Acta Pedagogia Asiana

Short Communication
Volume 5(SI), 2026, 45−54
https://doi.org/10.53623/apga.v5iSI.1050

Construction of an Educational Teaching Evaluation System under the Context of Deep Integration of Artificial Intelligence and Teaching Practices

Tianru Zhang[1], Huangjia Wu[2], Yixin Feng[1], Quang Zhang[1], Myeongsu Seong[1], Jie Sun[1], Mark Leach[1], Eng Gee Lim[1]

[1]School of Advanced Technology, Xi'an Jiaotong-Liverpool University, Suzhou, China
[2]College of Science & Technology, Ningbo University, Ningbo, China

*Corresponding author: Tianru.Zhang@xjtlu.edu.cn

SUBMITTED: 12 February 2026; REVISED: 25 March 2026; ACCEPTED: 30 March 2026

ABSTRACT: In an era marked by the deep integration of artificial intelligence (AI) with educational practices, this study explores the transformation and optimization of educational teaching evaluation systems. Recognizing the pivotal role of AI in reshaping teaching and learning environments, the research delves into the design of a comprehensive evaluation framework that aligns with the dynamic nature of contemporary education. It emphasizes the integration of AI-driven tools and methodologies to enhance the accuracy, efficiency, and fairness of educational teaching evaluation. The study proposes a multifaceted approach, including categorized indicator setting, process-oriented evaluation, multi-stakeholder involvement, broadened evaluation perspectives, and dynamic student performance monitoring. Through a critical analysis of existing practices and theoretical frameworks, a model is proposed to foster a more adaptive, equitable, and student-centered educational landscape. The ultimate goal is to harness AI's potential to elevate educational outcomes and promote continuous improvement in teaching practices.

KEYWORDS: Educational teaching evaluation; artificial intelligence (AI); teaching practices; multi-stakeholder engagement; dynamic monitoring

1. Introduction

Higher education institutions worldwide are actively exploring the integration of Generative AI into teaching and educational practices. As society transitions from the Industrial Revolution to the era of digital intelligence, the development of new technologies continues unabated. Generative AI has profoundly impacted higher education by assisting teachers in lesson preparation, promoting autonomous and personalized learning, supporting inquiry-based education, aiding in thesis writing, homework guidance, exam review, language learning, and enhancing digital literacy [1–3]. This integration injects new vitality into higher education and drives innovation in educational models globally. Despite these advancements, educational teaching evaluation systems often lack adequate data support and comprehensive frameworks. Efficient cross-institutional evaluations are rare, and the absence of structured teaching

outcome data limits timely adaptation to global talent market demands. Integrating AI with educational evaluation can provide real-time, data-driven insights, enable effective non-quantitative assessments of teaching outcomes, and support curriculum development and teaching strategies, thereby enhancing overall educational quality.

2. Literature Review

2.1. AI in education.

Understanding and shaping the world has been an enduring pursuit in human development. As a revolutionary form of productive force, artificial intelligence (AI) has achieved significant breakthroughs in methodology and tool innovation, bringing unprecedented opportunities and challenges. The core strength of AI has lain in its analytical capabilities, enabling a deeper comprehension of the origins of problems and the complex interconnections between data, thereby greatly enhancing decision-making quality and operational efficiency. In the realm of education, AI has driven a transformation of teaching models. The traditional binary relationship between teachers and students has evolved into a trinity that includes teachers, students, and machines, with the latter taking on roles as intelligent teaching assistants, learning companions, and even tutors, growing and learning alongside teachers and students. This shift has reshaped traditional perceptions of teaching, learning, and evaluation, urging greater emphasis on cultivating students' values, innovative thinking, and practical skills [4]. The integration of AI has introduced a variety of new learning scenarios, such as gamified learning, social learning, collaborative learning, autonomous learning, problem-oriented learning, and project-based inquiry learning. Moreover, through immersive teaching and augmented reality/virtual reality (AR/VR) technologies, AI has created more vivid and intuitive learning experiences. Advances in educational knowledge engineering have enabled the transformation of educational resources into structured knowledge systems, with knowledge graphs assisting students in mastering content more efficiently.

Ayodeji Abatan et al. pointed out that, in the field of education, artificial intelligence technologies had been widely used in the development of intelligent tutoring systems and automated scoring systems [5]. Olushola Babatunde Ayorinde et al. noted that AI algorithms enhanced the learning experience through personalized learning and revolutionized educational teaching methods [6]. Zamathula Queen Sikhakhane Nwokediegwu and her research team proposed an AI-driven adaptive learning system designed to accommodate each student's learning style and preferences [7]. These studies demonstrated the significant role of AI in education. At the higher education level, the key to building an AI ecosystem lay in mastering core technologies [8]. Functional departments and secondary units needed to consider how to integrate AI technology into educational and workflow processes, clarify what changes AI could bring to higher education, and identify the problems it was expected to solve. For example, personnel departments, undergraduate colleges, and graduate schools were encouraged to explore how AI could be used to provide personalized services, transforming institutional needs and ideas into technical solutions to improve efficiency [9]. In summary, the application of AI in higher education has expanded rapidly, offering significant benefits across various domains, from personalized learning and efficient administration to research and student support. While challenges such as ethical considerations, data privacy, and the digital

divide have remained, the integration of AI has held substantial potential for improving educational outcomes and preparing institutions for the future of learning.

2.2. Educational teaching evaluation system.

In the 21st century, as skill requirements continued to evolve, the educational teaching evaluation system became a key tool for advancing the development of higher education [10]. Through a meticulously designed system for evaluating education and teaching, institutions of higher learning were able to gain a comprehensive understanding of the state of educational practices, identify challenges within the teaching process, and provide robust data to support educational reform and innovation. This article examined the critical importance of constructing an effective educational teaching evaluation system and outlined the guiding principles for building such a system from the perspectives of completeness, specificity, scientific rigor, and operability.

2.2.1. Importance of building an educational teaching evaluation system.

In the field of higher education, the rapid evolution of skills necessitated that institutions continually innovated their teaching methods and evaluation systems. Firstly, the educational teaching evaluation system provided institutions with an objective feedback mechanism, enabling them to identify and strengthen teaching strengths while addressing weaknesses in a targeted manner. Regular evaluations allowed institutions to continuously refine their teaching approaches and improve outcomes. Secondly, this system ensured that teaching and learning activities were closely aligned with professional standards. By establishing clear and explicit evaluation criteria, it helped cultivate high-quality graduates who met the specific requirements of professional fields. Thirdly, a robust evaluation system enabled educational institutions to accurately understand societal needs for professional talent. Tracking surveys of graduates' employment and career development allowed institutions to adjust their educational strategies, thereby enhancing the relevance of education and the competitiveness of graduates in the job market. Lastly, the educational teaching evaluation system served as an essential tool for motivating teachers to innovate and explore in teaching practice. The assessment of teaching effectiveness promoted professional growth, stimulated innovation, and enhanced the overall quality of teaching practices..

2.2.2. Challenges in the current educational teaching evaluation system.

Despite its critical role in improving educational quality, several challenges remain in contemporary teaching evaluation systems [11].

a) Insufficiency of a Scientific Classification Evaluation System: The existing classification evaluation system had shortcomings in its dimensions, standards, and methods, failing to fully capture students' actual performance and effectiveness in educational teaching activities. It often did not distinguish between teaching activities of different natures and purposes, instead applying overly unified and generalized standards that neglected the diversity and complexity of educational practices. In addition, the system focused excessively on quantitative outcomes, overlooking the importance of teaching attitudes and processes, which made it difficult to reflect students’ non-intellectual factors such as participation, sense of responsibility, and cooperation [12]. At the same time, it did not

adequately consider individual differences among students and lacked personalized evaluation mechanisms, thereby limiting opportunities for personalized development.

b) Limited Participation of Evaluation Subjects: In the evaluation process, teachers or educational institutions were often the sole evaluators, neglecting the participation and feedback of students, peers, and society. This lack of diversity restricted the breadth and depth of evaluation perspectives and affected the objectivity and fairness of the results. Broader participation could have provided a more comprehensive basis for evaluation, enhancing its credibility while promoting openness and transparency [13].

c) Lack of Dynamic Tracking and Monitoring Mechanisms: The absence of effective dynamic tracking and monitoring mechanisms affected the continuity and timeliness of the evaluation system, making it difficult for educators to assess students' long-term learning outcomes [14]. Without such mechanisms, evaluations were often limited to single or short-term results, overlooking the progression of students' abilities and psychological development. This limitation hindered the timely adjustment and optimization of teaching strategies.

Overall, traditional educational evaluation systems are often characterized by a narrow set of indicators, high subjectivity, and insufficient oversight. Integrating artificial intelligence into these systems offers an opportunity to address these shortcomings, providing more objective, dynamic, and comprehensive evaluation of teaching and learning outcomes [15, 16]. Based on the analysis of current issues and best practices, we propose a comprehensive model for a new era educational teaching evaluation system that leverages AI technology (Figure 1).

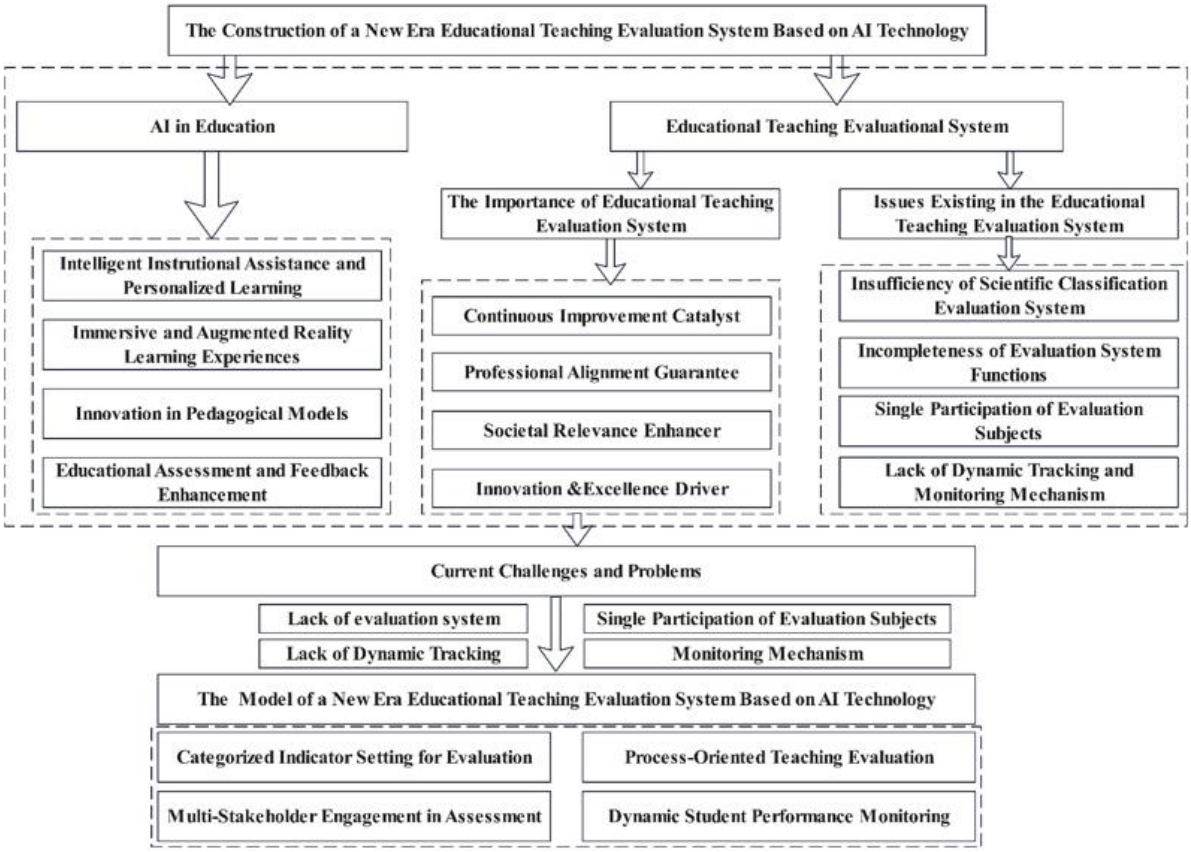

Figure 1. The model of a new era educational teaching evaluation system based on AI technology.

3. Structural Topic Modeling.

The construction of a contemporary educational teaching evaluation system leveraging artificial intelligence (AI) techniques involves four main dimensions: categorized indicator setting for evaluation, process-oriented teaching evaluation, multi-stakeholder engagement in assessment, and dynamic monitoring of student performance. These dimensions collectively form a comprehensive approach that addresses the challenges and complexities of modern educational environments, ensuring that evaluations are both robust and adaptable.

3.1. Categorized indicator setting for evaluation.

In the field of higher education, accurately grasping the intrinsic laws of education and teaching was crucial for constructing a scientifically sound and effective evaluation system. To enhance the scientific rigor and effectiveness of the system, it was necessary to develop a deep understanding of the goals and content of education and teaching, and to design an evaluation index system that aligned with these objectives [15]. This system aimed to comprehensively assess students' practical abilities, innovative spirit, vocational skills, and sense of social responsibility, among other key competencies.

Firstly, the categorization of evaluation indices required breaking down various aspects of education and teaching into quantifiable or observable indicators. These included the degree of mastery of knowledge or skills, teamwork abilities, work attitudes, and innovative practice outcomes, thereby enabling a holistic assessment of students' educational achievements. The evaluation indices extended beyond the acquisition of knowledge and skills, encompassing the cultivation of attitudes and values, as well as non-skill qualities such as a sense of responsibility toward society and others.

Secondly, the establishment of evaluation indices needed to consider the diversity and stratification of education and teaching. This involved designing corresponding indices for different types of educational activities (such as classroom teaching, social practice, and skill competitions) and for learning objectives at various stages. Such a differentiated design helped ensure the relevance and effectiveness of the evaluation content, thereby promoting holistic student development across diverse contexts and conditions.

Lastly, to ensure the scientific rigor and rationality of the evaluation indices, the construction of the evaluation system required the inclusion of diverse perspectives. Opinions and suggestions from teachers, students, industry experts, and artificial intelligence systems were solicited to support the development of a comprehensive framework. This open and inclusive approach helped establish a widely accepted evaluation system that reflected the essence of education and teaching, thereby better serving educational goals and students’ developmental needs.

3.2. Process-oriented teaching evaluation.

When constructing an educational teaching evaluation system tailored to the skill requirements of the 21st century, it was imperative to thoroughly examine every aspect of the teaching process, including, but not limited to, classroom instruction, laboratory practice, and extracurricular activities. Educators were encouraged to adopt modern teaching methods such as heuristic, inquiry-based, and cooperative learning to enhance students' interest in learning and to cultivate their autonomous learning abilities and innovative thinking [16].

The evaluation system needed to pay special attention to the development of students' innovative thinking and problem-solving abilities, while also assessing whether teachers effectively integrated modern educational technologies such as generative artificial intelligence and big data platforms. The evaluation of practical teaching components, such as laboratory work and extracurricular activities, was crucial for encouraging students to apply theoretical knowledge in practice, thereby improving their practical and innovative capabilities.

The application of formative evaluation within the system was not overlooked. The appropriate use of artificial intelligence technologies enabled the timely identification and resolution of teaching issues, thereby enhancing teaching quality. For instance, in classroom instruction, the evaluation system focused on whether teachers employed heuristic approaches to stimulate students' active thinking and problem-solving abilities, thereby fostering innovative and critical thinking skills. Relevant indicators included classroom interaction, the quality of student questions and responses, and the depth of classroom discussions.

In laboratory practice, the evaluation system emphasized students' abilities to independently design experimental plans, operate instruments accurately, analyze results, and draw conclusions. Indicators included the quality of experimental reports, as well as the precision and safety awareness demonstrated during experimental procedures. For extracurricular activities, evaluation concentrated on students' participation in science and technology competitions, research projects, and related activities, with indicators such as the quantity and quality of participation and awards received.

By refining the evaluation methods of the teaching process, the educational teaching evaluation system more effectively promoted the reform and innovation of teaching methods, enhanced students' comprehensive qualities and abilities, and addressed the needs of 21st-century social development. This approach contributed not only to improving the overall quality of education and teaching but also to cultivating and preparing highly capable graduates for the advancement of higher education.

3.3. Multi-stakeholder engagement in assessment.

The implementation of multi-stakeholder participation and the expansion of evaluation dimensions both within and outside the school were crucial. The core of this process lay in transcending the traditional single-subject evaluation model by involving teachers, students, industry experts, social organizations, and other stakeholders in the evaluation, thereby achieving a holistic assessment of the entire educational process [17].

Multi-stakeholder participation in evaluation included not only teachers' assessments of students but also student self-assessment, peer review, and evaluations by industry experts and employers, all of which together formed an integrated evaluation system. This multi-dimensional approach reflected students' performance more comprehensively from different perspectives and levels, thereby enhancing the objectivity and fairness of the evaluation. For instance, industry experts and employers provided professional assessments of students' vocational skills and work attitudes that were closely aligned with real-world demands. Peer review facilitated communication and learning among students, thereby promoting mutual growth and progress.

Furthermore, expanding the evaluation dimensions both within and outside the school meant extending the focus from traditional knowledge acquisition and skill mastery to a broader range of competencies, including innovation ability, teamwork, and social

responsibility. By incorporating social practice, volunteer service, and innovation and entrepreneurship activities into the evaluation system, institutions were able to assess students' achievements more comprehensively. The use of artificial intelligence technologies improved the efficiency and scope of assessment while also encouraging students to apply their knowledge and skills in real-life and social contexts, thereby enhancing their adaptability and overall competence.

3.4. Dynamic student performance monitoring.

To foster the comprehensive development of students' abilities and the continuous improvement of educational quality, it was essential to establish a multi-dimensional and comprehensive evaluation system that enabled continuous monitoring and assessment of teaching processes and outcomes [18]. Within this framework, the application of artificial intelligence technologies played a particularly important role.

Firstly, refining the evaluation function required integrating traditional outcome-based evaluation with process-oriented and formative evaluation, ensuring that the system captured students' learning attitudes, participation, skill mastery, and innovative achievements. A comprehensive evaluation mechanism supported by big data helped teachers and administrators gain deeper insights into student performance while also providing timely feedback and guidance to students, thereby promoting continuous improvement and development.

Secondly, dynamic monitoring of student performance required the evaluation system to be flexible and adaptive, capable of responding to evolving educational objectives and student needs. By establishing electronic evaluation and feedback systems and utilizing artificial intelligence to collect and analyze learning data, real-time monitoring of students' progress and performance was achieved. This mechanism enabled teachers to identify learning challenges promptly, adjust teaching strategies, and implement more personalized and precise instruction.

Furthermore, enhancing the evaluation function also involved strengthening its motivational role. By establishing reward mechanisms and recognition systems, students were encouraged to actively participate in educational activities, with outstanding performance appropriately acknowledged. Big data platforms allowed students to receive timely positive feedback, which increased their motivation and initiative while fostering a supportive learning environment. This approach effectively promoted the achievement of educational objectives, enhanced students' practical and innovative abilities, and contributed to the development of high-quality talent for society.

4. Conclusion

The rapid development of artificial intelligence (AI) technology has become a significant force driving educational innovation. In the context of the new era, constructing a scientific, comprehensive, and effective educational teaching evaluation system has been crucial not only for improving the quality of education but also for achieving talent cultivation goals. This paper examined the construction strategies of an educational teaching evaluation system under the deep integration of AI and education, emphasizing the importance of incorporating AI technologies. Firstly, the paper clarified that the establishment of evaluation indicators should be combined with AI technologies, utilizing data analysis and learning analytics to more accurately assess students' learning processes and outcomes. With AI-assisted evaluation

methods, a more comprehensive understanding of students' learning behaviors and cognitive development could be achieved, thereby providing more targeted feedback for teaching. Secondly, the paper proposed strategies for expanding evaluation participants, encouraging multiple stakeholders—such as students, teachers, industry experts, and AI systems—to take part in the evaluation process. The introduction of AI systems provided more objective data, assisting other evaluators in making more informed and balanced judgments. Furthermore, the paper emphasized the importance of strengthening process management. With the support of AI, educational evaluation placed greater emphasis on learning processes, thereby achieving an effective integration of formative and summative evaluation. By monitoring and analyzing students' learning progress in real time, teachers were able to adjust teaching strategies promptly and promote personalized learning. In addition, the paper explored the application of AI in teaching process evaluation, student learning evaluation, teacher performance evaluation, and educational resource assessment. The application of AI technologies not only improved the efficiency and accuracy of evaluation but also supported the development of students' 21st-century skills, such as critical thinking, innovation, and collaboration. In summary, building an educational teaching evaluation system that met the skill requirements of the 21st century required the integration of AI technologies. This approach was conducive to stimulating students' interest in learning and fostering innovation, while also supporting the cultivation of versatile, technically skilled graduates with strong practical and innovative abilities to meet societal needs. By comprehensively considering the construction of such systems under the deep integration of AI and education, institutions were able to continuously improve evaluation practices, promote educational innovation and development, and cultivate high-quality talent aligned with the demands of the new era.

Author Contributions

Tianru Zhang, Huangjia Wu, Yixin Feng, Quang Zhang, Myeongsu Seong, Jie Sun, Mark Leach, and Eng Gee Lim contributed equally to this work. All authors were involved in the conceptualization of the study, methodology development, data analysis, manuscript drafting, and final review.

Competing Interests

The authors declare no competing interests.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Acknowledgment

This work is partially supported by The Natural Science Foundation of the Jiangsu Higher Educational Institution of China (Grant No. 25KJB470023), XJTLU Research and Teaching Development Funding RDF-21-02-067 and TDF2223-R25-204.

Reference

[1] Cirneanu, A.-L.; Moldoveanu, C.-E. (2024). Use of Digital Technology in Integrated Mathematics Education. *Applied System Innovation*, *7*, 66. https://doi.org/10.3390/asi7040066.

[2] Holmes, W.; Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education, 57*(4), 542–570. https://doi.org/10.1111/ejed.12533.

[3] Alenezi, A.; Alenezi, A. (2025). Evaluating the Effectiveness of Chatbot-Assisted Learning in Enhancing English Conversational Skills Among Secondary School Students. *Education Sciences*, *15*, 1136. https://doi.org/10.3390/educsci15091136.

[4] Zhou, S.; Xie, H.; Hu, Y. (2023). The Promotion of AI in the Digital Transformation of Education—Review of "Applications of Artificial Intelligence in Education." *Applied Chemistry, 52*(07), 2267. https://doi.org/10.16581/j.cnki.issn1671-3206.2023.07.012.

[5] Abatan, A.; Jacks, B.S.; Ugwuanyi, E.D.; Nwokediegwu, Z.Q.S.; Obaigbena, A.; Daraojimba, A.I.; Lottu, O.A. (2024). The role of environmental health and safety practices in the automotive manufacturing industry. *Engineering Science & Technology Journal, 5*(2), 531–542. https://doi.org/10.51594/estj.v5i2.830.

[6] Ayorinde, O.B.; Daudu, C.D.; Okoli, C.E.; Adefemi, A.; Adekoya, O.O.; Ibeh, C.V. (2023). Reviewing the impact of LNG technology advancements on global energy markets. *World Journal of Advanced Research and Reviews, 21*(2), 335–345. https://doi.org/10.30574/wjarr.2024.21.2.0462.

[7] Nwokediegwu, Z.Q.S.; Ugwuanyi, E.D.; Dada, M.A.; Majemite, M.T.; Obaigbena, A. (2024). Water-energy nexus: A review of policy and practice in Africa and the USA. *Magna Scientia Advanced Research and Reviews, 10*(1), 286–293. https://doi.org/10.30574/msarr.2024.10.1.0031.

[8] Lee, D.; Yeo, S. (2022). Developing an AI-based chatbot for practicing responsive teaching in mathematics. *Computers & Education, 191*, 104646. https://doi.org/10.1016/j.compedu.2022.104646.

[9] Shukla, A.; Pokhariya, H.S.; Michaelson, J.; Laxminarayanamma, K.; Kumar, M.; Krishna, O. (2023). Distributed deep reinforcement learning for autonomous IoT healthcare devices in the cloud. *Proceedings of the 2023 International Conference on Artificial Intelligence for Innovations in Healthcare Industries (ICAIIHI).* https://doi.ieeecomputersociety.org/10.1109/ICAIIHI57871.2023.10488976.

[10] Abina, A.; Temeljotov Salaj, A.; Cestnik, B.; Karalič, A.; Ogrinc, M.; Kovačič Lukman, R.; Zidanšek, A. (2024). Challenging 21st-Century Competencies for STEM Students: Companies' Vision in Slovenia and Norway in the Light of Global Initiatives for Competencies Development. *Sustainability*, *16*, 1295. https://doi.org/10.3390/su16031295.

[11] Chen, Y.; Li, S.; Chen, R. (2025). Impact of Industry and Education Integration on Employment Quality in Higher Vocational Colleges: Moderating Role of Faculty Qualifications and Curriculum Development Capacity. *Education Sciences*, *15*, 1316. https://doi.org/10.3390/educsci15101316.

[12] Wang, X.; Zhao, J.; Lu, Y.; Li, X. (2024). Spatial Pattern, Quality Evaluation, and Implications of Preschool Education Facilities in New Urban Areas Using Multi-Source Data: A Case Study from Lingui New District in West China. *Buildings*, *14*, 1718. https://doi.org/10.3390/buildings14061718.

[13] Wan, L.; Qiao, X.; Li, M. (2023). Research on the Application of Learning Pass in Vocational Blended Teaching. *Science and Technology Information, 21*(03), 171–175. https://doi.org/10.16661/j.cnki.1672-3791.2206-5042-9892.

[14] Bao, L. (2024). "Learning Pass + Smart Vocational Education" to Optimize Vocational Teaching. *Science and Technology Wind, 09*, 72–74. https://doi.org/10.19392/j.cnki.1671-7341.202409024.

[15] Martins, R.M.; Gresse Von Wangenheim, C. (2023). Findings on teaching machine learning in high school: A ten-year systematic literature review. *Informatics in Education, 22*(3), 421–440. https://doi.org/10.15388/infedu.2023.18.

[16] Haroud, S.; Saqri, N. (2025). Generative AI in Higher Education: Teachers' and Students' Perspectives on Support, Replacement, and Digital Literacy. *Education Sciences*, *15*, 396. https://doi.org/10.3390/educsci15040396.

[17] Ogor, E.N. (2007). Student academic performance monitoring and evaluation using data mining techniques. *Electronics, Robotics and Automotive Mechanics Conference (CERMA 2007),* 354–359. https://doi.org/10.1109/CERMA.2007.4367712.

[18] Elbourhamy, D.M.; Najmi, A.H.; Elfeky, A.I.M. (2023). Students' performance in interactive environments: An intelligent model. *PeerJ Computer Science, 9*, e1348. https://doi.org/10.7717/peerj-cs.1348.