate that teachers generally assessed the effectiveness of integrated educational platforms, gaming applications, and assignment development tools positively, as shown in Table 1. Since the average ratings generally exceed 4.0 points, teachers consider these tools effective in improving both their teaching practices and their students' learning outcomes. The highest mean scores were given to such items as the overall effectiveness of the combination of tools (4.40), the recommendation of the intervention for implementation in other language courses (4.45), and the increased confidence of teachers in using digital technologies after the intervention (4.35).

Many language learning applications today are based on AI technologies that both students and teachers can utilize. These technologies are capable of simulating intelligence and making decisions similar to human thinking through processes available on computers and mobile devices [29]. Similar studies have been conducted in the context of teaching other foreign languages. For example, the role of AI in English language teaching was analyzed by Fitria [33]. The results demonstrated that AI offers a favorable learning environment for studying English, particularly for modeling conversational communication. These findings are consistent with the results of the current study, which demonstrated the effectiveness of AI-based educational platforms, gaming applications, and assignment development tools in RFL. The findings resonate with broader trends in AI integration into language learning and can be extrapolated to the RFL context.

Most contemporary research tends to focus on analyzing students' experiences with AI educational technologies. However, this study deliberately chose to explore the perspectives of teachers. In addition, the behavioral intentions of EFL teachers to use AI in their teaching were analyzed by An *et al.* [14]. In their study, a five-point Likert scale was employed. The results showed that teachers positively evaluated expected performance, social influence, facilitating conditions, language knowledge, and technological pedagogical

knowledge regarding AI. The conclusions of An *et al.* [14] support the present study: while university teachers perceive the potential of AI positively, barriers to practical implementation persist.

Table 1. Results of the repeated teacher survey

Statement	Average score
1. Educational platforms (Moodle, Coursera, Open EdX, eFront)	
The educational platform I selected contributed to the effective delivery of content.	≈ 4.22
Multimedia materials presented on the platform improved my students' understanding of the subject.	≈ 4.30
The organization of course modules facilitated student navigation and access to materials.	≈ 4.15
Integrating the educational platform into my curriculum improved students' learning outcomes.	≈ 4.18
2. Gaming applications (Duolingo, Talk2Russia, Russian Verbs Pro)	
Allocating time for gaming applications during lessons helped to increase student engagement.	≈ 4.00
Gaming applications contributed positively to the development of my students' language skills.	≈ 4.25
My students enjoyed using gaming applications during the learning process.	≈ 4.35
The competitive nature of gaming applications motivated students to practice more outside of class.	≈ 4.10
3. Assignment development tools (Kahoot!, Quizlet)	
Assignment development tools were effective for assessing students' knowledge.	≈ 4.27
The ability to create customized tasks allowed me to align assessments with learning objectives.	≈ 4.20
The automated processing of assignment results saved my time and improved feedback efficiency.	≈ 4.33
Assignment development tools effectively reinforced the material studied.	≈ 4.25
4. Overall experience with AI tools	
The combination of educational platforms, gaming applications, and assignment development tools improved the effectiveness of my teaching.	≈ 4.40
After the intervention, I feel more confident in using digital technologies in teaching.	≈ 4.35
The training session provided adequate preparation for integrating technologies into my classroom.	≈ 4.30
I would recommend using these tools in other language courses.	≈ 4.45

Another study by Mukhallafi [34] adopted an analytical approach to describe AI and strategies for its use in English language teaching. The results identified a set of strategies suitable for AI integration in language education, although a low level of practical implementation of these strategies was observed. Similarly, the current study revealed that teachers are proactive in adopting AI-based educational tools but often lack sufficient structured support from their educational institutions. To improve the effectiveness of AI tool usage in RFL teaching, it is crucial for educational institutions to invest in comprehensive professional development initiatives that meet teachers' needs, promote collaboration, and encourage continuous engagement with emerging technologies. In a related study, Shin [35] developed an English classroom model that utilized AI through a flipped learning approach. The findings indicated that the AI-supported flipped classroom model had a positive impact on students' self-efficacy. Since the process of language development is based on communication, it is essential to incorporate both traditional and digital communication strategies into teaching and learning processes. Consequently, AI-based applications, such as simulation and communication programs, are positively evaluated, as these tools simulate real-life situations for conversation and interaction in the target language [36].

AI-based communication tools assist in designing practice situations for accurate pronunciation through audio exercises and visual resources. These tools offer exercises aimed at describing and interpreting images and everyday scenarios, as well as listening activities and guided pronunciation practice. Separately, a study examined the impact of ChatGPT on English language learning [37]. The findings indicated that the neural network generally motivates learners to develop reading and writing skills. Respondents expressed neutral attitudes toward ChatGPT's influence on the development of listening and speaking skills. Overall, the results suggest that ChatGPT-based learning environments are motivational for students.

5. CONCLUSION

The initial survey results indicate that most teachers possess a sufficient level of awareness regarding various AI-based educational technologies. In particular, 65% of respondents reported being familiar with chatbots and voice assistants, and 70% indicated awareness of the ChatGPT neural network. Furthermore, awareness extended to educational platforms (80%), gaming applications (75%), and assignment development tools (70%). Despite this high level of awareness, it is important to note that the practical application and regular use of these tools varied, suggesting that while teachers recognize the potential of AI technologies, barriers may exist that prevent their full integration into teaching practices. This highlights the need for targeted professional development and support systems to bridge the gap between awareness and effective implementation of AI in teaching RFL.

The findings may serve as a foundation for initiatives aimed at supporting the professional development of RFL teachers in Kazakhstan. Such initiatives could assist educators in adopting innovative

pedagogical approaches and effectively integrating technologies into their teaching practices. The intervention model is transferable to other linguistic and institutional contexts. Its flexible framework for selecting tools by category (platforms, applications, assessment tools) allows for adaptation, such as replacing applications with equivalents for other target languages. The model’s three-component structure (content delivery, gamified practice, formative assessment) serves as a universal template applicable to diverse educational systems. Successful adaptation to different contexts would require a preliminary diagnostic assessment of teacher awareness, similar to the first stage of the present study. Future research could explore the development of digital literacy skills among both teachers and students. Additionally, future studies may focus on the specific AI elements that teachers were least likely to integrate into their practice, such as chatbots, voice assistants, and the ChatGPT neural network.

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This research has no conflict of interests.

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All participants gave written informed consent to participate in the research.

ETHICAL APPROVAL

The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The research was approved by the local Ethics Committee of Eurasian National University named after L. N. Gumilyov (Protocol No. GEN-7729 of 2024/06/05).

DATA AVAILABILITY

All data generated or analyzed during this study are included in this published article.

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APPENDIX 1

Questionnaire: "Teachers' awareness of AI tools and their use in teaching Russian as a foreign language"

Section 1: Demographic information

1. What is your teaching experience in Russian as a foreign language (RFL)?

- Less than 1 year
- 1–5 years
- 6–10 years
- 11–15 years
- More than 15 years

2. What level of students do you primarily teach?

- First-year students
- Second- and third-year students
- Fourth-year students
- Graduate (Master's) students

3. How many hours per week do you teach Russian as a foreign language?

- Less than 5 hours
- 5–10 hours
- 11–15 hours
- 16–18 hours

Section 2: Awareness of AI tools

4. Are you familiar with the following AI tools and applications? (Check all that apply)

- Chatbots and voice assistants (Voicemaker, Archost, Zvukogram, Robivox, Speechpad)
- Neural network ChatGPT
- Educational platforms (Coursera, Moodle, Open EdX, eFront)
- Gamified applications (Duolingo, Talk2Russia, Russian Verbs Pro)
- Task development tools (Kahoot! and Quizlet)

5. How often do you use the following AI tools in your teaching? (Indicate the frequency of use for each tool using the scale: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always)

AI Tool	1	2	3	4	5
Chatbots and voice assistants					
Neural network ChatGPT					
Educational platforms					
Gamified applications					
Task development tools					

6. How did you learn to use these tools? (Check all that apply)

- Self-taught
- Teacher training courses
- Internal professional development
- External professional development
- From colleagues
- Other (please specify)

7. In your opinion, how effective are the following AI tools in improving language learning outcomes? (Rate each tool on a scale from 1 to 5, where 1=Not effective, 2=Slightly effective, 3=Moderately effective, 4=Very effective, 5=Extremely effective)

AI tool	1	2	3	4	5
Chatbots and voice assistants					
Neural network ChatGPT					
Educational platforms					
Gamified applications					
Task development tools					

8. How would you rate the ease of integrating AI tools into the curriculum on a scale from 1 to 5, where 1 = Difficult to integrate and 5 = Easy to integrate?
9. How would you rate the impact of artificial intelligence tools on student learning outcomes on a scale from 1 to 5, where 1 = No impact and 5 = Significant impact?
10. Do you believe that artificial intelligence tools are essential for modern language teaching?
 - Yes
 - No
 - Not sure
11. In your opinion, can artificial intelligence tools replace traditional teaching methods?
 - Yes
 - No
 - Not sure
12. What challenges do you face when integrating AI tools into your teaching practice?
 - Technical issues
 - Lack of training
 - Student engagement
 - Other (please specify)
13. Do you receive support from your institution for using AI tools?
 - Yes
 - No
14. What improvements would you like to see in AI tools for education?

APPENDIX 2

Evaluation of the effectiveness of AI-based intervention

1. Educational platforms (Moodle, Coursera, Open EdX, eFront):

- The educational platform I selected contributed to effective content delivery.
- The multimedia materials presented on the platform enhanced my students' understanding of the subject.
- The organization of course modules facilitated student navigation and access to materials.
- The integration of the educational platform into my curriculum improved student learning outcomes.

2. Gamified applications (Duolingo, Talk2Russia, Russian Verbs Pro):

- Allocating time for gamified applications during lessons helped increase student engagement.
- Gamified applications made a positive contribution to the development of my students' language skills.
- My students enjoyed using gamified applications during the learning process.
- The competitive nature of gamified applications motivated students to engage more frequently outside the classroom.

3. Task development tools (Kahoot!, Quizlet):

- Task development tools were effective for assessing students' knowledge.
- The ability to create customized tasks in these tools allowed me to align assessment with learning objectives.
- Automated processing of task results saved me time and enhanced the efficiency of feedback.
- Task development tools effectively reinforced the material learned.

4. Overall experience with AI tools:

- The combination of educational platforms, gamified applications, and task development tools enhanced the effectiveness of my teaching.
- Following the intervention, I feel more confident in using digital technologies in my teaching.
- The training session provided adequate preparation for implementing these technologies in my classroom.
- I would recommend using these tools in other language courses.

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