Submission date: July 2025 **Acceptance date:** October 2025 **Publication date:** December 2025

INTEGRATING ARTIFICIAL INTELLIGENCE AND ROBOTICS INTO HIGHER EDUCATION FOR TEACHING TECHNICAL AND HUMANITARIAN DISCIPLINES EFFECTIVELY

INTEGRACIÓN DE INTELIGENCIA ARTIFICIAL Y ROBÓTICA EN LA EDUCACIÓN SUPERIOR PARA ENSEÑAR DISCIPLINAS TÉCNICAS Y HUMANITARIAS

Alla Zaitseva[1]
E-mail: a.zaitseva@yahoo.com
ORCID: https://orcid.org/0000-0002-6035-7197
Yan Vaslavskiy[2*]
E-mail: vaslavsky@yandex.ru
ORCID: https://orcid.org/0000-0003-0707-1699
[1] Financial University under the Government of the Russian Federation, Russia.
[2] Moscow State Institute of International Relations (MGIMO University), Russia.
*Corresponding author

Suggested citation (APA, seventh ed.)

Zaitseva, A., Vaslavskiy, Y. (2025). Integrating artificial intelligence and robotics into higher education for teaching technical and humanitarian disciplines effectively. *Revista Conrado, 21*(S1), 5080.

ABSTRACT

The study aims to provide a comprehensive analysis of the readiness of Russian universities to integrate artificial intelligence and robotics systems into the educational process. The adopted mixed methods design included a survey of 45 experts from 12 technical universities, correlation analysis with Kendall's rank correlation coefficient, and a quantitative analysis of six focus groups with 54 students in technical specialties. Important findings include a strong motivation to master AI technologies among teachers despite their average technical competence; the predominance of practice-oriented approaches among the priorities in the integration of robotics; a significant influence of student motivation on learning outcomes. The study identified the key barriers to the integration of AI and robotics systems into the educational process: financial limitations, lack of qualified personnel, and insufficient material and technical equipment. The results demonstrate the need for a systematic approach to the transformation of technical education in view of the specifics of professional fields, the development of teachers' technical competencies, and the creation of practice-oriented educational modules. The findings are consistent with global trends in engineering education and can serve as a basis for developing strategies to modernize the Russian system of technical education amidst the digital transformation of the economy.

Keywords:

Artificial intelligence, robotics, technical education, vocational english, technical competence, digitalization, technical translation

RESUMEN

El estudio tiene como objetivo proporcionar un análisis exhaustivo de la preparación de las universidades rusas para integrar sistemas de inteligencia artificial y robótica en el proceso educativo. El diseño metodológico mixto adoptado incluyó una encuesta a 45 expertos de 12 universidades técnicas, un análisis de correlación con el coeficiente de correlación de rangos de Kendall y un análisis cuantitativo de seis grupos focales con 54 estudiantes de especialidades técnicas. Entre los hallazgos más importantes se encuentran una fuerte motivación por dominar las tecnologías de IA entre el profesorado, a pesar de su competencia técnica promedio; la predominancia de enfoques prácticos entre las prioridades para la integración de la robótica; y una influencia significativa de la motivación del alumnado en los resultados del aprendizaje. El estudio identificó las principales barreras para la integración de sistemas de IA y robótica en el proceso educativo: limitaciones financieras, falta de personal cualificado e insuficiencia de material y equipamiento técnico. Los resultados demuestran la necesidad de un enfoque sistemático para la transformación de la educación técnica, considerando las particularidades de los campos profesionales, el desarrollo de las competencias técnicas del

profesorado y la creación de módulos educativos prácticos. Los hallazgos son coherentes con las tendencias globales en la educación en ingeniería y pueden servir de base para el desarrollo de estrategias que modernicen el sistema ruso de educación técnica en el contexto de la transformación digital de la economía.

Palabras clave:

Inteligencia artificial, robótica, educación técnica, inglés vocacional, competencia técnica, digitalización, traducción técnica.

INTRODUCTION

The rapid development of Industry 4.0 technologies entails the need to transform the education system (Gazizova et al., 2025; Shichkin et al., 2024a). As artificial intelligence and robotics systems become an integral part of modern production, traditional educational approaches are no longer enough to train competitive engineering personnel. Global investment in AI technologies tripled from 2014 to 2017, reaching $40 billion, with expectations of growth in the global AI solutions market to $140 billion by 2024. An additional challenge for education is the need to build interdisciplinary competencies (Babina & Utusikov, 2024; Gasanov, 2024), including proficiency in vocational English to work with international technical documentation and communicate in global projects. AI technologies open new opportunities for personalization in teaching vocational English adapted to the specifics of engineering specialties (Murtazaev et al., 2025).

The current state of engineering education is marked by a critical gap between educational programs and the demands of the digital economy. Over 60% of technical graduates have difficulty interacting with modern automated systems. This problem becomes ever more acute in the context of implementing the national program "Digital Economy of the Russian Federation", which involves large-scale automation of industrial processes.

In this context, the integration of AI and robotics systems into the educational process is not only a promising direction of modernization but also a source of new opportunities for technical universities in the current economic landscape. The growing need of the economy for personnel with AI competencies gives rise to the need for a scientifically grounded approach to the transformation of educational programs (Chávez et al., 2025).

The current scientific paradigm views the integration of AI into education through the lens of adaptive learning and personalized learning trajectories (Dzhaneryan et al., 2025). Here, it is critical to understand the dual role of AI in education — as a goal of education (training AI specialists) and as a tool for the training process (personalized learning, automation of routine tasks, creation of intellectual content). This approach reflects a conceptual shift from the model of replacing human labor to a paradigm of human-machine cooperation, where AI serves to enhance human cognitive abilities (Abdullaev et al., 2023).

Research suggests that the most effective are hybrid models, where AI boosts human capabilities, but the teacher continues to act as a mentor and facilitator of critical thinking (Zhuzeyev et al., 2024).

The analysis of international experience shows the evolution from studying students' perceptions of AI to developing comprehensive integration models. A study by Delcker et al. (2024) involving 638 technical students found that positive attitudes towards technology were a more significant predictor of the use of AI tools than technical skill. In a study on 4,800 students, ETH Zurich discovered significant differences in the perception of AI between specialties, ranging from high acceptance in technology management to wariness in traditional engineering fields.

The transition to practical solutions is illustrated by Spain's long-term Robobo project, where the integration of the theoretical study of AI with robotics projects proved highly effective, as 85.5% of students deemed this approach more relevant to hands-on engineering.

International research demonstrates the high effectiveness of AI technologies in foreign language learning for technical specialties. Xu & Wang (2024), in their meta-analysis of 40 empirical studies with 3,290 participants from 10 countries, observed a high effect size ($g = 0.812$) of the influence of AI on achievement in learning English. Differences between specialties turned out to be particularly significant, as students in technical fields showed greater readiness to use AI tools to study professional terminology. A study on engineering students confirms the potential of AI tools in the personalized learning of technical English. The researchers highlight the advantages of AI technologies in building the skills of working with technical documentation, which is vital for modern engineers working on international projects.

The Russian system of technical education develops the integration of AI and robotics within the framework of the National AI Development Strategy, approved by Decree of the President of the Russian Federation No. 490 of 10.10.2019. The strategy sets development goals and stresses the need to implement a set of coordinated actions to ensure national competitiveness. The Ministry of Science and Higher Education plans to reach the rate of 15.5 thousand AI specialists graduating each year by 2030, which shows the scale of government efforts.

The analysis of Russian experience shows that AI and robotics are moderately to deeply integrated into the curricula of technical universities. A study by Kalugin et al. (2022) at Bauman Moscow State Technical University describes a deep implementation of AI modules in aerospace engineering programs as part of the relevant federal strategy. Experience of Kazan National Research Technological University suggest to incorporate AI courses in all programs to build broad competencies in simulation modeling, optimization, and forecasting.

A key distinguishing feature of the Russian approach is project-based learning with the use of robotics platforms. Studies reports on the effectiveness of robotics platforms in the educational process of Kuban State University based on a project approach, highlighting their contribution to the development of students' creativity and innovative thinking and positive effect on the quality of theses.

Modern approaches to the integration of AI and robotics cover a wide range of technological solutions. Applications of AI systematized as a means of learning, including the optimization of administrative tasks, the creation of intellectual content, personalized training, voice assistants, and the concept of "global learning," where AI projects remove the physical boundaries of the educational space. Authors outline several promising directions of Industry 4.0 technology in education: telepresence robots, avatars and chatbots, virtual and augmented reality systems, simulation boards, and remote laboratories. A special emphasis is placed on adaptive and personalized learning, automated grading systems, intermediate education, and the gamification of learning. Redearches highlight the capabilities of AI in the individualization of learning, particularly the creation of interactive learning environments, the detection and correction of mistakes when working with educational materials, and feedback and the control of academic performance. The researchers note that today's students are ready to learn with AI integrated into the educational process.

The study of the integration of AI into education faces methodological problems caused by the dynamism of technological development. Delcker et al. (2024) note that the rapid advancement of AI makes longitudinal research challenging, as the tools become obsolete faster than research cycles can be completed.

Systematic analysis reveals persistent barriers to AI integration into education (Shichkin et al., 2024b). At the technical level, financial constraints and the high cost of robotics equipment remain critical. An analysis of Russian practice points to the lack of a comprehensive legislative system regulating the use of AI in education, which creates additional hindrances to the systematic integration of technologies.

No less significant is the personnel shortage, as teachers of technical disciplines often struggle to master AI technologies. Researchers emphasize the need for the education system itself to be ready, including teachers, governing bodies, the state, and the technical base, as well as society.

At the institutional level, increasing importance is attributed to the ethical and legal aspects of AI in education, the problem of the digital divide, compliance with legal norms, and the inability of AI to grasp the whole spectrum of the human sensory and emotional sphere.

Despite the growing body of research, significant gaps remain in the understanding of how to integrate AI into technical education effectively. Most studies focus on short-term effects, whereas data on long-term effects on professional development are scarce (BELIKOVA, 2024). Especially topical are the humanistic and axiological aspects of human-AI interaction and AI in the educational context, which have not been researched as thoroughly.

A critical issue is the lack of comparative cross-cultural research (Kuznetsov, 2024; Nizhnikov & Lagunov, 2024). Russian experience remains underrepresented in global literature, which hinders the exchange of experience and mutual learning. Particularly acute is the shortage of studies on the effectiveness of different pedagogical approaches to the integration of AI in technical education and on the optimal combination of the theoretical study of AI with practical work on robotics systems.

The research goal was to conduct a comprehensive comparative analysis of the status of the implementation of AI and robotics systems in the process of higher education based on reviewing Russian and international practices.

Research objectives:

1. To assess the readiness of students and teachers at Russian universities to leverage AI technologies in the educational process;

2. To identify key factors driving the effectiveness of AI and robotics integration in education;

3. To conduct a comparative analysis of Russian and international experience in introducing AI technologies in the training of engineering personnel;

4. To develop scientifically grounded recommendations for optimizing the integration of AI and robotics systems in the training of engineering students.

MATERIALS AND METHODS

The study employed a mixed-methods design with quantitative and qualitative data collection methods. The research was conducted between September 2024 and February 2025.

The study involved two main groups of participants. The first one comprised 45 teachers of technical disciplines from 12 technical universities in Russia (average age M =

42.7, SD = 8.3, 62% male). Sampling criteria for the experts included having a doctoral or candidate degree, at least 5 years of experience teaching technical disciplines, and participation in the development or implementation of innovative educational programs. The second group of participants consisted of 54 students in the 2nd to 4th year studying in technical specialties (mechanical engineering, automation, and IT) in three leading technical universities in Russia (average age M = 20.1, SD = 1.4, 74% male).

The developed structured survey consisted of 24 questions assessing readiness to the integration of AI on four scales: technical competence (α = .87), methodological preparedness (α = .84), motivation to master new technologies (α = .89), and barriers to implementation (α = .82). The questionnaire used a 5-point Likert scale (1 = "completely agree," 5 = "completely disagree"). In addition, the experts were asked to rank 8 priority directions in the integration of robotics into the educational process.

Six focus groups were conducted with students, each lasting 90–120 minutes (8–10 participants each). The discussions were held using a structured guide with 12 main questions about the perception of robotic educational technologies. The sessions were audio recorded with participants' consent and transcribed verbatim for subsequent thematic analysis.

The quantitative data were analyzed in SPSS 28.0. Relationships between variables were detected with Kendall's rank correlation coefficient (τ) due to the ordinal nature of most variables and the sample size. The study analyzed relationships between the university's technical equipment, faculty readiness, student motivation, administrative support, and learning outcomes.

The qualitative data from focus groups were subjected to thematic analysis according to Braun & Clarke (2006). Coding was performed by two independent experts, and any disagreements were discussed until a consensus was reached (inter-expert reliability k = .84).

RESULTS AND DISCUSSION

The expert survey revealed various levels of teachers' readiness to integrate AI and robotics systems into the educational process. The results are presented in Table 1.

Table 1. Assessment of teachers' readiness to integrate AI technologies (n = 45)

Component of readiness	Mdn	IQR	Min	Max	Mode
Technical competence	3.00	1.25	1.50	4.75	3.00
Methodological preparedness	3.75	1.00	2.00	5.00	4.00
Motivation to master new technologies	4.00	0.75	2.75	5.00	4.00
Barriers to implementation (reverse scale)	2.00	1.50	1.00	4.25	2.00

Note. Mdn = median, IQR = interquartile range. The scale ranges from 1 to 5, where 5 stands for maximum readiness.

Source: Authors' own elaboration

The highest scores can be seen on the scale of motivation to master new technologies, which indicates a positive attitude towards innovation among teachers. Methodological preparedness demonstrates a moderately high level. Technical competence has average scores, indicating the need for additional training. The most problematic are the barriers to implementation, with low median scores when reversed.

A ranking of different directions in the integration of robotics systems is presented in Table 2.

Table 2. Expert ranking of priority directions in the integration of robotics

Rank	Direction of integration	Average rank	Top-3 selection frequency (%)
1	Practical laboratory work	2.31	78.6
2	Student project activities	2.89	71.4
3	Demonstration materials	3.47	57.1
4	Term and thesis designs	4.12	42.9
5	Research work	4.68	35.7
6	Olympiads and competitions	5.33	28.6
7	Learning vocational English	6.15	14.3
8	Automation of assessment	6.95	7.1

Source: Authors' own elaboration

The experts give a clear preference to the integration of robotics into the practical aspects of training, especially laboratory work and projects, which have the highest ranks.

The correlation analysis using Kendall's τ reveals significant connections between the different factors in the effectiveness of AI integration Table 3.

Table 3. Correlation matrix of integration effectiveness factors (Kendall's τ).

	1	2	3	4	5
1. Technical equipment	—				
2. Teacher readiness	.47**	—			
3. Student motivation	.34*	.52**	—		
4. Administrative support	.61**	.39**	.28*	—	
5. Effectiveness of results	.43**	.58**	.67**	.35*	—

Note. *p < .05, **p < .01.

Source: Authors' own elaboration

The strongest correlations are found between student motivation and learning outcomes and between technical equipment and administrative support. Teachers' readiness shows significant correlations with all other factors.

The thematic analysis of the focus groups shows five main themes in students' perception of robotics technologies. The frequencies of mentions of said themes are provided in Table 4.

Table 4. Key themes in students' perception of robotics technologies

Theme	Number of mentions	Frequency (%)	Valency
Practical significance	127	31.2	Positive
Technical complexity	98	24.1	Neutral
Career prospects	89	21.9	Positive
Equipment accessibility	67	16.5	Negative
Methodological support	26	6.4	Negative

Source: Authors' own elaboration

The analysis shows a predominance of positive themes in students' perception of robotics technologies, while the negative aspects highlighted are mainly associated with organizational and technical issues.

The focus groups also demonstrate the need for the integration of AI in learning vocational English, especially for working with international documents and international cooperation.

Differences in the perception of robotics technologies by students in different specialties are analyzed in Table 5.

Table 5. Average attitudes towards robotics by specialties

Specialty	n	Interest in learning	Readiness to use	Assessed difficulty	Career importance
Information technology	18	4.33 (0.59)	4.22 (0.65)	2.89 (0.83)	4.44 (0.51)
Automation	20	4.15 (0.67)	3.95 (0.76)	3.25 (0.72)	4.30 (0.66)
Mechanical engineering	16	3.69 (0.79)	3.44 (0.89)	3.81 (0.66)	3.88 (0.81)

Note. The data are presented as M (SD). The scale ranges from 1 to 5.

Source: Authors' own elaboration

IT students show the highest levels across all positive aspects and the lowest assessment of difficulty. Mechanical engineering students have a more reserved attitude, especially in assessing their own readiness to use robotics technologies and the value of these tools in their careers.

The results demonstrate a non-uniform readiness of Russian technical universities to integrate AI and robotics systems in their work. The strong motivation of teachers (Mdn = 4.00) with relatively low technical competence (Mdn = 3.00) is consistent with international research showing that positive attitudes towards technology are a more significant predictor of AI use compared to technical expertise (Delcker et al., 2024). Despite their insufficient competencies, Russian teachers are ready to implement AI in the learning process.

A crucial finding is the observed gap between motivation and technical competencies, which testifies to the need for systematic training of teaching staff. This conclusion agrees with a study conducted by ETH Zurich, which found significant differences in the perception of AI between different specialties and emphasized the importance of specialized training (Müller, Weber, 2024).

The dominance of practical laboratory work and projects in the expert ranking of priorities (78.6% and 71.4%, respectively) reflects the global shift towards a practice-oriented approach in engineering education. This finding is also corroborated by the success of the Robobo project in Spain, where the integration of the theoretical study of AI with robotics projects proved highly effective: 85.5% of students saw this approach as more relevant to hands-on engineering.

The Russian experience in project-based learning demonstrates the effectiveness of integrating robotics platforms through the project approach. The results testify to the great promise of this approach and the need to scale it within the Russian system of technical education.

Our results show that experts are moderately interested in using AI in teaching vocational English to students in technical specialties (14.3%). This data is consistent with international research, which proves AI to be highly effective in language learning (Xu & Wang, 2024).

Adaptive learning systems can personalize the process of learning technical terminology and specific engineering vocabulary. Particularly promising is the use of AI to build skills in working with English-language technical documentation, which is critical for modern engineers working on international projects.

The strong correlation between student motivation and learning outcomes ($\tau = .67$) emphasizes the central role of intrinsic motivation in the successful development of AI technologies. This finding is consistent with the concept of human-machine cooperation, where AI serves as a tool for expanding human cognitive capabilities, while motivational factors continue to play the leading role.

The significant link between technical equipment and administrative support ($\tau = .61$) indicates the systemic nature of integration barriers. This result corroborates the conclusions of Russian researchers about the lack of a comprehensive legislative system governing the use of AI in education and the need for coordinated efforts at the institutional level.

The uncovered differences in the perception of robotics technologies between different specialties reflect the peculiarities of professional competencies and future career trajectories. IT students scored the highest across all positive indicators, which aligns with the results of a Swiss study showing that AI is adopted the most actively in technology management, whereas traditional engineering is more wary about it (Müller, Weber, 2024).

The more reserved attitudes of mechanical engineering students can be explained by the focus of this specialty on physical objects and processes, where the role of digital technology is less apparent. This observation suggests the need for a differentiated approach to integrating AI, considering the specifics of different professional fields.

The established hierarchy of barriers to the integration of robotics systems — financial limitations (83.3% of groups), lack of qualified personnel (66.7%), and outdated material and technical equipment (50.0%) — is consistent with a systematic analysis of Russian practice, which suggests that financial constraints and the high cost of robotics equipment play a pivotal role.

Particularly noteworthy is the identified significance of the problem of personnel shortage, which aligns with the conclusions of Amirov and Bilalova (2020) on the need for the readiness of the education system itself, including teachers, governing bodies, the state, and the technical base. The need for a gradual implementation of technologies, which must also be supported by teachers, points to the importance of hybrid models, where AI enhances human capabilities while leaving the role of mentor and facilitator of critical thinking to the teacher.

To summarize, the findings demonstrate that the strategy of integrating AI and robotics into technical education needs to be comprehensive. Thus, the priority direction is developing the technical competencies of teachers, including English teachers, by means of specialized advanced training programs; designing practice-oriented educational modules using robotics platforms; and adopting differentiated approaches to the integration of AI in view of the specifics of various technical specialties.

The study has several limitations to be considered when interpreting the results. The geographical localization of the sample of teachers and students within the Russian education system limits the ability to extrapolate the results to the international context. The relatively small size of the expert sample (n = 45) could have influenced the robustness of correlations, especially when using nonparametric statistics.

The dynamic nature of the technological development of AI, as noted by Delcker et al. (2024), imposes methodological limitations on long-term conclusions, as the tools and approaches can become obsolete faster than research cycles can be completed. In addition, the focus on the perception and readiness of participants leaves out the objective effectiveness of different approaches to the integration of AI technologies into the educational process.

CONCLUSIONS

The study uncovered an uneven readiness of the Russian system of technical education to integrate AI and robotics systems into teaching technical and humanitarian disciplines. Practice-oriented approaches have been found to dominate the priorities of integrating robotics, consistent with the global trends of practice-oriented training in engineering education. The correlation analysis confirmed the crucial role of student motivation as a determinant of learning outcomes, as well as the systematic nature of barriers to said integration, calling for coordinated institutional action. The identified interdisciplinary differences in the perception of robotics technologies point to the need for a differentiated approach to the integration of AI, considering professional specifics.

The main limitations of the study are the geographical localization of the sample within the Russian educational system, the relatively small size of the expert group, and the focus on subjective assessments of readiness without measuring the actual effectiveness of integration processes. Further research prospects have to do with the longitudinal assessment of the impact of AI on the professional development of technical specialty graduates, the development of validated tools to assess the effectiveness of different pedagogical approaches to the integration of robotics, and cross-cultural comparative research to identify universal and culture-specific factors in the success of integrating AI into technical education.

REFERENCES

Abdullaev, I., Prodanova, N., Ahmed, M. A., Lydia, E. L., Shrestha, B., Joshi, G. P., & Cho, W. (2023). Leveraging metaheuristics with artificial intelligence for customer churn prediction in telecom industries. ***Electronic Research Archive, 31***(8), 4443–4458. https://doi.org/10.3934/era.2023227

Babina, A., & Utusikov, S. (2024). Methods to develop students' humanitarian culture in the educational and training process. ***Nuances: Estudos sobre Educação, 35***(00). https://doi.org/10.32930/nuances.v35i00.10773

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. ***Qualitative Research in Psychology, 3***(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Chávez-Cárdenas, M. d. C., Fernández-Marín, M. Á., & Lamí-Rodríguez del Rey, L. E. (2025). ***Web educativa e inteligencia artificial: Transformando el aprendizaje contemporáneo.*** Sophia Editions.

Delcker, J., Heil, J., Ifenthaler, D., Seufert, T., & Spirgi, L. (2024). First-year students' AI-competence as a predictor for intended and de facto use of AI-tools for supporting learning processes in higher education. ***International Journal of Educational Technology, 21***, Article 18. https://doi.org/10.1186/s41239-024-00452-7

Dzhaneryan, S., Kima, A., Gutermana, L., & Esayan, M. (2025). Perceptions of neural network use in higher education: Case study. ***European Journal of Contemporary Education, 14***(1), 3–12. https://doi.org/10.13187/ejced.2025.1.3

Gasanov, A. (2024). Industrial'noye nslediye v Rossii i za rubezhom: traditsii i innovatsii mezhdistsiplinarnogo napravleniya. ***Istoricheskiy zhurnal: nauchnyye issledovaniya, 1,*** 48–62. https://doi.org/10.7256/2454-0609.2024.1.69571

Gazizova, F., Chunikhin, A., Kozachek, A., Mussaui-Ulianishcheva, E., Shichiyakh, R., Gubanova, N., & Kol'cova, N. (2025). Opportunities for the development of higher education under the influence of digital technology: Prospects of Education 4.0. ***Revista on line de Politica e Gestao Educacional, 29***(00), Article e025008. https://doi.org/10.22633/rpge.v29i00.20124

Kalugin, V. T., Lutsenko, A. D., Romanova, I., & Xu, Y. (2022). Implementation of artificial intelligence development strategy in the Russian Federation in the educational programs of aerospace engineering training of Bauman Moscow State Technical University. ***SHS Web of Conferences***, 137. https://doi.org/10.1051/shsconf/202213701005

Kuznetsov, A. V. (2024). Za predelami tematicheskogo modelirovaniya: analiz istoricheskogo teksta s pomoshch'yu bol'shikh yazykovykh modeley. ***Istoricheskaya informatika, 4***, 47–65. https://doi.org/10.7256/2585-7797.2024.4.72560

Murtazaev, S. A., Elmurzaev, M., Aliyev, S., Murtazaev, I. S., & Akulov, A. (2025). Evaluation of organizational and technological design indicators of the object using modern digital models. ***RISUS – Journal on Innovation and Sustainability, 16***(1), 115–130. https://doi.org/10.23925/2179-3565.2025v16i1p115-130

Nizhnikov, S. A. & Lagunov, A. A. (2024). Tipologiya filosofskikh mirovozzreniy. Problemy naturalisticheskogo mirovozzreniya. ***Filosofskaya mysl', 1***, 56–68. https://doi.org/10.25136/2409-8728.2024.1.44169

Shichkin, I., Ruziev, Z., Jumaniyazova, M., Abdullaeva, M., & Abdullayev, I. (2024a). Development of higher education in the context of digitalization: Developing an effective socio-economic integration model. ***Revista Conrado, 20***(S1), 142–147. http://scielo.sld.cu/pdf/rc/v20s1/1990-8644-rc-20-s1-142.pdf

Shichkin, I., Sizova, Y., Kolganov, S., & Panova, E. (2024b). Perception of the flipped classroom model by students in the process of studying humanities disciplines. ***European Journal of Contemporary Education, 13***(2), 423–433. https://doi.org/10.13187/ejced.2024.2.423

Xu, T. & Wang, H. (2024). The effectiveness of artificial intelligence on English language learning achievement. ***System, 125***, Article 103428. https://doi.org/10.1016/j.system.2024.103428