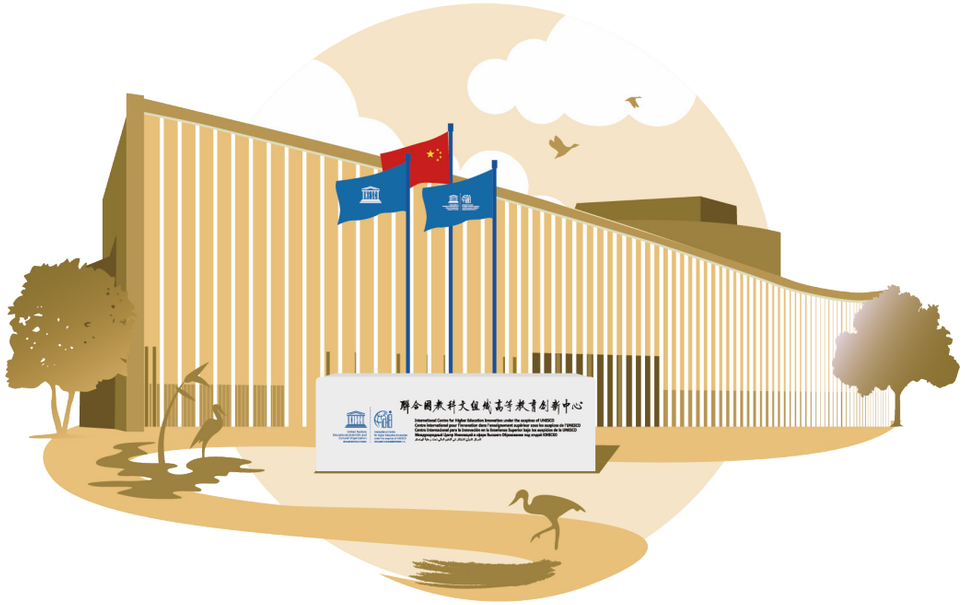


Published by the International Centre for Higher Education Innovation
under the auspices of UNESCO

CLOUD

Connecting Leaders Online for University Digital Transformation

Issue 13
2024.11

Leading Effective AI Application in Higher Education

Practices and Perspectives from Central Asia and Beyond

CLOUD - Connecting Leaders Online for University Digital Transformation

www.ichei.org
UNESCO-ICHEI
unescoichei
UNESCO-ICHEI

CLOUD is the quarterly publication launched by the International Centre for Higher Education Innovation under the auspices of UNESCO (UNESCO-ICHEI) in 2021. The name ***CLOUD*** symbolises a global network for knowledge sharing driven by Information and Communications Technology (ICT). ***CLOUD*** aims to build an exchange platform that connects professionals in the realm of global higher education by sharing knowledge, project updates, data and best practices related to the digital transformation of global higher education.

UNESCO-ICHEI Leader: BI Xiaohan
Chief Cultural Advisor: SHEN Xiaoli
Contributors: SU Rui, ZHOU Jingyi, XU Mingshun
Editor-in-Chief: SU Rui, ZHOU Jingyi

Content Assistants/ Interns: SHEN Yujia, MAO Han, LI Yuhan, LI Xintian, SHI Xiaotong, LIN Yongqi, ZHONG Di
Translation: SHEN Yujia, MAO Han, LI Yuhan, LI Xintian
Cover Person: Dr. Marat Rakhmatullaev, Professor of the department "Information and Library Systems" of Tashkent University of Information Technologies (TUIT)
Design and Layout Coordination: SHI Ziai, YANG Jiahui, DONG Mingyue

UNESCO-ICHEI works with global partners in the knowledge production and communication of ***CLOUD*** without any commercial purpose. ***CLOUD*** is committed to building a global knowledge community and providing original knowledge production and possibilities for the digital transformation of global higher education. During the process of knowledge production, communication, and sharing, UNESCO-ICHEI hereby makes the following declarations regarding the contents of ***CLOUD***:

1. The intellectual property rights of this publication belong to UNESCO-ICHEI, and the source must be acknowledged if the content of this publication is cited.
2. The designations employed in this publication and the presentation of relevant materials (including maps) do not imply the expression of any opinion whatsoever on the part of UNESCO-ICHEI concerning the legal status of any country, territory, city or areas of its authorities, or concerning the delimitation of its frontiers or boundaries. The term 'country' as used in this publication also refers to, as appropriate, territories or areas.
3. Articles in this publication express the opinions and research outcomes of the authors and the editing team and do not represent the opinions of UNESCO-ICHEI. The editing team has made its best effort to ensure the accuracy of the data and assumes no liability or responsibility for any consequences of their use.

Languages:*CLOUD* is available in six official languages of UNESCO (Chinese, English, French, Arabic, Russian and Spanish).

Competent Authority: International Centre for Higher Education Innovation under the auspices of UNESCO (Shenzhen, China)
Organizer: Knowledge Production and Communications Centre, International Centre for Higher Education Innovation under the auspices of UNESCO (Shenzhen, China)

Information and copyrights: © UNESCO-ICHEI

The International Centre for Higher Education Innovation under the auspices of UNESCO (Shenzhen, China) was established on June 8th, 2016, and is the tenth Education Sector UNESCO Category 2 centre in the world. On November 13th, 2015, the 38th General Conference of UNESCO approved the establishment of UNESCO-ICHEI in Shenzhen, China, which is the first Category 2 centre for higher education in China.

Tel.: 0755-88010925
E-mail: office@ichei.org
Address: No. 1088, Xueyuan Rd., Xili, Nanshan District, Shenzhen, Guangdong, China, 518055

CONTENT

unesco

International Centre
for Higher Education Innovation
under the auspices of UNESCO
联合国教科文组织
高等教育创新中心

Dear partners and colleagues,

As an advocate and practitioner of using information technology to empower education, I am pleased to witness the immense potential of digital technology, which is driving educational transformation on a global scale. This progress opens up broad opportunities for bridging the digital divide and achieving the common vision of Sustainable Development Goal 4 (SDG 4). In particular, generative artificial intelligence (GenAI) technologies, such as ChatGPT, are continuously evolving through iterative upgrades, offering unprecedented opportunities for educational transformation and rapidly becoming a key driving force behind the digital transformation of global higher education.

Today, digital technology is profoundly changing our teaching methods, learning models, and the entire education system, and this influence will continue to expand. At the same time, the application of GenAI in education raises significant new challenges and risks, particularly concerning data security and ethical issues. We must remain committed to finding solutions through policy and technological innovation. In these evolving domains, UNESCO is playing a leading role. We are pleased to see that the International Centre for Higher Education Innovation under the auspices of UNESCO (UNESCO-ICHEI) has set excellent examples in various areas, including cutting-edge research, innovative practices, and the establishment of global collaborative networks.

As a hub connecting Eastern and Western cultures, Central Asia and its neighboring countries are at the forefront of the technological revolution. The introduction of GenAI comes at a critical time as these nations strive to promote the digital transformation of higher education. We have observed that local governments, higher education institutions (HEIs), and related organizations in Central Asia and beyond are actively promoting the use of GenAI in teaching, learning, and management. For instance, in areas such as developing large language models and constructing smart campuses, they are exploring pathways to integrate education and technology, creating replicable policies and practices for governance and application. The IIOE Micro-Certification Project for Higher Education Workforce Digital Competency Building, jointly undertaken by UNESCO Institute for Information Technologies in Education (UNESCO IITE) and UNESCO-ICHEI within the International Institute of Online Education (IIOE) networks, facilitates the integration of AI literacy enhancement and skill certification. Its continuously updated mechanism supports the realization of lifelong learning goals and serves as a robust foundation for the digital transformation of higher education in Central Asia and beyond.

The rapid development and application of AI technology bring a host of unprecedented challenges: How can we ensure that education remains inclusive while maintaining content quality? How can we better equip teachers to inspire and engage students? How can we drive the transformation of teaching and learning? How do we prevent the misuse of technology and ensure proper governance? These pressing questions require ongoing exploration. We have observed the efforts of countries in Central Asia and beyond in striking a balance between education and technology integration. In the digital era, they are proactively addressing challenges related to data governance, cybersecurity, policy and regulation, and ethics. With a substantial young population and a rapidly evolving education system, countries in Central Asia and beyond recognize the crucial role of GenAI in promoting educational accessibility and inclusiveness, enhancing content quality, strengthening governance in teaching, and unlocking significant potential for the future.

The impact of AI technology on higher education does not have a one-size-fits-all answer. We must seize opportunities and actively address the challenges that arise. We believe that through cooperation and collaborative efforts, we can achieve satisfactory outcomes. At the High-Level Regional Policy Dialogue in Central Asia held in June this year, over 220 higher education stakeholders from Central Asia and beyond gathered to exchange experiences and ideas regarding the application of AI technology to enhance higher education. We have observed that HEIs in different countries and regions each face unique innovations and challenges in technology application and governance. I believe that, moving forward, through effective discussions and knowledge sharing, we can combine our strengths, learn from one another, and ultimately ensure that technology applications are people-oriented, allowing education to fulfill our shared vision.

Dr. Tao ZHAN

Director of UNESCO Institute for Information Technologies in Education

01

Foresight and Landscape

- The High-Level Regional Policy Dialogue in Central Asia: Facilitating GenAI-driven Higher Education Transformation
- Promising Directions for the Development of Artificial Intelligence in Higher Education in the Republic of Uzbekistan
- The Application of AI Technology in Higher Education in Kazakhstan: Challenges, Policies and Practices

The High-Level Regional Policy Dialogue in Central Asia: Facilitating GenAI-driven Higher Education Transformation

Contributors: ZHOU Jingyi, SU Rui, SHEN Yujia
Organisation: Knowledge Production and Communications Centre (KPCC), UNESCO-ICHEI

The High-Level Regional Policy Dialogue in Central Asia themed "Facilitating GenAI-driven Higher Education Transformation" was successfully held in Tashkent, Uzbekistan. The event brought together more than 220 crucial higher education stakeholders from 14 countries in Central Asia and beyond, namely Uzbekistan, Kazakhstan, Tajikistan, Kyrgyzstan, Turkmenistan, Russia, Belarus, Georgia, Turkey, the United Arab Emirates, Germany, France, Pakistan and China, including senior officials from the ministries of education, local Higher Education Institutions (HEIs) leadership, representatives of UNESCO HQs and field offices, scholars, industry professionals, and enterprises. As one of the few reigional multi-stakeholder events taking place early in 2024, the Policy Dialogue was pivotal in fostering constructive exchanges, consolidating promising cases, and providing recommendations to higher education stakeholders in the region and beyond. Furthermore, it supports the discussion and framing of relevant policies and action plans for GenAI-driven higher education governance and teaching personnel's professional development at a wide range of levels, including regions, countries, institutions and individual levels.

The Policy Dialogue was structured into three thematic sessions: "Policy and Governance on GenAI in Higher Education at the Regional and National Levels", "Institutional Approach on Policy, Governance and Practice of GenAI" and "AI Literacy and Professional Development for Higher Education Workforce". These sessions facilitated in-depth discussions on various topics, including the opportunities and challenges of GenAI in education, the ethical use of AI, education governance, the formation of multilateral partnerships, and leveraging the IIOE Micro-Certification Project for Higher Education Workforce Digital Competency Building to reskill and upskill leaders and teaching personnel.

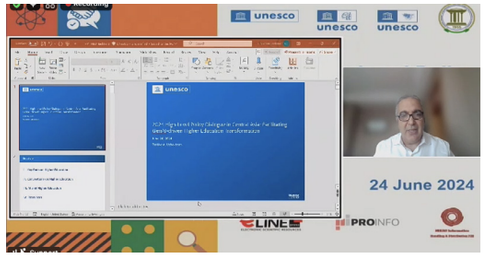
The event marks an exchange mechanism for multi-stakeholders in the area. During the discussions, attendees explored various policies and initiatives for applying GenAI in higher education. TUIT will prepare a report on the outcomes of the conference, share best practice cases with all parties, and analyse specific local needs and challenges. The launch of Phase II of the Joint Project between UNESCO-ICHEI and UNESCO IITE marked the new stage of joint efforts to drive the digital transformation of higher education in Central Asia in the AI era. Additionally, IIOE introduced the '1+x' GenAI Course Series during the Policy Dialogue to the sub-region and showcased innovative GenAI solutions from enterprises.

In the welcoming address, **Dr. Sultanov Djamshid**, Vice Rector for Academic Affairs at TUIT, Uzbekistan, delivered a welcoming address as Conference Chairman, indicating that the event provides a platform for higher education stakeholders in the region and beyond to explore AI integration into higher education. He highlighted the necessity of achieving educational equity and quality through collective efforts and resource sharing.

Ms. Sara Noshadi, Director of UNESCO Tashkent Office, emphasised that a multifaceted approach and collaborative efforts between stakeholders are needed to address the challenges of AI in higher education, enhancing investment in digital infrastructure, capacity building, policy development, and fostering a culture of innovation and acceptance across Central Asia. The policy dialogue endeavours to foster stimulating in-depth discussion, build lasting partnerships, and chart a course toward a future where GenAI empowers higher education to reach new heights of excellence and equity. Prof. JIN Li, Director of UNESCO-ICHEI and Vice President of Southern University of Science and Technology, China, stressed that the policy dialogue provides a platform to share innovations and form partnerships to shape the future of higher education. In Central Asia, UNESCO-ICHEI, in close cooperation with flagship HEIs in the region, local governments, UNESCO field offices, as well as enterprise partners, has successfully implemented a series of joint projects and activities. **Prof. JIN Li** called for institutions and organisations from Central Asia and beyond to join the IIOE network and collaborate on the IIOE Micro-Certification Project, addressing the urgent need for upskilling and reskilling the higher education workforce in the GenAI era.

On June 24, 2024, the High-Level Regional Policy Dialogue in Central Asia themed "Facilitating GenAI-driven Higher Education Transformation" was successfully held in Tashkent, Uzbekistan. The Policy Dialogue was co-organized by the Tashkent University of Information Technologies (TUIT, IIOE Uzbekistan National Center), the UNESCO Institute for Information Technologies in Education (UNESCO IITE), the UNESCO Almaty Regional Office (UNESCO Almaty), and the International Centre for Higher Education Innovation under the auspices of UNESCO (UNESCO-ICHEI). The event was supported by Uzbekistan's companies: ELINE Press Ltd. and PROINFO Ltd.

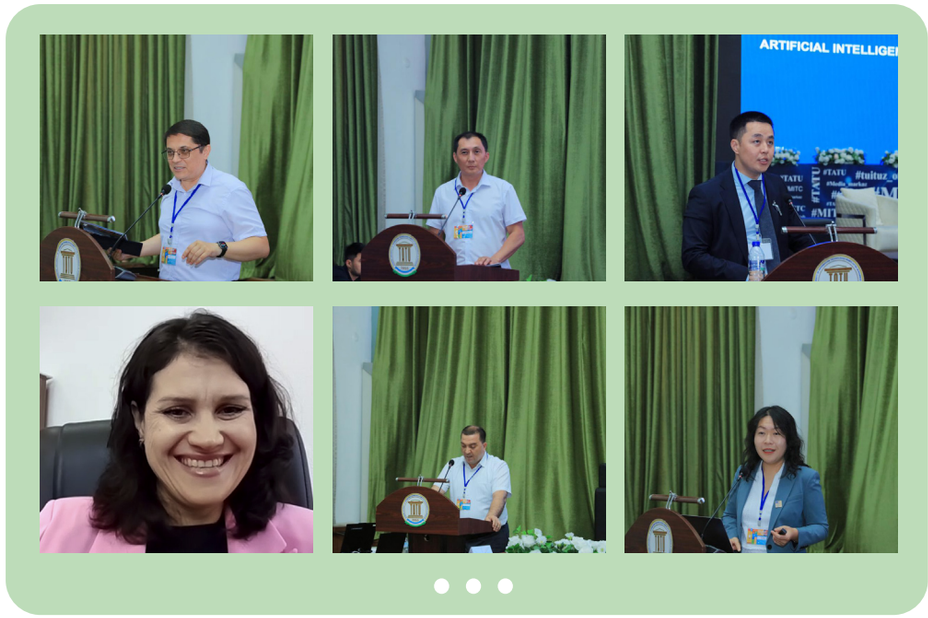
The Keynote Speeches were moderated by **Prof. Rakhmatullaev Marat**, Professor of TUIT; Team Leader of Higher Education Reform Experts in Uzbekistan. **Mr. Atayev Azat**, Deputy Minister of Education of Turkmenistan, introduced active integration of AI into higher education at the institutional and national levels. The Ministry of Education of Turkmenistan is focusing on developing personalized learning and educational data analytics using generative AI to make data-driven decisions. Moreover, the Ministry of Education of Turkmenistan collaborated with the UNESCO IITE and experts from leading universities in China to develop and adopt a Cooperation Roadmap for 2024-2025, enhancing the digital transformation of higher education in Turkmenistan. **Mr. Abdullaev Sherzod Shavkatovich**, Chief Specialist of the Department of ICT Implementation and Digitalization of the Ministry of Higher Education, Science and Innovation; Secretary of the Advisory Council on AI, Uzbekistan, emphasised the strategic importance and investment required to develop LLM across the country. Currently, Uzbekistan has been collaborating with international experts to advance its LLM initiatives and promote technological development. **Prof. Dr. Isak Frumin**, Head of Observatory of Higher Education Innovations, Constructor University, Germany, emphasised the need to balance higher education and technology applications. He suggested that institutions need to put new technology into action and application first, and in the process ensure effective governance. HEIs need to look more at the opportunities rather than being hung up on risks and challenges. **Mr. Borhene Chakroun**, Director of Policies and Lifelong Learning Systems Division, UNESCO HQs, highlighted the role of Global Convention on the Recognition of Qualifications concerning Higher Education in education equity, inclusivity, and lifelong learning. Considering AI's growing influence on higher education, the convention promotes the recognition of qualifications and academic mobility, thus fostering innovation and preparing students for the future job market.



Policy and Governance on GenAI in Higher Education at the Regional and National Levels

In Session 1, higher education stakeholders from countries in Central Asia and neighbouring regions shared their practical experiences in policy and governance of GenAI in higher education, presenting the remarkable features of synergistic cooperation among multiple subjects in policy formulation and advancement of action planning with close attention to regional context. At the policy-making level, representatives from regional and national levels emphasised the importance of government involvement and cross-sectoral collaboration. Among them, the representative of Uzbekistan shared its "whole-of-government" AI strategy, which aims to comprehensively promote the construction, implementation and regulation of GenAI in education, ensuring that its applications remain human-centred. Meanwhile, Russian universities' AI strategies focused on the synergy of science, education, innovation, and management, reflecting the key role of university-industry cooperation in AI talent cultivation and future employment. At the action level, Kyrgyzstan focuses on regional cooperation and policy implementation, and some local institutions have actively promoted the digital transformation of higher education through AI Centre, Smart Campus and other programmes. Kazakhstan's action plan emphasised building AI infrastructure and ecosystems, including Supercomputers and Kazakhstan's version of the large language model (KazLLM). These efforts aim to enhance cross-cultural communication, data security, education and research through improved data collection and AI innovation at the national level. With regard to the opportunities and challenges of GenAI for higher education, UNESOC-ICHEI shared its experience of AI competency reskilling and upskilling programmes for higher education workforce, and called for multi-stakeholder cooperation in developing educational resources and capacity building, thereby forging policy recommendations and practical consensus.

In the roundtable discussion, experts, researchers, and entrepreneurs shared their views and experiences on the challenges and policy-making related to GenAI at regional and national levels. **Overall, countries in Central Asia and neighbouring regions have shown strong attention and a positive attitude towards the development of GenAI. However, they also highlight challenges in applying GenAI to higher education, such as data governance, cybersecurity, and policy regulation.** Currently, some Central Asian countries have launched AI-related strategies. Kazakhstan has put forth a project on developing AI



for 2024-2029 and established AI research centres at some local universities to accelerate AI technology development through research. Tajikistan approved the Strategy for the Development of Artificial Intelligence until 2040, aiming to achieve the fourth national strategy - accelerating the national industrialisation process - through AI. In addition, Kyrgyzstan held a large-scale seminar on AI earlier this year AI seminar in early 2024, in which government agencies and educational institutions were involved in the discussion of AI applications. At the same time, representatives expressed concerns about the challenges AI poses in education. The Uzbekistan representative highlighted optimism regarding the integration of GenAI in education but stressed the need to strengthen data governance to enhance digital security. The Pakistani representative emphasized the transformative impact of AI on education, pointing to the demand for upgrading teachers' pedagogical methods, and stressed that developing countries should prioritize addressing data governance, cybersecurity, and the alignment of related policies and regulations in the application of AI.

Institutional Approach on Policy, Governance and Practice of GenAI

Focusing on policy governance and the application practice of GenAI in higher education, experts from various institutions shared their active explorations and innovative practices. HEIs in Central Asia and neighbouring regions are actively exploring multiple paths for applying GenAI in higher education and constructing corresponding normative frameworks, aiming to integrate the emerging technologies in all aspects of teaching, research and management of the higher education system. For example, Russia's Higher School of Economics (HSE) has identified the integration of education and AI technologies as a strategic direction for the next five years. The Georgian Technical University has begun incorporating GenAI into educational and research processes while advocating for funding and partnerships to advance AI-related projects and programs. Meanwhile, the Uzbekistan Moscow Institute of International Relations (Tashkent branch) has applied AI to the management, administration, and teaching processes of HEIs, emphasizing its role in improving education quality and innovating the educational ecosystem through its practical applications in management training. In addition, the Belarusian Minsk State Linguistic University has successfully used AI to improve translation efficiency, leading a new trend in language learning, and has successfully integrated AI technology in developing educational programmes and enhancing teachers' AI competencies, demonstrating its innovative practices in managing graduate training quality. Notably, the representative from Turkmenistan, while sharing the significant progress made in the country's innovative development strategy, highlighted the importance of developing ethical guidelines for the use of GenAI in education and the need for transparency and accountability in governance, calling for ensuring the responsible use of AI in higher education.

In the roundtable discussion, representatives from HEIs in Central Asia and neighbouring regions elaborated on the blueprints and initiatives to promote the integration of AI into higher education at the university level. The discussion focused on 4 key areas: curriculum design and talent cultivation, teaching applications and comprehension enhancement, policy guidance and regulation, and multi-stakeholder collaboration and transformation.

- **Curriculum Design and Talent Cultivation:** Representatives from Tashkent University of Information Technologies (TUIT) in Uzbekistan, Eurasian National University in Kazakhstan, and Zhejiang University (ZJU) in China emphasized their institutions' commitment to offering AI-related courses to develop students' relevant skills, and AI courses have been incorporated into the curriculum framework system of undergraduate, postgraduate, and doctoral courses in many universities. For example, ZJU's Red Book on Artificial Intelligence Literacy of College Students (2024 Edition) provides useful guidance for developing such courses.

- **Teaching Applications and Comprehension Enhancement:** Delegates from the American University of Central Asia in Kyrgyzstan and ZJU in China advocated for promoting the use of AI in teaching to help students understand its mechanisms and for leveraging GenAI to foster teaching innovation.

- **Policy Guidance and Regulation:** Representatives from TUIT in Uzbekistan and American University of Central Asia in Kyrgyzstan discussed the importance of policy in AI development, emphasizing ethical usage and policy development. For example, TUIT has adopted tools to verify assignment originality and emphasised the need to further strengthen policy development to regulate the ethical use of AI;

- **Multi-Stakeholder Collaboration and Transformation:** ZJU's industry-university-research collaborations and partnerships with enterprises, as well as the Institute of Electrical and Electronics Engineers (IEEE)'s efforts to establish AI governance standards and support global education course development, have all played an effective role in promoting the digital transformation of higher education.

AI Literacy and Professional Development for Higher Education Workforce

In the context of GenAI, AI literacy and professional development of teachers in higher education was also a key topic of this Policy Dialogue, where experts from international organisations, universities and enterprises carried out multi-dimensional collaborative practices around literacy enhancement and developmental empowerment. On one hand, international organisations are actively launching initiatives to improve AI literacy among higher education educators. UNESCO-ICHEI introduced the IIOE "1 + X" GenAI course series,

which covers fundamental courses and domains like pedagogy, governance, operation and industries, etc. These courses aim to equip educators with essential AI skills and knowledge. Meanwhile, UNESCO-ICHEI has implemented the IIOE Micro-Certification Project for digital competencies, supporting educators in upskilling and reskilling, which allows HEIs partners to co-develop IIOE micro courses, and customise and localise Micro-Certification. A representative from UNESCO IITE presented UNESCO's work on professional capacity-building for teachers and proposed the second phase of the "Digital Transformation of Higher Education in Central Asia" (May 2024 - May 2026), which aims to promote the effective application of GenAI in teaching, learning, and management in higher education in Central Asia and other Russian-speaking countries. On the other hand, digital infrastructure projects driven by university-industry collaboration are creating further opportunities for educators' professional development. A representative from TUIT shared details of its Smart Classroom Project, a collaboration with the UNESCO-ICHEI, SUSTech, and EdTech Company CreateView. This initiative leverages modern electronic devices and software solutions to facilitate and assist in teaching and learning. Similarly, Huawei's AI-empowered smart education solutions, including smart classrooms, campus ICT infrastructure, scientific research, and talent development, are conducive to accelerating the digital transformation of higher education across the region.

In the roundtable discussion, experts combined their own experiences and perspectives to discuss in depth the innovative approaches of professional development of higher education educators in the era of AI, focusing on education demand-oriented to promote the practice of the initiative, and put forward a series of specific measures:

- **Teacher Training:** The UNESCO Almaty Regional Office pointed out that ICT-related training can be provided to teachers based on the UNESCO ICT Competency Framework for Teachers as a tool to make up for the lack of opportunities for teachers' professional development;

- **Intelligent Teaching Scenarios:** Tsinghua University developed vertical applications of large language models (LLM) tailored to disciplinary characteristics, creating diverse teaching scenarios such as intelligent assistants and knowledge mapping. These systems provide personalised learning support, intelligent assessment, and feedback for students, enhancing educators' ability to integrate AI into teaching;

- **Addressing Educational Challenges:** Seewo company identified challenges facing current higher education at present, including the lack of personalised education for students, insufficient resources for teachers, and the inadequate development of management courses in the field. Based on these, the company explored innovative approaches for educator professional development, aiming to equip teachers with AI capabilities to tackle real-world educational challenges;

- **Developing Knowledge-Based Models:** The AI department of the National University of Uzbekistan is working on a comprehensive knowledge-based model to improve educators' AI literacy.

Closing Remarks

As the conference concluded, two speakers from the event's co-organisers delivered closing remarks. **Prof. Rakhmatullaev Marat**, Professor of TUIT, Team Leader of Higher Education Reform Experts in Uzbekistan, expressed gratitude to all attendees and extended special thanks to the speakers for their excellent presentations. He noted that the 2024 High-Level Policy Dialogue in Central Asia was a successful international conference held in Uzbekistan, promoting cooperation and exchanges among multiple stakeholders in the region. This event has not only facilitated meaningful dialogue but also strengthened the collaborative efforts necessary for advancing higher education in Central Asia and beyond. **Prof. LIANG Jiansheng**, Executive Deputy Director of UNESCO-ICHEI, pointed out that the policy dialogue represents a fertile ground for generating new ideas, fostering cooperation, and exploring the future directions of higher education. The IIOE Micro-certification Project is dedicated to enhancing the digital competency and AI literacy of the higher education workforce. Prof. Liang called for collective action in the co-development of the project and expressed his vision for co-shaping an educational landscape that embraces the transformative power of AI.

Through this policy dialogue, participants expressed their confidence in the potential of AI technology and outlined their plans to integrate emerging technologies into higher education systems. By leveraging human-centred design, national policy support, inclusive capacity building, and innovative talent cultivation models, the Central Asia region aims to advance digital economies and enhance the quality of higher education through the development of AI technologies. In the future, UNESCO-ICHEI will enhance collaboration with multi-stakeholders in Central Asia and beyond, leveraging the IIOE Micro-Certification Project to empower HEIs in realising their digital transformation strategies and to support the reskilling and upskilling of higher education workforce across the sub-region.

Promising Directions for the Development of **Artificial Intelligence in Higher Education in the Republic of Uzbekistan**

© unsplash

© unsplash

Abstract:

The article discusses important aspects of the development of artificial intelligence (AI) in higher education in Uzbekistan. Information is provided on the Presidential Decrees, the Concept and the AI Development Program. The measures taken to train personnel at universities of the Republic and training programs are considered. Also, international conferences, round tables, and forums dedicated to AI play an important role in solving the problems of AI development in higher education in the region of Central Asia. The problems faced by the republic in teaching AI at universities and advanced training centers are indicated.

Keywords: artificial intelligence, Uzbekistan, higher education, IT park, Central Asia.

Although the first attempts to create Artificial Intelligence (AI) systems were made more than 50 years ago, the development of theoretical methods and the first applications for the use of artificial intelligence in education began no more than 30 years ago. The International Society AIEd (IAIED), established in 1997, holds annual conferences on this topic and even publishes own international scientific journal Artificial Intelligence in Education (IJAIED) [1]. However, only the emergence of computer technology, the expansion of the capabilities of servers, computers and telecommunications networks in the last 5-7 years have made it possible to actively use AI in teaching and learning students.

AI has the potential not only to expand the capabilities of educational analytics, but to require huge amounts of data, confidential information about students and teachers, which raises serious data protection issues. The UNESCO Guide, *Guidance for generative AI in education and research* provides an assessment of the potential risks associated with the use of generative AI (GenAI), emphasizes the need for educational institutions to confirm the ethics and pedagogical expediency of using GenAI systems in education[2]. These achievements and risks require fundamental revision of government policy and strategy for the use of AI in the educational process. The Guide is a significant, timely document that is currently being translated into many languages around the world. The UNESCO Headquarters sent a request to the staff of the Tashkent University of Information Technology to translate this Guide into Uzbek. The document has been translated and will soon (after review and official publication) be sent to the Ministry of Higher Education, Science and Innovative Development and universities of Uzbekistan. We have no doubt that the document will play an important role in the rational use of AI in republic's higher education.

Special hopes are pinned on the Strategic Cooperation between the Southern University of Science and Technology, the International Center for Innovation in Higher Education under the auspices of UNESCO (UNESCO-ICHEI), Guangzhou CreateView Education Technology Co., Ltd. and the Tashkent University of Information Technology named after Muhammad al-Khorezmi (TUIT). The Smart Classrooms being launched at TUIT on the basis of UNESCO-ICHEI support will allow teaching ICT teachers from all universities of Uzbekistan and possibly neighboring countries of Central Asia in such important subjects as the creation of applications and resources for micro-certification, the application of new ICT progress (including AI) in the educational process. Priority will be spread to teaching professors and doctoral students to apply AI in teaching, access to valuable information resources, self-study, creation of AI systems and knowledge bases.

In the Republic of Uzbekistan, the President and the Government promptly responded to global trends in the development of AI in various industries. They understand that the development of higher education is inextricably linked with advanced information technologies and especially AI. In 2021, two special resolutions were adopted aimed at the rapid development of AI technologies: Resolutions of the President "On measures to create conditions for the accelerated introduction of artificial intelligence technologies" (No.PP-4996 dated February 17, 2021) and "On measures to introduce a special regime for the use of artificial intelligence technologies" (No.PP-5234 dated August 26, 2021). These documents identify the most priority areas for the development of intelligent technologies [3].

A special legal regime has been created in the Republic, the so-called "regulatory sandbox", a special legal regime for the experimental introduction of intelligent technologies not controlled by current legislation in 12 priority areas, such as higher education, finance, public health, energetics and others. Intensive research is being conducted on international standards in the field of AI and Big Data analysis[4-6].

Design of a scientific ecosystem in the field of AI requires regular scientific research. For this purpose, the Scientific Research Institute for the Development of Artificial Intelligence (Research Institute for the Development of Digital Technologies and Artificial Intelligence) under the Ministry of Digital Technologies of the Republic of Uzbekistan has been set up[3].

Dr. Marat Rakhmatullaev

Professor of the department "Information and Library Systems" of Tashkent University of Information Technologies(TUIT), Doctor of Technical Sciences. Specialization: Artificial Intelligence, fuzzy logic, digital libraries, system analysis, information library systems, expert systems. The author 27 projects, published more than 250 scientific works, including 12 monographs and textbooks. Team leader of the Higher Education Expert team in Uzbekistan. Coordinator of UNESCO-ICHEI's projects in Uzbekistan. Rakhmatullaev is the author of the project (since 1999), the organizer and chairman of the annual International Conference "Internet and Library and Information Resources in Science, Education, Culture and Business" Central Asia. Editor-in-chief of the scientific and methodological journal "Prospects for the development of higher education" (since 2013). Chairman of the scientific seminar "INTELLIGENT INFORMATION RETRIEVAL SYSTEMS" at the Tashkent University of Information Technology. The holder of the Order of «Friendship» of the President of Uzbekistan for the contribution to the science and education of the Republic. https://orcid.org/0000-0003-2587-1120. , www.tuit.uz

IT Park and President of Uzbekistan

The primary tasks of the Research Institute are following:

- Organization of scientific research aimed at the full implementation of the Digital Uzbekistan 2030 Strategy and the exploitation of AI technologies into the economy, social sphere, education and public administration;
- Development of innovative products for the management and automation of production processes based on AI technologies, as well as their models, algorithms and software;
- Conducting fundamental and applied scientific research in the field of AI, forming a scientific ecosystem for the development of digital technologies;
- Establishing cooperation and implementing joint projects with leading foreign innovative and scientific institutions for the development of AI technologies.

At the initiative of the President of Uzbekistan, an AI Center is going to be set up in the IT Park, and $50 million will be allocated to subsidize projects in this direction. Moreover, the ecosystem to support both start-up ICT and AI projects will be created. For the first time, this year $134 million of investments were attracted to develop startups. More than 50 local companies have appeared in this field. A $10 million venture fund to support startups is going to be launched. The State will provide financial support to projects carried out by attracting foreign investment, each contributing 50% towards the project.

IT Park Uzbekistan

Training in AI

Highly-qualified personnel are obviously needed to implement the above-mentioned programs and projects. AI experts in the Republic are trained in a number of universities. There is a need for 600 specialists in big data processing and language models. This number will increase several times in the coming years. The President stressed the importance of training specialists who meet the needs in the context of industries. The most active work on the training of highly qualified AI specialists is being carried out at the TUIT and the National University of Uzbekistan (NUU). The joint Faculty of Information Technologies of TUIT and the Belarusian State University of Informatics and Radioelectronics have introduced an educational program in AI in the Bachelor's degree direction. Currently, 200 students are enrolled in the directions:

- 60610700 – Artificial Intelligence;
- 60711500 – Mechatronics and robotics.

They also prepare masters in the following areas:

- 70610701 – Artificial Intelligence;
- 70610505 – Internet of Things;
- 70610503 – Computer systems in medicine;
- 70611702 – Intelligent information and communication systems.

TUIT has opened a separate doctoral program "Digital technologies and artificial Intelligence". Since 2022, 5 quotas for doctoral studies and a target quota for independent researchers have been allocated in the field of AI. The department has laboratories "Artificial Intelligence and IOT technologies" and "Embedded systems". It is planned to create laboratories "Robotics" and "Cloud Computing".

The Bachelor's degree programs have been significantly updated and the experience of leading foreign universities has been taken into account. TUIT pays special attention to teaching such programs as "Human-computer Interaction", "Introduction to Artificial Intelligence", "Internet of Things Technologies", "Big Data", "Robotics and Intelligent Systems", "Cloud Technologies", "Knowledge Oriented Development", "Artificial Intelligence Technologies and Tools in Robotics" and others. In the Master's degree, the following areas of knowledge are expected, including: "Artificial intelligence and neural networks", "Information search and extraction", "Big Data", "Intelligent information and communication systems", "Parallel algorithms in intelligent systems", "Machine Learning", "Methods and means of data mining", "Computer Vision", "Analysis speech signals", etc.

The Department of Artificial Intelligence at the National University of Uzbekistan was established in 2022 at the Faculty of Applied Mathematics and Intelligent Technologies. Bachelor's students are trained here in the following areas:

- 60610100 – "Computer Science and Programming Technologies";
- 60610200 - "Information Systems and Technologies";
- 60610700 – "Artificial Intelligence".

In addition, undergraduates study in the following areas:

- 70610101 - "Computer Science and programming technologies (by field)";
- 70610201 - "Computer systems and their software (by industry)";
- 70610701 - "Artificial Intelligence".

Strategic partnership between UNESCO-ICHEI and TUIT

- 5330100 - "Mathematics and software of information systems";
- 5330200 – "Computer Science and Information Technology";
- 5330300 – "Information Security";

The main scientific direction of the department is to develop methods of data mining and artificial neural networks. The department has the scientific seminar "Intellectual analysis in solving applied problems". The seminar discusses the reports of staff and doctoral students of the department, the results of scientific competitions from various organizations of the Republic of Uzbekistan.

One of the problems is the shortage

of AI scientists and teachers, and there is a great need for internships and training courses in leading scientific and educational centers of leading foreign countries. The organization "El-yurt umidi" ("HOPE OF THE MOTHER LAND") has been established in Uzbekistan, which is a state fund created to establish close cooperation with researchers, experts and gifted youth who live and work overseas, through training and advanced training of citizens of the republic. This year, at the expense of the fund, 30 young scientists conducting scientific activities on AI have been dispatched to study at leading foreign universities in the USA, Russia, India and the UK.

In addition, in order to localize ICT, in particular AI services, 3,000 experts will be destined to advanced training in manufacturing companies in Germany, Japan, South Korea, China and Turkey within this year. A program will be developed to expand the participation of local IT enterprises in the maintenance of large international (foreign) IT enterprises[9]. This gives hope that in the near future there will be enough number of highly qualified AI specialists and teachers in universities and advanced training courses in the republic.

High-level Regional Policy Dialogue in Central Asia (Photo 2)

High-level Regional Policy Dialogue in Central Asia (Photo 3)

problems and solutions in the field of development and application of AI systems have been discussed. Below is information about the most important events.

The Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan, together with Tashkent State University of Economics, held the First International conference "DIGITAL TRANSFORMATION AND ARTIFICIAL INTELLIGENCE: PROBLEMS, INNOVATIONS AND TRENDS" in September 2024. The conference was attended by representatives of different countries (Russia, Kazakhstan, Iran, etc.), universities and research centers. The tasks of applying AI in different areas of activity were considered. The main attention was paid to the actual tasks of using AI in higher education.

An important event for the development of AI in higher education was the holding of a High-level Regional Policy Dialogue in Central Asia on the theme of "Facilitating GenAI-driven Higher Education Transformation" on June 24, 2024 in Tashkent, Uzbekistan.

Conferences and Forums

AI is becoming a priority in science and education. In recent years, many conferences, forums and scientific seminars have been held in universities and research centers in Uzbekistan, where

High-level Regional Policy Dialogue in Central Asia (Photo 1)

The event was organized on the initiative of the International Center for Innovation in Higher Education under the auspices of UNESCO (UNESCO-ICHEI) and the Tashkent University of Information Technology (TUIT), which is the National Center of IIOE in Uzbekistan[7].

The outputs of the Policy Dialogue have significance for the development of higher education not only in the Central Asian region, but also on a global scale. Informative reports and an exchange of views by leading scientists and specialists in generative AI from different countries (Uzbekistan, Kazakhstan, Tajikistan, Kyrgyzstan, Turkmenistan, Russia, Belarus, Georgia, Turkey, the United Arab Emirates, Germany, France, Pakistan and China) provided crucial recommendations for the development of national policies and action plans for the management of higher education based on GenAI.

Conclusion

The current time is obviously the one of AI. Every country should be ready for the consequences of using AI. The development of the system of training highly qualified personnel, the adaptation of curricula, teaching methods in the conditions of AI are the most urgent task.

Higher education in Uzbekistan faces some challenges in training AI personnel. The main problem is the lack of AI teachers, insufficient experience in conducting scientific research, there are no well–equipped scientific laboratories for conducting scientific research on AI, and the legal framework for the use of AI in higher education is insufficiently developed.

Despite the problems, Uzbekistan has made progress in this area in recent years, the state allocates financial resources for the development of AI systems, new departments are opening, and universities have the opportunity to destine gifted young people for internships to universities in leading countries of the world to study AI experience. The Research Institute for the Development of Digital Technologies and Artificial Intelligence under the Ministry of Digital Technologies of the Republic of Uzbekistan, IT parks, TUIT are actively working on the development of applied AI systems for various fields of activity. Of particular interest are the developments on the application of AI methods for the intellectualization of the search for scientific and educational information carried out at TUIT[8].

The hope rises that Uzbekistan will be able to overcome the issues in the nearest future and AI will serve for the benefit of the development of education and society as a whole.

References

1. Zawacki-Richter et al. Systematic review of research on artificial intelligence applications in higher education – where are the educators? International Journal of Educational Technology in Higher Education (2019). https://doi.org/10.1186/s41239-019-0171-0

2. GUIDANCE FOR GENERATIVE AI IN EDUCATION AND RESEARCH. UNESCO 2023. Published in 2023 by the United Nations Educational, Scientific and Cultural Organization, 7, place de Fontenoy, 75352 Paris 07 SP, Franc. ISBN 978-92-3-100612-8.

3. Resolution of the President of the Republic of Uzbekistan "ON MEASURES TO CREATE CONDITIONS FOR THE ACCELERATED INTRODUCTION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES". https://lex.uz/docs/5297051

4. On the Strategy of introducing artificial intelligence in Uzbekistan. https://www.uzdaily.uz/ru/prezident-uzbekistana-poruchil-razrabotat-strategiiu-vnedreniia-iskusstvennogo-intellekta/ and https://www.spot.uz/ru/2024/08/14/ai-uzbekistan/

5. How artificial intelligence transforms legislation in Uzbekistan. https://anhor.uz/it-science/artificial-intelligence-legislation-uzbekistan-uzbek-expert/

6. It is planned to open an artificial intelligence center and a venture fund at the IT PARK. https://www.gazeta.uz/ru/2024/08/20/it-park/

7. UNESCO IITE co-organized the High-Level Regional Policy Dialogue on the use of AI in higher education in Central Asia. Tashkent. June. 2024. https://iite.unesco.org/news.

8. Mukhammadjon Musaev, Marat Rakhmatullaev, Sherbek Normatov Kamoliddin Shukurov Malika Abdullaeva Integrated Intelligent System for Scientific and Educational Information Retrieval Environment. Technology. Resources. Rezekne, LatviaProceedings of the 15th International Scientific and Practical Conference. Volume II, 212-219 https://journals.rta.lv/index.php/ETR/article/view/8028/6338

9. Dialogue on the development of engineering science and education was held. https://www.uzembassy.lv/embassy-messages/32

The Application of AI Technology in Higher Education in Kazakhstan: **Challenges, Policies and Practices**

Zakir Jumakulov, Vice-Rector of Research and International Collaborations at the Kazakh National Women's Teacher Training University
jumakulov.z@qyzpu.edu.kz

Zakir Jumakulov is a recipient of Bolashaq International scholarship. He holds a Master's degree in Public Policy (MPP) from Michigan State University, USA (2012), and an undergraduate degree from from L. N. Gumilyov Eurasian National University (2008). In 2017-2018 he worked as a project manager of the Center for Social Interactions and Communications of «Samruk-Kazyna» JSC. In 2018-2021, he was the Director for Research Programs at Nazarbayev University Graduate School of Education.
Zakir is an active educational researcher. In 2016 he received "Leaders of Science" award by Thomson Reuters and the National Center for Scientific and Technical Information for his coauthored publications in the highest cited social science journals in 2011-2015. In 2019 Zakir received "Scopus Award Kazakhstan 2019", by Elsevier for his contribution to the development of research in Kazakhstan.

Piotr Lapo, Deputy Director of the Kazakh National Women's Teacher Training University Library
lapo.p@qyzpu.edu.kz

Piotr Lapo graduated from the Belarusian State University (BSU) with a degree in Applied Mathematics in 1981 and for a long time his main activity was software development for various automated control systems. He entered the library business in 1994, having taken the position of the head of the department of automation of library processes in the Scientific Library of the National Academy of Sciences of Belarus.
Later he headed the Fundamental Library of BSU for 15 years, since March 2015 he has been working as a general expert in the Scientific Library of Nazarbayev University (Nur-Sultan, Kazakhstan).

- Interned in the USA (University of Illinois at Urbana-Champaign) and Poland (Nicolaus Copernicus University in Torun).
- He taught at the Belarusian State University of Culture and Arts and is the author of more than 70 publications.
- Initiator and executor of a number of national and international projects in the field of librarianship.
- President of the Belarusian Library Association in 2001-2005.

https://conference.wiut.uz/ykf2023/keynotes

© unsplash

In 2019 and 2022, seminars arranged as "Mission – 2030" Business Games were held in all 17 regions of Kazakhstan to raise public awareness about the UN Local Agenda for 2030 and identify priorities for sustainable development in the country. Kazakhstanis noted such the Strategic Development Goals (SDGs) as SDG 3 "Good Health and Well-being"; SDG 4 "Quality Education"; SDG 8 "Decent Work and Economic Growth"; SDG 11 "Sustainable Cities and Communities"; SDG 6"Clean Water and Sanitation" as 5 top SDGs in 2019, and such the SDGs as SDG 1 "No Poverty"; SDG 3 "Good Health and Well-being"; SDG 4 "Quality Education"; SDG 6 "Clean Water and Sanitation" and SDG 8 "Decent Work and Economic Growth" in 2022. It should be noted that SDG 4 "Quality education" was listed as one of the most important SDGs for the country in both surveys, and in 2022 the share of votes cast for the SDG 4 "Quality education" amounted to 59,7% of the total number of respondents and was second only to SDG 3 "Good Health and Well-being" (65,4%)[1].

The use of artificial intelligence (AI) in education will make educational and scientific activities more effective and solve some of the most serious problems of modern education, introducing innovations into teaching and learning practices and, ultimately, accelerating progress towards achieving SDG 4 [2]. In Kazakhstan the development of educational, research and production (professional) competencies in the field of smart technologies, AI, integration of cyber-physical systems, energy of the future, design and engineering was the main goal of the Roadmap aimed at developing competencies in the field of smart technologies, AI, integration of cyber-physical systems, energy of the future, design and engineering through the construction of an effective scientific and innovative system based on research universities, Astana Business Campus high-tech park of Nazarbayev University and Alatau technology park in Almaty, for 2016 – 2018 [3]. The Roadmap was developed and approved by the Kazakhstani Government's Resolution dated September 29, 2016 No. 547 in order to implement the National Action Plan within the framework

of the Message of the Head of State “Kazakhstan in the New Global Reality: Growth, Reforms, Development” to the people of Kazakhstan on November 30, 2015. To achieve the Roadmap goal, the following tasks were determined in the document: studying the world experience (including OECD countries) and issues of personnel training in universities

> The use of artificial intelligence (AI) in education will make educational and scientific activities more effective and solve some of the most serious problems of modern education, introducing innovations into teaching and learning practices and, ultimately, accelerating progress towards achieving SDG 4.

and world-class research centers in the field; analyzing national and foreign scientific research, articles and publications in the field, and holding competitions for grant and program-targeted financing of scientific research in the field with the participation of universities and research institutes of the country. Most of the Roadmap tasks were stated under the control of the Ministry of Science and Education of the Republic of Kazakhstan.

According to the Government's Readiness Index for Artificial Intelligence for 2023 compiled by Oxford Insights [4], Kazakhstan has the 72nd rank among 193 countries in the world, as well as the 3rd rank in the regional ranking for South and Central Asia after India and Turkey.

In his speech at the plenary session of the Digital Bridge Forum [5] held in Astana 12 – 13 October of 2023, President of Kazakhstan Kassym-Jomart Tokayev stated that AI is no longer science fiction, but reality, and that AI technology has been as revolutionary as electricity and the Internet in the past [6]. Mr. Tokayev noted that all the necessary conditions for the development of AI should be created in the country as soon as possible and outlined the following key priorities of work in this direction:

- Developing and approving a strategic document defining the scope, tasks and tools for the development of AI to set a sustainable vector for the country's technological progress.

- Introducing AI technologies in such important sectors for the economy of Kazakhstan as the oil and gas industry, energy, agriculture, transport and logistics.

- Developing a modern legal regulatory framework that corresponds to the best international practice, with taking into account the needs of the market and the interests of citizens.

- Strengthening consistently the national digital IT infrastructure (data centers specializing in AI) as the basis for the future progress of the digital industry and AI (involving global players such as Amazon, Google, Mastercard, and Citigroup).

- Developing an ecosystem of big data, which is a kind of “fuel” for AI. All information must be anonymized and securely protected, and any risks of personal data leakage are excluded. It is necessary to launch a National Artificial Intelligence platform in 2025, which will combine data from the state and large businesses, ensure their relevance and accessibility. Today, data are collected from government agencies in Smart Data Ufiles, to which 93 information databases are connected.

- Reforming the Bureau of National Statistics to transform it into a real digital agency and developing a policy for managing and defining a target data architecture that will become the basis for effective government decision-making.

- Full-scale deployment of the 5G network in the country by the end of 2025 and provide residents of the most remote areas with Internet access, using the capabilities of low-orbit satellite systems.

- Adapting the education system to the needs of the future labor market, and forming new competencies of employees from secondary school; launching in a pilot mode an online platform for schoolchildren and students, through which they will learn how to write program code, in order to solve the problem of a shortage of qualified teachers.

- Developing the venture capital market as the most important driving force of innovation and technological progress.

The President of Kazakhstan also noted the special importance of reasonable control over AI, which means searching for a “golden mean” between technological progress and collective security.

Regarding higher education, Mr. Tokayev drew attention to the need for a significant update of the content of educational programs and methods of teaching university disciplines. Future specialists (teachers, doctors, agronomists, lawyers, industry specialists, etc.) must have basic knowledge in the field of AI. It is planned to transform the Institute of Smart Systems and Artificial Intelligence [7] at Nazarbayev University into a full-fledged research institute to attract the best specialists and experts to it and form a holistic ecosystem in the field of AI. The Institute will include an R&D center working in close partnership with global and domestic leaders in the IT industry.

To successfully implement the plan for the introduction of AI in all areas of the economy, the Ministry of Digital Development, Innovations and Aerospace Industry of the Republic of Kazakhstan, under which the Committee for Artificial Intelligence and Innovation Development was created, developed the Conception for the Development of Artificial Intelligence for 2024–2029 [8], which was approved by Resolution of the Government of the Republic of Kazakhstan dated July 24, 2024 No. 592.

The Ministry of Science and Higher Education of the Republic of Kazakhstan (MSHE RK) plays an active and significant role in the implementation of AI in higher education to develop AI skills of teachers of universities and the human capital of the country. As part of cooperation with Huawei, 40 ICT Academies have been opened, 7 of which in 2024, and more than 100 trainers have been trained and 1,000 students have been certified in the company's programs. 3 AI courses have been localized: 2 professional courses for ICT Academies students and one universal course for everyone. The Ministry together with AstanaHub [9], the largest international technopark of IT startups in Central Asia, launched the full-scale courses which include two areas: GenAI and GameDev. Each of them consists of 6 blocks. For today, 700 teachers from 47 universities completed the training. MSHE RK together with Google launched GenAI courses, which were attended by 7,000 students from 15 universities of the country. The courses consist of modules and blocks with practical knowledge, video lessons, and tests at the end of each block. NVIDIA's DLI University Ambassador Program trains educators in AI and accelerated computing, providing them with materials and tools to implement in university programs. 12 universities are participating in the project, and 2 teachers have received a certificate of successful completion of the program. The National Educational and Methodological Board for ICT specialties, which functions at the International University

of Information Technology, has adopted the Interuniversity Standard for the Application of Artificial Intelligence in Higher and Postgraduate Education; developed a Roadmap for training personnel in the field of AI; developed a basic component for Educational Programs in the field of ICT; created courses for advanced training of teaching staff on the use of AI in teaching practice.

The MSHE RK has created a consortium of several educational organizations - the Institute of Information and Computing Technologies, Satpayev University, Nazarbayev University, the National Scientific and Practical Center “Til-Kazyna” named after Sh. Shayakhmetov, the Institute of Linguistics named after A. Baitursynov and Al-Farabi Kazakh National University - to create a modern large language model (LLM) for the development of cultural and linguistic heritage of Kazakh people. About 6-billion-word usages are collected, and the LLM model is being trained using a supercomputer through cloud solutions. MSHE RK has been instructed to complete data collection for KazLLM by the end of 2024, and the first large language model should be trained in Q3 2024.

During his annual state-of-the-nation address on September 2, 2024, President Kassym-Jomart Tokayev announced the establishment of a National Center for Artificial Intelligence, which will be accessible to schoolchildren, students, researchers and entrepreneurs in Astana by the beginning of 2025. As the Prime Minister of Kazakhstan Olzhas Bektenov noted, “By 2029, the number of products using AI should increase 5-fold. Accordingly, the share of educational programs or disciplines on AI should increase. We need qualified specialists in the field” [10]. He called upon to form “an ecosystem for youth engagement, human capital development and promotion of AI culture” based on the National Center for AI.

To ensure advanced training of specialists in the field of AI for the digital economy of the Republic of Kazakhstan, the University Alliance of Science and Technology, whose members are the International University of Information Technology, Astana IT University, Almaty University of Power Engineering and Telecommunications named after G. Daukeev, Kazakh-British Technical University, University of International Business, with the support of NNEF Public Foundation [11], has developed a specialized joint educational program of the “Artificial Intelligence” bachelor's degree level for 3 years of study. The Program was included in the roadmap of the MSHE RK for training university faculty in the field of AI in HE organizations for 2024. An inter-university standard for the use of AI in higher education organizations of Kazakhstan was also developed.

On June 20-27, 2024, the International University of Information Technologies together with the University Alliance of Science and Technology, with the support of NNEF Public Foundation, held the first Summer School on Artificial Intelligence [12] in Kazakhstan, which was entitled “Trends and Prospects for the Development of AI in the field of Education” and attended by more than 100 higher education teachers. The participants of the Summer School worked on five main tracks: (1) general issues of using neural networks, (2) cognitive technologies, (3) natural language processing, (4) AI in education and science, (5) Blockchain technologies. Kazakhstani and foreign experts gave lectures, analyzed real cases with the participants, held interactive sessions to master new approaches and exchange professional developments in the field of AI. It is planned to hold the Summer School annually.

In addition to the introduction of AI into the educational process and advanced training programs for faculty, Kazakhstani universities are implementing other AI projects. For example, the International University of Information Technology is implementing 8 research projects on the use of AI and machine learning in economics, medicine, and ecology. One of them is a project to develop machine learning methods and algorithms for predicting cardiovascular pathologies based on echocardiography and electrocardiography. Kazakh-British Technical University is developing cognitive models that predict human behavior in various situations, which is important for creating user interfaces and decision support systems. Language models (NLP and LLMs) are used in legal proceedings and solving problems of low-resource languages. In the field of robotics, "robodogs" are used to study memory and control objects in industrial complexes. The university also actively participates in smart city projects and the global AI for Good initiative aimed at achieving the UN Sustainable Development Goals. At Astana IT University, scientists are developing an AI assistant that will help students in their scientific work, including choosing and formulating research topics, selecting literature, and developing software code. The neural network also analyzes students' work and helps in using the laboratories' computing resources.

In conclusion, it should be noted that in Kazakhstan, under the auspices of the Ministry of Science and Higher Education of the Republic of Kazakhstan, policies and practices related to AI in higher education are being actively implemented, including with the participation of foreign universities and global companies operating in the field of information business. Currently, the focus is on the development of AI skills of teachers and the modernization of curricula, taking into account the use of AI applications in educational practice. At the same time, it is noteworthy that there is no mention of the use of any guidelines or recommendations prepared by the international community of experts under the auspices of UNESCO in reports and information materials on the implementation of AI in higher education in Kazakhstan. The use of UNESCO guidelines and recommendations could make the work on the implementation of AI in higher education in Kazakhstan more comprehensive, systematic and effective.

References

[1] 2022 Voluntary National Review (VNR) on Sustainable Development Goals of Kazakhstan. Access mode: http://hlpf.un.org/sites/default/files/vnrs/2022/VNR%202022%20Kazakhstan%20Report%20English.pdf

[2] Artificial Intelligence and Education: Guidance for Policy-makers. - UNESCO 2021. Access mode: https://unesdoc.unesco.org/ark:/48223/pf0000376709

[3] https://adilet.zan.kz/rus/docs/P1600000547

[4] Government AI Readiness Index 2023. Access mode: https://oxfordinsights.com/ai-readiness/ai-readiness-index/

[5] Digital Bridge 2023 Astana Kazakhstan. Access mode: http://digitalbridge.kz/

[6] https://www.akorda.kz/ru/glava-gosudarstva-prinyal-uchastie-v-mezhdunarodnom-forume-digital-bridge-2023-1294242

[7] Institute of Smart Systems and Artificial Intelligence (ISSAI). Access mode: https://issai.nu.edu.kz/

[8] Conception for the Development of Artificial Intelligence in the Republic of Kazakhstan for 2024–2029. Access mode: https://www.gov.kz/memleket/entities/mdai/documents/details/606493?lang=ru

[9] https://astanahub.com/en/

[10] https://primeminister.kz/ru/news/pravitelstvom-prinyata-kontseptsiya-po-razvitiyu-iskusstvennogo-intellekta-na-2024-2029-gody-28786

[11] https://foundation.kz/en/

[12] https://iitu.edu.kz/ru/news/summer-school-artificial-intelligence/#

02

Deep Dive

- Professional Development and Capacity Building for Educators in Kyrgyzstan in the AI Era: Challenges and Opportunities
- Collective Intelligence: Zhejiang University is Exploring New Pathways for Higher Education in the Age of Artificial Intelligence
- Regional Initiatives to Introduce AI in Higher Education in Kyrgyzstan
- AI-Driven Transformation: Tajikistan's Bold Leap in Education and Digital Economy
- The Concept of Professional Development of Educators in the Field of Artificial Intelligence in Minsk State Linguistic University
- Pakistan and a Digitally Empowered Higher Education System: Getting There?
- Revolutionizing the Education Industry: The Power of Technology to Ensure Equal and High-Quality Education for All
- Streamlining Assessment with AI at HKUST: Saving Time, Ensuring Fairness, and Personalizing Feedback
- Building Digital Solutions for the Education Sector - Kingsoft Office

Professional Development and Capacity Building for Educators in Kyrgyzstan in the AI Era: Challenges and Opportunities

Gulmira Imasheva, Senior professor, Osh State University

Gulmira Imasheva is a Senior Professor of the Interfaculty Department of Practical Russian Language at the Institute of Philology and Intercultural Communication, OshSU. With over 30 years of experience in education, she is well-versed in contemporary psychological and pedagogical learning concepts and possesses a high level of scientific and methodological expertise in her subject area. She is the author of more than 20 scientific articles and 10 educational-methodological guides for students of non-linguistic faculties. To ensure consistently positive results in the educational process, this educator skillfully applies a differentiated approach to students, using an optimal combination of methods, forms, and teaching tools. She widely implements various digital resources and educational technologies that increase students' motivation to study the subject.

Aisulu Imashova, Senior professor, Kyrgyz National University

Ms. Aisulu Imashova has over 20 years of experience in Higher Education, specializing in project management and implementation. Ms. Imashova worked for a decade with the EU Erasmus+ (Tempus) program in Kyrgyzstan, which provides professional development, organizational capacity building, and transnational partnerships for innovative outputs and best practice exchanges. Including learning mobility opportunities for students, educators, trainees, volunteers, and young individuals (https://erasmusplus.kg/en/). As a researcher at the National Academy of Sciences of the Kyrgyz Republic, her research focuses on the impact of artificial intelligence on education. In her role as an ETF community and representative member of the AI club, Ms. Imashova conducts short training sessions for higher education and vocational education and training (VET) teachers in Kyrgyzstan to increase their awareness of AI applications in the academic process.

© pexels

Introduction

Artificial intelligence (AI) is opening up new horizons for higher education, and its most important task is to prepare teachers to work effectively with new technologies. In Kyrgyzstan, where educational infrastructure is significantly limited, especially in rural and remote areas, AI can not only support the educational process, but also significantly improve the qualifications of university teachers, expanding their professional capabilities.

Professional development of educators in the AI era requires a comprehensive approach focused on developing key skills and competencies to adapt to change and make the most of new technologies. The UNESCO AI Competency Framework for Teachers offers a strategy that takes into account the specifics of preparing specialists to work with AI in resource-constrained settings and aims to develop skills for working in an AI-rich environment. The framework includes five priority aspects: developing a human-centered approach, adhering to ethical standards, exploring the basics and possibilities of AI, using AI in pedagogy, and using AI for continuous professional development (https://www.unesco.org/en/digital-education/artificial-intelligence).

For Kyrgyz universities, this approach is particularly valuable because it helps structure and guide faculty training programs to support their AI readiness. The framework emphasizes that faculty are not just users of AI, but also facilitators of its application. They must have the skills to use AI in teaching and research, while being able to assess its capabilities and potential risks. In Kyrgyzstan, this also includes adapting curricula, accessing learning platforms, and sharing experiences across universities to create conditions for continuous professional development of faculty.

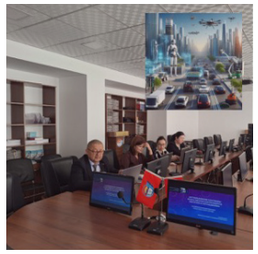
In the context of global digital transformation and challenges facing the educational system of Kyrgyzstan, the development of teachers' competencies is becoming an important step towards creating an inclusive, effective and modern higher education system.

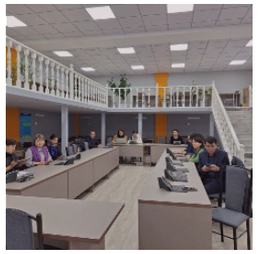
Challenges and Needs

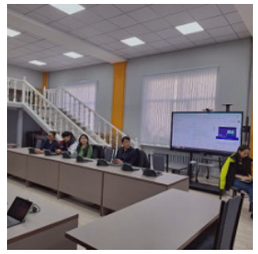
The professional development of university teachers in the context of

AI implementation requires major changes in the approach to their training. One of the main tasks is to develop digital literacy and data analysis skills necessary for working with AI, as well as an understanding of the ethical aspects associated with its use in the educational process.

Kyrgyzstan needs to create a sustainable system of support for teachers aimed at developing these key competencies. In the context of limited digital infrastructure and the resource-intensive nature of AI, specialized trainings and advanced training courses play a special role, which will allow teachers not only to master basic AI tools, but also to learn how to use them in accordance with professional and ethical standards. These trainings should cover a wide range of topics - from the basics of working with AI and big data analysis to ethical issues and the safety of using technology in education.







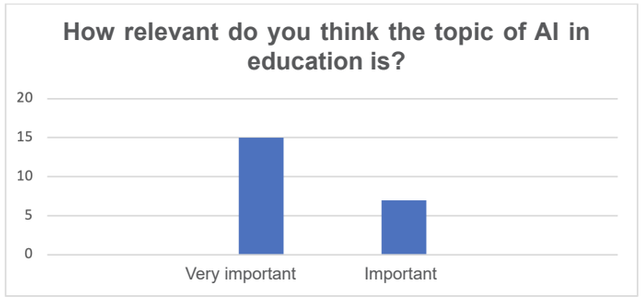


Fig. 1

The development of such a system requires improving the availability and quality of technical infrastructure in universities. Investments in digital infrastructure and training programs, including partnerships with international organizations and universities, can play a key role in building a professional environment that promotes continuous growth and exchange of experience among teachers.

In this regard, since the beginning of 2024, in order to increase the potential of the teaching staff of universities, a number of master classes and trainings have been held at 5 universities in Kyrgyzstan (International University of the Kyrgyz Republic, OshTechnology University, International University of Kyrgyzstan, Kyrgyz National University, Toktomamatov International University in Zhalal Abad). The trainings were a private initiative of the authors of this article, as active members of the Community of Innovative Teachers in Kyrgyzstan. The training covered 120 representatives from universities, including teaching staff and administrators, where more than half of the participants were trained free of charge. The training was introductory in nature with an emphasis on the practical application of Generative AI tools. Upon completion of the training, 22 participants were surveyed to identify the perception of teachers on the use of AI in education, main expectations, concerns and possible ways of implementation.

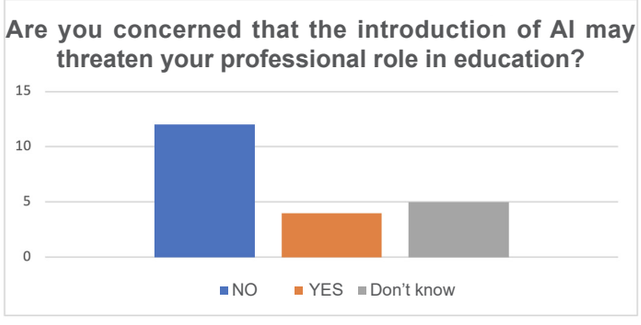
From the results, all respondents acknowledge the relevance of using AI, which indicates a high interest in technology. Many teachers noted that AI opens up opportunities for teaching practice and professional development, especially in the context of remote learning, although some are concerned that excessive automation may weaken students' active participation in learning.

Approximately 80% of respondents indicated their willingness to implement new AI platforms such as ChatGPT and Gamma app in their work. However, some respondents mentioned a lack of specialized skills, emphasizing the need for ongoing training and courses. Teachers indicated that the most important competencies are the ability to formulate queries, confident PC proficiency, knowledge of pedagogical principles, and adherence to ethical standards. This highlights the need for more in-depth and targeted training programs to improve digital literacy. 45% of respondents enjoyed working with new AI platforms other than ChatGPT, 30% gained a deeper understanding of working with AI programs, and 25% liked the opportunity to practically apply the knowledge gained.

Research shows that the majority of respondents (around 70%) believe that AI will have a positive impact on the quality of student learning. This opinion is based on several key benefits that AI provides in the educational environment. In particular, respondents note that AI can provide a more personalized approach to learning, adapting learning materials and methods to the individual needs and learning styles of each student. In addition, access to a wide range of educational resources and materials allows students to deepen their knowledge and develop skills at their own pace.

However, it is worth noting that 20% of respondents express concern about the possible negative consequences of the introduction of AI into the educational process. They fear that the use of technology

Fig. 2.



may lead to a decrease in students' independence, limiting their motivation to learn and explore new topics. In this context, the issue of a potential threat to the professional role of teachers is also raised: if AI takes over some of the functions related to teaching, this may affect the need for traditional teachers.

Additionally, 10% of respondents doubt that AI will always improve the quality of education. They point to risks associated with dependence on technology and possible flaws in algorithms that may not take into account the unique characteristics of each student.

Thus, while most respondents see significant potential for AI to improve the quality of education, it is important to consider the concerns associated with its implementation. Successful integration of AI into the educational process requires research to understand its impact on students and teachers, as well as developing strategies to minimize potential risks and preserve the value of traditional learning. The tasks most in demand for automation by respondents were checking student work, preparing materials, and conducting interactive lectures. This highlights that teachers are willing to use AI to simplify routine tasks while maintaining the creative and educational components of their work.

Also, teachers consider it important to have clear ethical standards for the use of AI. There is a need to protect students' personal data and maintain academic integrity. More than 80% of respondents noted the importance of an ethical framework, and 20% expressed a need for more information on this topic.

In summary, respondents agree that the combination of learning with AI, whether they like it or not, has become the main technology of modern education and is subject to widespread implementation and effective application in the educational process. Naturally, at the same time, it is necessary to introduce certain conditions and rules under which AI can or should be used and under which it is not recommended. It is necessary that the use of AI be regulated by usefulness and expediency. First of all, both the teaching and the trained parties should proceed from the advantages of the systems used and be aware of their main strategies and the benefits of achieving higher learning outcomes. Respondents emphasize that no advanced technology, including AI, can replace human intelligence, i.e. a professional teacher. AI will become a main partner of professional teachers, which will help optimize the educational process and create the best conditions for both sides in order to improve the quality of education. This means that any technology in education needs to be considered more as an aid than a method to make learning easier.

Collective Intelligence: **Zhejiang University is Exploring New Pathways for Higher Education in the Age of Artificial Intelligence**

ZHANG Yuyan, Senior Engineer at the Information Technology Center of Zhejiang University and Director of the Educational Research and Training Department of the ZhiYun Lab, specializes in educational technology, smart learning space, and the application of AI in education. Under her leadership, the team successfully planned and implemented the "ZJU Online" teaching spaces, building 800 smart classrooms and developing platforms such as "Learning in ZJU", "ZhiYun Classroom", Knowledge Graph, and Virtual Teaching Research Studio. These efforts were recognized with the First Prize of the Zhejiang Provincial Teaching Achievement Award in 2021 and the Second Prize of the National Teaching Achievement Award in 2022. She also manages the daily operations of the National Digital Literacy and Skills Training Base (ZJU) and serves as a lecturer at the National Information Technology Talent Training Base.

ZHANG Yuyan

YANG Qingyuan, Assistant Engineer at the Information Technology Center of Zhejiang University, and Adjunct Lecturer at the Jing Hengyi School of Education, Hangzhou Normal University. His research focuses on educational informatization, artificial intelligence in education, and learning sciences and technologies.

YANG Qingyuan

ZHANG Zihui, Chief Engineer at the Information Technology Center of Zhejiang University. He joined Zhejiang University in April 2018 and established the ZhiYun Lab. He has built a new generation of borderless reach smart campus "ZJU Online" based on Internet innovation technology, and successively completed the top-level design for major platforms for teaching and research, including "ZJU DingTalk," "ZJU Cloud Computing," "Learning in ZJU," "Researching in ZJU," "ZhiYun Classroom," and "Great Teacher." In 2023, he participated in the Deep-time Digital Earth Programme (DDE) as the Chief Engineer in charge of the top-level design of DDE Cloud.

ZHANG Zihui

CHEN Wenzhi, Professor, Director of the Office for Informatization Construction Leading Group at Zhejiang University. He also serves as the Director of the Information Technology Center at Zhejiang University and as the Deputy Director of the Expert Group on Educational Management Informatization under the Ministry of Education (China). Additionally, he holds several key positions, including Director of the Undergraduate Information Technology Teaching Steering Committee in Zhejiang Province, Director of the Educational Technology Committee of the Zhejiang Higher Education Association, and Director of the Education Informatization Committee of the Zhejiang Computer Federation. His research areas include computer architecture, hardware/software co-design, cloud computing and big data, education informatization, and intelligent education. CHEN has published more than 100 papers and 10 textbooks. He has received numerous awards, including the First Prize of the Zhejiang Science and Technology Progress Award (twice), the First Prize of the Zhejiang Provincial Teaching Achievement Award (twice), and the Second Prize of the National Teaching Achievement Award (once). He has also been awarded the Baosteel Excellent Teacher Award and the Yongping Teaching Contribution Award from Zhejiang University and has been recognized as a teaching master under Zhejiang Province's "Ten Thousand Talents Program."

CHEN Wenzhi

In the wave of transformation from the information age towards the Artificial Intelligence (AI) era, higher education is facing unprecedented challenges and opportunities. Seizing this historic moment to facilitate the high-quality development of teaching and learning has become a pressing issue for the educational sector. Embracing the spirit of "one should be as unassertive and inclusive as the vast ocean which admits hundreds of rivers", Zhejiang University (ZJU) actively engages with AI, fostering the deep integration and synergistic development of education, technologies, and talents.ZJU has been continuously explored the empowering role of AI in talent cultivation, implementing a series of initiatives in professional discipline development, foundational computational resources, and platform support. These measures aim to assist faculty and students in understanding, utilizing, and innovating with AI, systematically advancing AI education, and achieving tangible results.

Innovative Collaboration in AI Education: Constructing an Open and Sharing Education Platform

Since 2019, ZJU has been deeply involved in the compilation of the *New Generation of Artificial Intelligence Textbooks Series*, which focused on AI fundamental theories, key technologies, industry applications, ethics and safety. In the meantime, ZJU built the Zhihai platform for scientific and educational research and implemented "AI+X" teacher training program. ZJU also completed a series of textbooks, including 25 books on theoretical and technical knowledge and 11 practical guides, supplemented with virtual teaching and research environments, open-source resources (OER), and application models, and strengthened the community of university teachers' growth. These initiatives laid a solid foundation for the cultivation of interdisciplinary AI talents.

In 2021, ZJU joined forces with Shanghai Jiao Tong University, Fudan University, Nanjing University, University of Science and Technology of China, Tongji University, and leading enterprises such as Huawei, Baidu, SenseTime, to establish a new generation AI science and education league, and launched the Minor-in-AI and Interdisciplinary Curriculum Program ("AI+X"), see Figure 1. This program integrates innovative mechanisms such as co-construction and sharing, credit recognition, league certification, and SPOC (Small Private Online Course) teaching to cultivate interdisciplinary talents with AI expertise. The program adopts an integrated online and offline teaching model, constructing systematic learning that emphasizes industry-academia integration and interdisciplinary collaboration. Participants are required to accumulate at least 12 credits from 7 courses (falling into 5 tracks) within 2 years.

In March 2023, ZJU keenly grasped the trends of the time and took the lead in offering specialized elective courses on Generative Artificial Intelligence (GenAI) in the College of Computer Science and Technology. This initiative aims to empower the ZJU's faculty and students to actively anticipate the future and grow into innovative, high-quality talents that meet the demands of evolving industries. Considering that GenAI has been rapidly evolving and has been implemented in various application scenarios, ZJU established the Center for AI For Education. The center is responsible for the development of AI-related undergraduate and graduate public courses, textbooks, practical teaching, and faculty training, thereby promoting the integration of AI into teaching, learning, and research activities. The university encourages the development of "AI+Disciplines" and has started a special support program for empirical research in AI For Education that focuses on personalized cultivation, including course design, teaching methods, teaching resources, teaching tools, teaching evaluation, and personalized guidance. By June 2024, the program has supported 134 research projects.

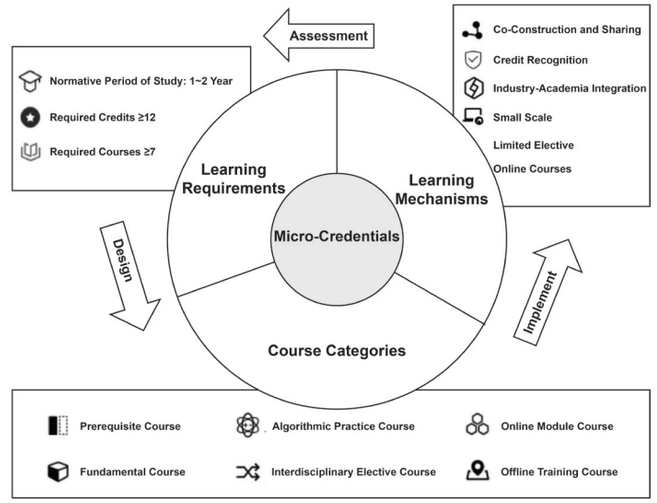


Figure 1: Minor-in-AI and Interdisciplinary Curriculum Program ("AI+X")

In June 2024, ZJU proudly released the bilingual Chinese and English version of the *Red Book on Artificial Intelligence Literacy of College Students (2024 Edition)*. The Red Book deeply analyzes the four core factors of college students' AI literacy: systematic knowledge, constructive ability, creative value, and humanistic ethics (see Figure 2). Additionally, it clearly identifies the three essential pillars that support the cultivation of this literacy: a diversified curriculum system, digital teaching resources, and an interdisciplinary faculty team. The book also actively advocates that universities are supposed to build diversified, open, and systematic AI practical training projects and constructed digital teaching resources and generative learning platforms to enhance learners' practical and application capacity. Furthermore, the red book proposes 3 strategies to comprehensively facilitate students' AI literacy: a) laying a robust foundation for AI general education; b) actively exploring the deep integration and vertical interdisciplinary talent cultivation model of "AI+X"; c) leveraging the "minor-in-AI" program to fully utilize the unique advantages of interdisciplinary studies in cultivating AI-skilled citizens who can meet the needs of future society.

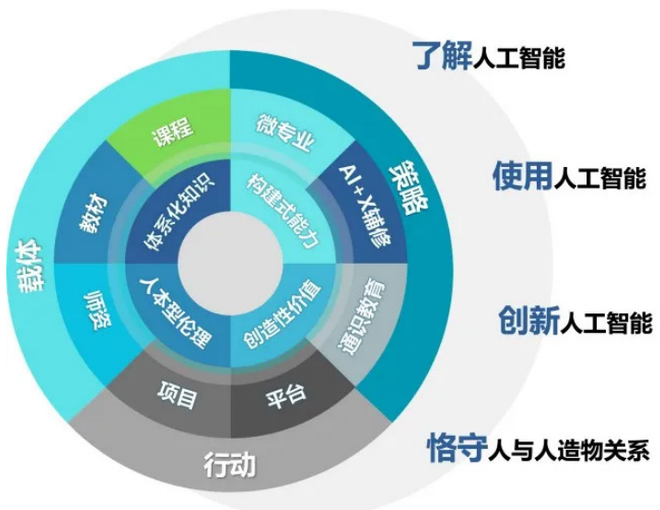


Figure 2: The Connotation, Training Carriers, Actions, and Strategies of College Students' AI Literacy

The Center of AI For Education coordinates resources from ZJU and other institutions, forming a multi-university collaboration mechanism for innovation. Through “crowdfunding,” it brings together the power and resources of various parties to collectively drive reform in education and pedagogy.

The Light of the West Lake Computing Alliance: Creating A Collaborative and Open Service Operation Platform for Computing Power

Figure 3: The Establishment Ceremony of the Light of the West Lake Computing Alliance

The Light of the West Lake Computing Alliance is another significant initiative by ZJU in the field of AI. On November 22, 2023, the Alliance was officially established at Zijingang Campus, ZJU, Hangzhou City, Zhejiang Province, China (see Figure 3). Initiated by ZJU and the Hangzhou Xihu District, the alliance aims to establish an AI industry platform for cooperation and innovation, open and shared among government, universities, and enterprises. In addition, it concentrates on planning and constructing computing network nodes, precisely matching the computing demands of higher education institutions' scientific research, fostering a computing innovation ecosystem, and promoting the development of the regional computing industry chain. Besides, the initial enterprise members of the alliance include China Mobile Zhejiang Branch, China Telecom Zhejiang Branch, China Unicom Zhejiang Branch, Alibaba Cloud Computing, INSIGMA, and Hangzhou Chengfeng Erlai Digital Technology Co., Ltd.

The establishment of the alliance was made possible through the concerted efforts of multiple parties. Government policy guidance, academic research innovation, and corporate technical support have collectively built a collaborative, open, and shared computing service platform. This platform not only meets the computing needs for academic research and innovation and enables faculty and students to better utilize AI, but also provides substantial support for the digital transformation of local industries.

Great Teacher Ecosystem Alliance: Achieving Personalized and Intelligent Education

The Great Teacher is also an innovative practice by ZJU in the field of AI for education. Leveraging existing computing power, data, and model capabilities, it has developed a comprehensive solution for building a large-scale model application system, which enables rapid customization of domain-specific intelligent agents that offer services such as content generation, interactive Q&A, and speech recognition across instruction, research, administration, daily life, and other scenes through low-code development.

The core of the Great Teacher lies in its focus on personalization and intelligence. By creating an intelligent assistant portal (see Figure 4), it aims to achieve ubiquitous AI usage across the campus, ensuring that everyone can effectively utilize AI. The Great Teacher supports and guides faculty and students in their development through intelligent means, providing each individual with a personal AI assistant, which delivers personalized educational services and facilitates innovation in AI.

> “The ecosystem alliance formed between universities and enterprises is the foundation for realizing the Great Teacher, effectively achieving integration across organizations, disciplines, and scenarios.”

The ecosystem alliance formed between universities and enterprises is the foundation for realizing the Great Teacher, effectively achieving integration across organizations, disciplines, and scenarios. ZJU, in collaboration with companies specializing in campus digitalization and large-scale models, has established an alliance to jointly develop the foundational capabilities and typical application scenarios for campus large-scale model applications, making campus applications smarter and more convenient.

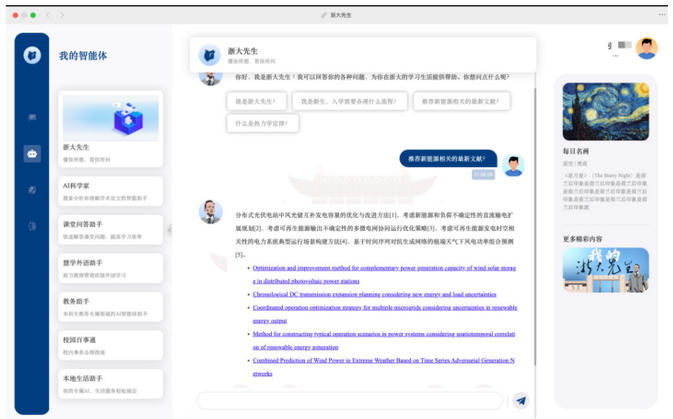


Figure 4: The Great Teacher User Interface

Conclusion

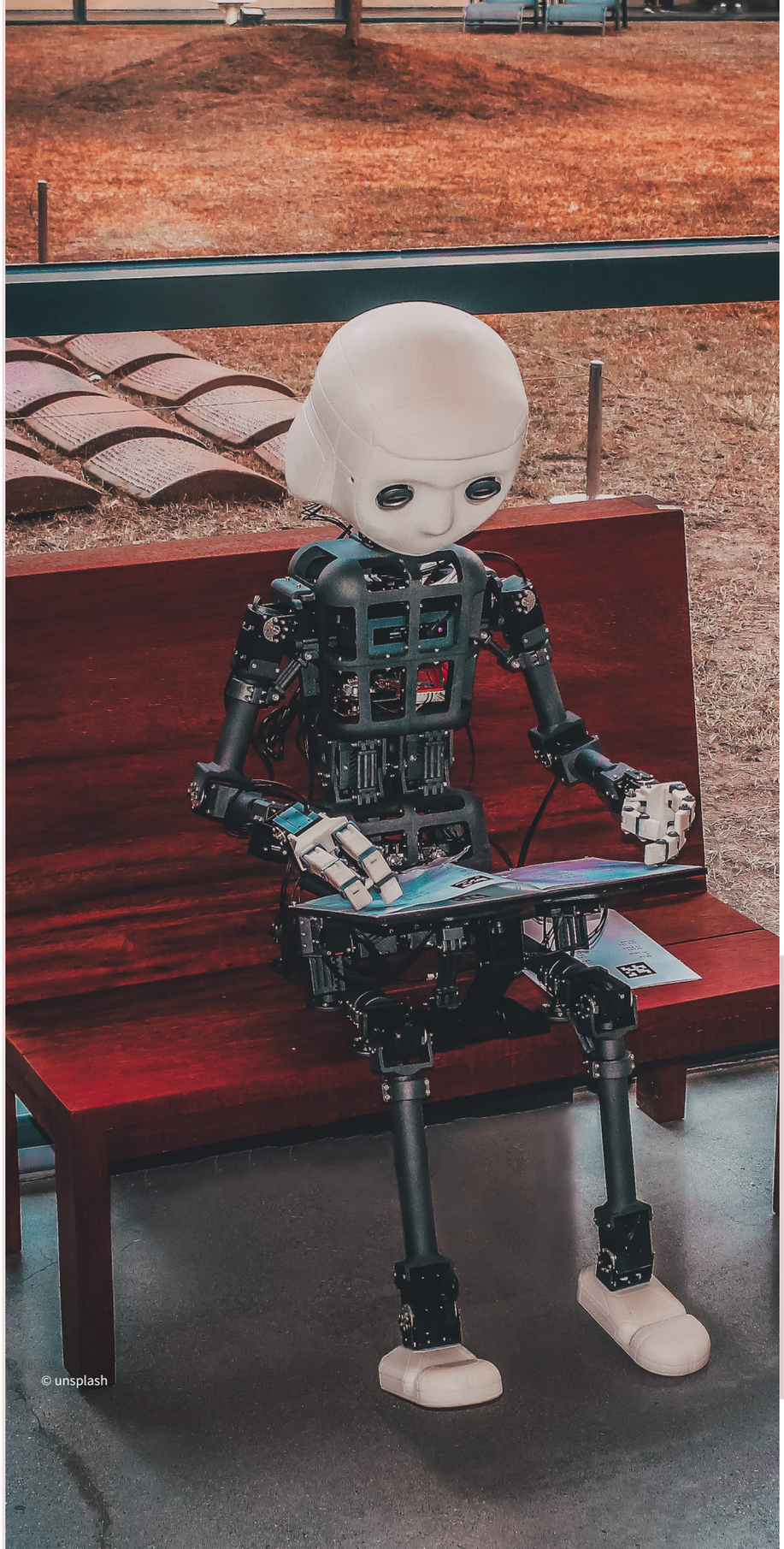
In the age of AI, the high-quality development of higher education requires new ideas and approaches. ZJU embodies the concept of collective intelligence through initiatives such as innovative collaboration in AI education, the Light of the West Lake Computing Alliance, and the Great Teacher Ecosystem Alliance. By embracing open sharing and collaborative innovation, these efforts collectively drive transformative changes in education. Collective intelligence is not only an innovative way of thinking but also a method of resource integration. Looking towards the future, there is no doubt that as AI technology continues to mature, higher education will encounter broader development opportunities, and collective intelligence will become a significant force in driving this progress.

> “In the age of AI, the high-quality development of higher education requires new ideas and approaches. ZJU embodies the concept of collective intelligence through initiatives such as innovative collaboration in AI education, the Light of the West Lake Computing Alliance, and the Great Teacher Ecosystem Alliance. By embracing open sharing and collaborative innovation, these efforts collectively drive transformative changes in education.”

Regional Initiatives to Introduce **AI in Higher Education in Kyrgyzstan**

Mambetakunov Ulanbek – Professor, Rector of the Bishkek Musical-Pedagogical Institute, Kyrgyzstan, Former Minister of Education, umambetakunov@gmail.com

A specialist in the field of pedagogy and the use of information technology in education, with over 30 years of experience in the educational system. Author of textbooks, monographs, and academic articles. He has served as Minister of Education, Deputy Minister of Education, Vice President of the Kyrgyz Academy of Education, and Dean of the Faculty of Information Technologies at the Kyrgyz National University named after J. Balasagyn. Currently, he holds the position of Rector at the Bishkek Music Pedagogical Institute named after T. Ermatov.



Digital transformation across all sectors of life requires the cultivation of a culture of open communication, knowledge sharing, and collaborative creativity within society. It is important to note that this process is not limited to technological development alone, but also involves creating new approaches to interaction between people, institutions, and machines. In this context, there is an urgent need for large-scale educational work among the general population, aimed at explaining the possibilities and advantages of using digital technologies. This approach will not only increase digital literacy but also foster a readiness among citizens to actively use new technological tools to address everyday tasks.

Today, we actively discuss artificial intelligence (AI) as a technological tool that mimics human decision-making processes and its limitless potential in the education system. We are already saying that a person who cannot effectively interact with AI, which is gradually becoming an integral part of daily life and professional activities, can be considered "illiterate." It is important to understand that digital literacy now includes not only basic computer and internet skills but also the ability to understand and use AI technologies to solve various tasks, from information retrieval to developing innovative solutions in various fields.

When discussing AI in higher education, we must also consider the question: **Do university faculty and students need artificial intelligence?** Many years ago, if we had not known about the capabilities of AI, our answer would have been negative. But today, knowing all its potential, we can confidently give a positive answer. Therefore, of course, yes. AI is already having a profound impact on the educational process, from automating administrative tasks to creating adaptive educational platforms capable of personalizing learning. The introduction of AI into educational processes opens up new opportunities for effective, individualized approaches to learning, improves the quality of educational services, and facilitates more effective analysis of learning outcomes and the adjustment of curricula in real-time.

Abstract:

Today, there is an urgent need for large-scale educational efforts aimed at explaining the possibilities and advantages of using digital technologies. This approach will not only improve digital literacy but also cultivate citizens' readiness to actively use new technological tools to solve everyday tasks. Currently, we are actively discussing artificial intelligence as a technological tool that simulates human decision-making processes. Therefore, our institute will begin implementing artificial intelligence in the training of music teachers, primary education educators, preschool teachers, English language teachers, and others. However, this article will focus on examples of AI integration into the activities of certain higher education institutions in Kyrgyzstan.

However, it is important to understand that AI should not be seen as a panacea for all the problems in education. It can only be a tool to help improve educational processes, but it does not solve problems such as lack of funding, inequality in access to quality education, and the human factor, which will always remain important. Therefore, the use of AI in education should be balanced and aimed at enhancing the experiences of both teachers and students, rather than replacing human interaction and academic work.

Examples of how AI is being introduced in Kyrgyzstan's educational sector include initiatives at several higher educational institutions. For example:

Kyrgyz State Technical University named after I. Razakov (KSTU) in Bishkek – one of the leading universities in Kyrgyzstan, actively developing areas related to information technology, including artificial intelligence. In recent years, the university has strengthened its work in IT, robotics, and AI, offering students modern programs and participating in research aimed at introducing advanced technologies into various sectors of the country's economy.

> However, it is important to understand that AI should not be seen as a panacea for all the problems in education.

Kyrgyz State Technical University named after I. Razakov

- **AI Educational Programs.** KSTU offers training programs in information technology, including specializations in the development and application of AI technologies. Students study both the theory and practice of AI, learning to use modern machine learning algorithms, big data processing, computer vision, and other technologies.

Undergraduate and graduate programs cover key disciplines such as:Machine Learning and Deep Learning;Artificial Neural Networks; Big Data Processing and Analysis;Robotics and Intelligent Systems;Computer Vision and Image Processing;Programming and AI Algorithm Development.

- **AI Research.** KSTU is actively developing scientific research in AI. The university supports research projects aimed at developing and implementing AI solutions in various areas of life, including AI applications in data analysis and forecasting, the creation of computer vision systems for diagnostics and automated analysis, research in neural networks and deep learning, and development of intelligent systems for industrial and agricultural automation. The university hosts scientific laboratories and research groups working on innovative AI-based solutions and conducting research to improve existing technologies.

- **Collaboration with Industry and International Partners.** KSTU collaborates actively with industrial enterprises and international scientific and educational institutions. Interaction with leading companies and tech centers allows students and researchers to participate in real-world projects, solve practical tasks, and implement advanced technologies in the real economy.

Furthermore, the university regularly participates in international AI conferences and symposiums, helping faculty and students stay updated on the latest global achievements in the field.

- **Infrastructure for AI Development.** To support AI development, KSTU has established modern infrastructure, including research laboratories equipped with powerful computational resources for big data processing and machine learning tasks. Students and researchers have access to modern AI development tools and platforms such as TensorFlow, PyTorch, and other popular technologies.

- **Future Prospects for AI Development at KSTU.** Considering global trends in digitization and automation, KSTU aims to prepare specialists who can work in environments of rapid technological progress. The university plans to strengthen its position in AI, develop new courses and programs, and implement innovations in education and research focused on areas like "Smart Cities and Management Systems" and "Intelligent Systems in Agriculture and Industry."

The university plays a vital role in Kyrgyzstan's educational and scientific ecosystem, developing AI and other advanced technologies to modernize various sectors and enhance the country's competitiveness on the global stage.

Kyrgyz National University named after Jusup Balasagyn – one of the country's leading universities, which has implemented a comprehensive digital transformation program that includes the introduction of AI technologies into the educational process. Within this program, the university is developing decision-support systems for administration, intelligent assistants for students, and adaptive educational platforms with AI elements. These initiatives aim to improve the quality of education, simplify university management processes, and provide convenient tools for students.

Osh Technological University named after M.M. Adyshev (OshTU) – actively implementing the pilot project ***"Smart Campus"***, which aims to introduce AI in various aspects of university infrastructure management and the educational process. This project includes several key components designed to improve the quality of life for students, faculty, and staff, as well as enhance the effectiveness of the learning process and university management.

One of the key components of the project is the development of ***"computer vision systems"*** used for campus security monitoring. These systems provide 24/7 video surveillance, helping to respond quickly to emergencies, prevent criminal activity, and ensure a safe

© pexels

learning and working environment. These systems can recognize suspicious behavior, automatically track the movement of objects and people, and integrate with other security systems for faster response.

Additionally, ***"intelligent energy management systems"*** are being developed as part of the project, allowing the university to significantly reduce electricity and resource costs. These systems automatically regulate lighting, heating, and air conditioning based on the time of day, room occupancy, and weather conditions, ensuring comfortable conditions for the learning process while minimizing energy consumption. This initiative contributes to creating an environmentally sustainable and cost-efficient university environment.

Another component of the project is the development of ***"adaptive educational applications"*** that use AI to personalize the learning process. These applications help students receive materials and assignments suited to their individual abilities and level of preparation, and assist teachers in more accurately assessing each student's progress and needs. AI algorithms analyze student interactions with content, identify weak points, and provide recommendations for improving learning outcomes. Chatbots and virtual assistants are also being implemented to support students in resolving academic and organizational issues, improving interactions between faculty and students.

Furthermore, the project includes the integration of ***"smart technologies for managing people and traffic flows"*** on the campus, optimizing movement routes, improving logistics, and minimizing congestion on university grounds.

These projects are important steps toward creating "smart" educational institutions where the learning process becomes more flexible, efficient, and accessible to all participants. By using AI and modern technologies, universities can not only improve the quality of education but also create a comfortable, safe, and sustainable infrastructure that fosters scientific potential and innovation. OshTU's initiatives reflect its commitment to technological leadership and preparing students for work in a rapidly changing world.

These examples illustrate how AI technologies are being effectively introduced in Kyrgyzstan's education and research sectors, opening up new opportunities for students and faculty. At the same time, it is important to remember that the success of digital transformation depends not only on technology but also on how society and the state adapt to these changes, how well training programs are conducted, and how we prepare specialists who can work with these new technologies at all levels.

Furthermore, ensuring the accessibility of technologies for all segments of the population is essential to prevent digital inequality from becoming a barrier for future generations. It is also important to develop infrastructure, support digital education initiatives, and foster partnerships between educational institutions, government agencies, and the private sector.

Equally significant is the preparation of teachers who can effectively integrate AI into the learning process, providing students with the necessary knowledge and skills. Only through such a comprehensive approach can we create a sustainable education system ready to meet the challenges and opportunities posed by artificial intelligence technologies.

Thus, the introduction of AI in Kyrgyzstan's educational and scientific fields is not only a technological revolution but also a step toward building a more adaptive and innovative society.

“Thus, the introduction of AI in Kyrgyzstan's educational and scientific fields is not only a technological revolution but also a step toward building a more adaptive and innovative society.”

AI-Driven Transformation: **Tajikistan's Bold Leap in Education and Digital Economy**

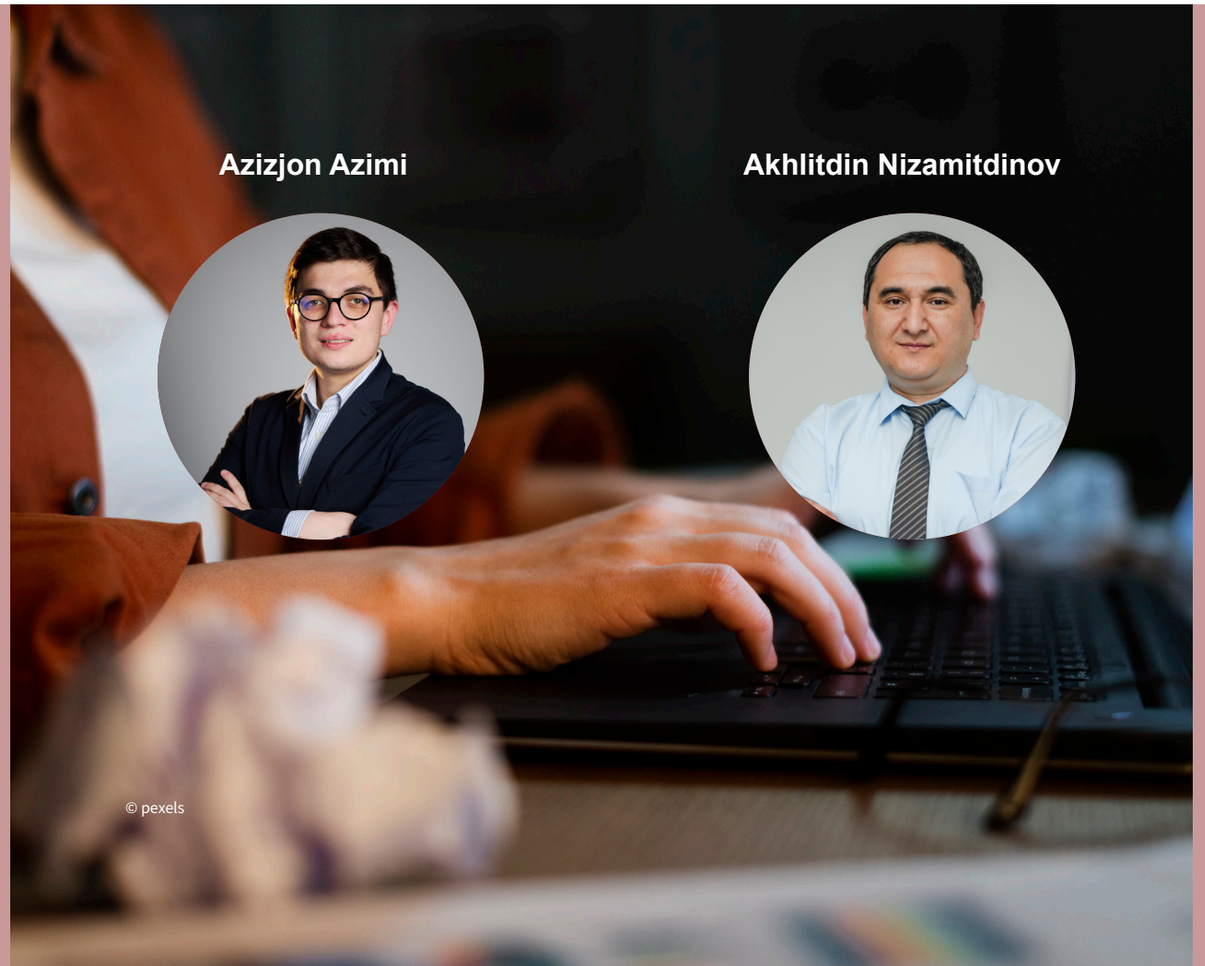
Tajikistan stands at a historic crossroads. In its pursuit of accelerated economic growth, the government has set a target to build a digital economy by 2040. An ambitious goal of increasing the annual GDP growth rate by 1.5% to 2% has been established, requiring a leapfrog model of economic development to reach this benchmark. However, a lack of skilled human capital in digital economy areas—both managerial and technical—has hindered the relevant bureaucracies from defining a clear roadmap to realize this vision.

To bridge this gap, the focus is on identifying a field of technology that can enable Tajikistan to leapfrog its developmental trajectory. Artificial Intelligence (AI), one of the fastest-growing fields globally and a promising avenue for significant economic impact, has been identified as a key tool for this leap. The relevance of AI lies not only in its rapid global development and commercial potential but also in its capacity to provide the competitive advantage that Tajikistan needs to bypass traditional stages of growth and modernize its economy efficiently.

Leapfrogging Development with AI

Leapfrogging allows countries to bypass traditional growth pathways through two primary channels: i) adopting the latest technologies directly, effectively skipping certain developmental stages, or ii) embracing emerging technologies that have untapped potential to pave a new path forward. Among fields like cloud computing, quantum computing, the Internet of Things, and biotechnology, AI stands out as a sector where Tajikistan has an opportunity to establish a leadership position.

The first AI lab in Central Asia—tajrupt.ai—was launched in Tajikistan in November 2019, winning one of 32 grants awarded



Azizjon Azimi is the Founder and CEO of zypl.ai and the Founding Chair of the Artificial Intelligence Council under the Ministry of Industry and New Technologies of the Republic of Tajikistan. An alum of Stanford University (MBA 2021 as a Knight-Hennessy Scholar) and Harvard University (MPP 2021), he is also the founder of A7σ (A7Sigma) – an AI holding company with ventures spanning foundational AI models, applied AI, green computing and AI talent education, headquartered in Tajikistan and the UAE.

A7σ's flagship initiative, zypl.ai, is an AI startup launched at Stanford's Startup Garage that pioneers the application of proprietary synthetic data to enhance the accuracy of machine learning models in risk assessment. To date, over 30 financial institutions across 13 countries have implemented zypl's generative AI software for several risk-related use cases, including credit scoring, fraud detection, and collection forecasting.

In his role as AI Council Chairman, Azizjon led the development and adoption of Tajikistan's national AI strategy – the first of its kind in Central Asia – and is now driving its implementation in collaboration with a consortium of stakeholders. With strong backing from the President and Government of Tajikistan, Azizjon is currently overseeing the establishment of Area AI, a dedicated AI park in Dushanbe, Tajikistan, designed to offer substantial incentives for both local and global AI companies.

Akhlitdin Nizamitdinov serves as the Deputy Chairman of the Artificial Intelligence Council under the Ministry of Industry and New Technologies of the Republic of Tajikistan and has been an Associate Professor of Applied Statistics at Polytechnic institute of Tajik technical University since 2003. He earned his Ph.D. in Applied Statistics through an Erasmus Mundus scholarship at Anadolu University. His research focuses on nonparametric regression algorithms using various spline functions and entropy optimization methods.

Throughout his academic career, he has held several leadership roles, including Associate Dean of the Informatics faculty (2017-2018), Head of the Department of Computer Science (2018-2022), and Head of the Digital Department (2022-2023). He also developed Tajikistan's first national program in artificial intelligence education at both the bachelor's and master's levels.

In 2019, Akhlitdin joined Central Asia's first Artificial Intelligence Center as Curriculum Lead and Instructor in Statistics and Machine Learning. Since 2021, he has been a Senior Machine Learning Engineer at zypl.ai, where he leads credit scoring projects for global banks across Central Asia, Middle East and Caucasus.

He is one of the inventors of zGAN, a cutting-edge generative model designed to create synthetic data, including rare and extreme outliers. This innovation plays a crucial role in enhancing machine learning models, enabling them to better handle complex and uncommon scenarios.

by the Islamic Development Bank among over 4,300 applicants. Tajrupt.ai's work in AI product development and talent cultivation has placed Tajikistan on the global AI map, giving it a valuable competitive edge within the region and setting the foundation for long-term, sustainable growth.

Tajrupt.ai launched an AI Academy—the first of its kind in Central Asia—to train a new generation of machine learning (ML) engineers. The Academy, which operates in two cities and online, currently enrolls 150 students from high schools, universities, and companies. Its interdisciplinary curriculum, spanning statistics, programming, and ML, includes capstone projects where student groups prototype and develop their own ML products. This practical, project-based approach aims to incubate local AI-enabled startups that can contribute to economic growth and foster a vibrant tech ecosystem. In addition, Tajrupt.ai has partnered with 12 companies in banking, telecom, consulting, and outsourcing sectors to offer 50 paid internships for its graduates, enabling them to apply entry-level AI skills in leading domestic companies. As a result, over 300 students have completed machine learning courses, significantly expanding Tajikistan's AI talent pool.

The Ministry of Industry and New Technologies is focused on supporting industrialization, while the recently formed AI Council is working to demonstrate how AI can contribute to Tajikistan's long-term development by promoting cross-sector deployments and strategic partnerships.

Demonstrating AI Use Cases

The AI Council's initial focus has been on raising awareness of the transformative power of AI among the Tajik population and government. By showcasing current AI applications and collaborating with public and private sector partners, the Council is actively demonstrating how AI can be deployed meaningfully across multiple sectors of the economy.

- Banking

AI is already being used to underwrite loans domestically and internationally, with 50 financial institutions adopting software developed by the Tajik startup zypl.ai. The National Bank of Tajikistan is looking to further expand digital banking by using AI for remote identification, enabling those who cannot attend banks in person to apply for loans and open accounts. This initiative has the potential to increase financial inclusion and streamline banking services across the country.

- Education

AI is supporting career counseling for high school students in Tajikistan, introducing a new level of guidance for students at a crucial time in their educational journey. Starting this summer, students will

complete a questionnaire as part of a national high school exam, with responses fed into an AI algorithm that provides personalized career recommendations. This initiative, a collaboration between UNICEF, TajRupt, the Ministries of Education and Labor, and the AI Council, will be scaled nationwide.

Tajikistan now has seven universities offering AI majors, though higher education institutions face challenges in reskilling and upskilling faculty due to limited funding, course availability, and faculty expertise. To address these issues, the government and UNDP co-launched the Upskill project, enabling 50 university professors to complete a one-year ML teaching program. This initiative will strengthen Tajikistan's educational infrastructure and increase the quality of AI education available to students.

Additionally, a pilot project is testing facial recognition technology as an alternative to access cards in schools, enhancing security while maintaining student privacy. This project, running in three schools, ensures privacy by running ML algorithms locally and storing data on internal servers.

- Telecoms

In the telecom industry, companies are using AI to predict customer churn and enhance retention efforts. The high rate of customer switching, due to intense competition in the sector, poses a significant challenge to telecom providers. To address this, two major companies have built AI models in-house, leveraging talent from the AI Council's Academy, and now use these models to identify customers likely to switch providers, enabling targeted retention strategies.

> “Tajikistan now has seven universities offering AI majors, though higher education institutions face challenges in reskilling and upskilling faculty due to limited funding, course availability, and faculty expertise.”

Research and Development

The exponential growth in data collection capabilities has accelerated the availability of data for machine learning training. However, regulatory measures surrounding data accessibility, such as those pertaining to privacy and intellectual property, have made it challenging to acquire sufficient data for model training. Privacy concerns related to personal information, trade secrets, and intellectual property further complicate data access and usage.

Over the past decade, generative models, particularly Generative Adversarial Networks (GANs), have gained popularity as a solution for data availability issues by generating synthetic data that closely resembles real data. However, with the increasing presence of outlier data that does not conform to traditional datasets, there is a need for augmented GANs to address the utility of these unique data points. The zGAN model developed by zypl.ai specifically addresses this need, generating realistic synthetic tabular data that reflects outlier characteristics, which can enhance model stability, improve the predictability of rare events, and enable simulations of entirely new scenarios.

Using zGAN, outliers can be generated in selected dataset

columns based on covariance matrices derived from real data, with customizable probability distributions and tail limits. The outlier percentage in each column is adjustable, allowing for tailored data generation based on specific research contexts. The zGAN's approach, rooted in Extreme Value Theory (EVT), provides a robust framework for modeling rare events across diverse distribution types, from light-tailed to heavy-tailed distributions.

The realism of zGAN's synthetic data is preserved by accurately reproducing the correlation structures of real data, ensuring that privacy is maintained through the use of hash-code-based similarity filters, which prevent the retention of any real client data following training.

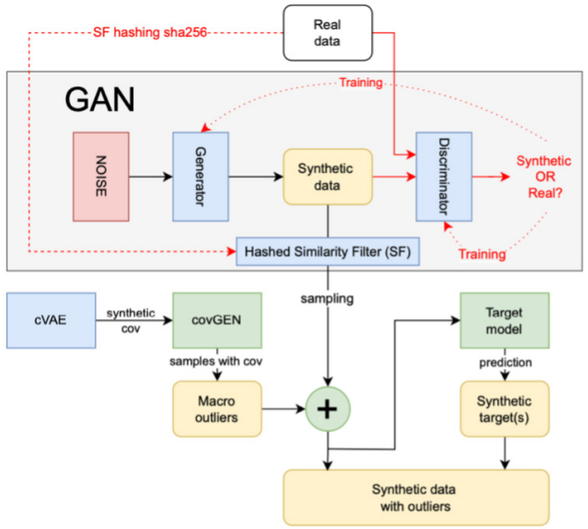


Figure 1: Generalized structure of zGAN.

Conclusion

Under the leadership of the AI Council (AIC), Tajikistan's AI sector has evolved into a transformative force for the nation's economy, setting a bold precedent in the Central Asian region. This transformation is driven by targeted initiatives, including the AI Academy, public-private partnerships, and groundbreaking innovations such as zGAN. These efforts are paving the way for an inclusive digital economy and fostering a sustainable tech ecosystem that will enhance Tajikistan's competitive standing globally.

The strategic focus on AI education, ethical governance, and international cooperation has solidified Tajikistan's position as a leader in AI within Central Asia. The commitment to a regionally aligned ethical framework for AI, along with the expansion of cross-border collaborations for research and development, signals Tajikistan's intent to play a leading role in responsible AI deployment. These efforts are not only building a skilled workforce but also establishing Tajikistan as a model for emerging economies aiming to harness AI for sustainable development.

Looking ahead, Tajikistan's vision is to cultivate a robust digital economy that addresses local challenges while driving international competitiveness. With an eye on the future, Tajikistan is creating a sustainable environment for AI innovation that balances technological advancement with ethical considerations, data privacy, and regional cooperation. By continuing to prioritize these areas, Tajikistan is well-positioned to leapfrog traditional growth barriers, laying the groundwork for a future where AI is a central pillar of societal progress and economic resilience.

References

1. Azimi, A. *Leapfrogging Development: Outlining a Vision for Tajikistan's National Artificial Intelligence Strategy.* Master's thesis, Harvard Kennedy School.

2. Rogerson, A. *Unlocking the Economic Potential of AI: Tajikistan's Plans to Become More AI-Ready,* Oxford Insights. Retrieved from https://oxfordinsights.com/insights/spotlight-series-tajikistan/

3. Azimi, A., et al. (2024). *zGAN: An Outlier-focused Generative Adversarial Network For Realistic Synthetic Data Generation,* https://arxiv.org/abs/2410.20808.

The Concept of Professional Development of Educators in the Field of **Artificial Intelligence in Minsk State Linguistic University**

Prof. Laptseva Natalia

Rector of Minsk State Linguistic University. Chairman of the Association of higher education institutions of the Republic of Belarus in the field of linguistic education. Teacher, specialist in the field of theory and methods of teaching and education (foreign languages). Candidate of Pedagogical Sciences, Associate Professor.

Research interests: developing a concept for creating manuals for teaching a foreign language to adults.

Head of the team of authors of textbooks on the German language for schools and gymnasiums of the Republic of Belarus, has more than 50 scientific publications. Member of the Editorial Board of the Chinese Journal of Slavic Studies.

Abstract:

The article presents the experience of Minsk State Linguistic University (MSLU) in the field of implementing Artificial Intelligence (AI) into the content of undergraduate educational programs and in the process of enhancing teachers' AI competencies. It also describes the directions of development of the scientific school of mathematical and applied linguistics.

The Republic of Belarus has a system of planned development of AI technology, which can be traced back to the National Strategy for Sustainable Development of the Republic of Belarus until 2040 and the State Programme ‘Digital Development of Belarus’ for 2021-2025. In order to ensure regulatory control over the use of AI relevant standards are being progressively developed, and the results of developments are presented annually at the Forum ‘Artificial Intelligence in Belarus’.

It is worth mentioning that such spheres as medicine, industry and agriculture are the leaders in the introduction of AI technology. In the educational system we are more at the stage of studying the possibilities of AI and its widespread implementation into the educational process in order to determine the most effective way of harmonious combination of innovative technology and human resource of a teacher.

Minsk State Linguistic University follows three main directions: (1) AI technology training, (2) using AI tools with regard to the specificity of the educational process, and (3) introducing new specialties to train practitioners that can develop AI technologies. In this respect, a 'Digital Learning Technologies' laboratory has been established to develop and conduct special training programmes for teachers on AI tools.

Additionally, special disciplines have been included in the curricula for the training of future foreign language teachers as well as translators to develop their competences in the use of AI in professional activities.

Further one can see the examples of some specialties and their main disciplines with the focus on particular modules and topical blocks:

Translation studies (in specified languages):

- Automated translation and post-editing.
- Module *"Information Technologies"* which includes the following blocks: *"Algorithmisation and programming of linguistic tasks"*, *"Databases and SQL language"*, *"Artificial intelligence in natural language processing"*.

Modern foreign languages (in specified languages):

- Digital technologies in language education.
- Pedagogical design of blended learning.
- Neural networks in foreign language teaching.
- Module *"Information Technologies"* that contains following blocks: *"Algorithmisation and programming of linguistic tasks"*, *"Databases and SQL language"*.
- Digital Literacy and Information Security.

Linguistic support of intercultural communication (in specified languages):

- Algorithmisation and programming of linguistic tasks.
- Databases and SQL language.
- Digital Marketing.
- Digital Technologies in Economics.

Linguistic education (in specified languages):

- Pedagogical design of blended learning.
- Machine learning and neural networks.
- Digital Literacy.

At our university we pay special attention to observe and follow ethical guidelines while applying AI potential in creative and research work by both students and teachers.

When introducing the AI technology tools into the educational process, it is much more effective the participation of educators in working out the algorithms for their further application because they know better the peculiarities of this educational process.

In the nearest future, we also plan to develop chatbots to provide students with real-time feedback to build an individual foreign language learning trajectory. One of the effective conditions for the development of foreign language teaching resources is the creation of a corpus of educational texts, which will include valuable materials for forming communicative competence in the foreign language, on the one hand, and responsible civic stance, on the other hand. It is evident, that the development and application of AI systems requires not only mathematicians and computer scientists, but also sociologists, historians, philosophers and linguists. In this regard, we believe that training in the specialty 'Digital Linguistics' is an adequate response to the present-day challenges. The programme will train undergraduate students to become confident in the use of AI tools and engage in its advancement.

In October 2024, Minsk State Linguistic University hosted the first International Conference 'Language in the Era of Digital Transformation and Application of Artificial Intelligence'. The first results have shown that this conference can be regarded as an effective platform for sharing experience in implementing AI tools in the educational process of teaching native and foreign languages, as well as for discussing the prospects for AI technology development – the technology of the future.

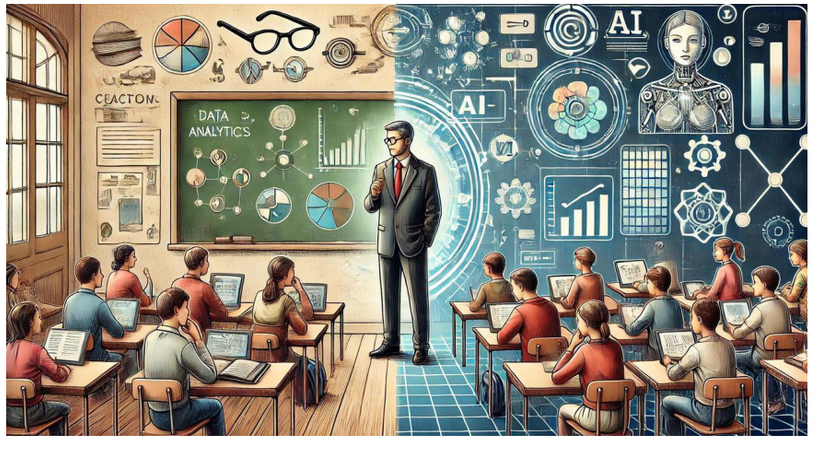
In conclusion, one can say that different spheres, as well as the educational sphere, follow the contemporary trends of development, among which AI technologies take one of the leading roles. The experience of Minsk State Linguistic University demonstrates that it goes with the times and is aimed at more intensive introduction of AI technologies into different university fields.

Pakistan and a Digitally Empowered Higher Education System: Getting There?

Dr Aneel Salman

Dr Aneel Salman is OGDCL-IPRI Chair Economic Security at Islamabad Policy Research Institute, Pakistan. He is also Chair, National AI Policy Committee, Government of Pakistan.

Imagine a classroom where an 'AI Assistant' instantly grades assignments, predicts student difficulties before they arise, and tailor lessons to each learner's unique style. Exciting? Undoubtedly! But what if this AI begins to encroach on tasks traditionally performed by professors or lecturers? Could the educator's role be diminishing, or is it evolving into something even more impactful?



Is Traditional Teaching in Pakistan's Higher Education Ready for AI?

When the COVID-19 pandemic hit, Artificial Intelligence (AI) became the unsung hero of education! As universities and colleges slammed their doors shut, AI-powered platforms swooped in to save the day, making remote learning surprisingly engaging and even personalised.

Funny thing is, back then, nobody was calling it 'AI.' It was like that mystery ingredient in your favourite dish - everyone was enjoying it but had no clue what it was. Today, we slap 'AI' on everything like a trendy hashtag, but during those lockdown days, AI was just quietly doing its thing, helping students learn and teachers teach from their bedrooms. This period made it clear that traditional educational models needed to evolve, and AI provided essential tools for this transition. Pakistan was no different.

Fast forward to 2024 and Higher Education Institutions (HEIs) like the University of Engineering and Technology (UET), Lahore have Master's programme in Artificial Intelligence; the National University of Sciences & Technology (NUST) offers specialised courses in Machine Learning and Natural Language Processing at both undergraduate and graduate levels. Similarly, institutions like Lahore University of Management Sciences (LUMS), Air University and COMSATS have also integrated AI-focused courses to better equip future educators and professionals with digital competencies.

But these are not just standalone courses for students. Places like Virtual University of Pakistan (VU) are actively incorporating AI into its teaching framework through faculty training and workshops like AI-driven content development[1] and practical sessions on using AI tools like ChatGPT for lesson planning and assessments. Allama Iqbal Open University (AIOU), recently teamed up with the Commonwealth Educational Media Centre for Asia (CEMCA) and worked with 256 faculty members from 37 universities on using AI[2] to create engaging, personalised learning experiences and design smarter curricula.

Honestly though, while AI can definitely enhance learning and make administrative work less of a headache, I think we are in for more of a slow-and-steady journey than an overnight revolution. The productivity boosts everyone's hoping for might not be as instant or game changing as they imagine. That's why, in my opinion, it is so crucial to keep our educators front and centre in this transformation -because, at the end of the day, it's their experience and guidance that truly make the difference.

What's more, despite HEIs recognising AI's importance and incorporating it into their systems; and universities offering courses in AI, access to technology remains uneven, particularly in rural areas where resources are limited. Many (HEIs)/colleges/universities lack the infrastructure to support AI tools, and HEI educators still do not have sufficient training.

The bigger caveat or irony of AI in academia is that while students are sprinting ahead, many of Pakistan's 'professors' (no offense to the senior ranks here – you're still the wisest in the room!) are finding themselves outpaced by the technological wave.

Let's be honest: if we want to bring AI into the classroom, faculty need to feel at home using these tools daily, not treating them like some exotic pet they're afraid might bite. It's not just about turning on the latest AI-powered gizmo; it's about making sense of the data these tools produce to actually help students learn better.

Sure, understanding the ins and outs of AI, from its functions to its ethical implications, is crucial. But integrating AI is less about flashy tech skills and more about a strategy that involves everyone - think of it like a team sport where


© pexels

we can't just rely on one star player. Professors and lecturers need ongoing learning - AI bootcamps, webinars, AI literacy crash courses, you name it. And here's the kicker: we can't just hand them a link to an online course and say, 'Good luck!' Engaging with peers in professional communities like Karachi.AI with over 10, 000 professionals for learning and applying AI can make a world of difference.

Now, in Pakistan, this is especially key. Imagine rural and urban teachers swapping stories, tips, and even a bit of friendly banter over Zoom. Throw in some mentorship from AI experts, and you're on to something. It's all about bridging the digital gap and knowledge gap, one webinar and one cup of chai at a time.

What about Ethical Dilemmas?

As an educator myself, one of AI's most significant changes in education has been in assessment. Traditional exams are no longer the best way to evaluate student learning. Performance-based assessments focusing on applying knowledge in real-world scenarios are gaining popularity. AI tools facilitate these assessments by providing personalised feedback and automating routine tasks, allowing teachers to focus more on instructional support. In Pakistan, where examination systems are often rigid and rote-based, introducing AI-enhanced assessments could lead to more meaningful evaluations of student learning.

But consider a scenario where an AI grading system begins to systematically assign lower scores to essays written by students from certain backgrounds due to biases embedded in its training data. Teachers, relying on the AI's assessments, fail to notice the pattern, leading to unfair academic penalties and diminished opportunities for those students. Such an oversight would not only undermine individual futures but also perpetuate systemic inequality.

With AI's growing role, educators must also be aware of ethical considerations, including data privacy, fairness, and biases in algorithms. Professional development programmes should equip teachers to be wary of these issues. In Pakistan, where digital literacy varies widely, educating teachers and students about ethical AI use is crucial to building trust in these technologies.

Resistance to Change

"I worry that AI might replace the personal connection I have with my students," says Aisha, an adjunct lecturer at a public sector university in the capital - Islamabad. *"Teaching isn't just about delivering content; it's about understanding each child's unique needs, and I'm not sure a machine can do that."* Dr. Karim, a university professor and old friend, shares his apprehension: *"Rapid integration of AI could render some of my skills obsolete. Will I soon become a dinosaur replaced by a machine or voice on a laptop? Not all of us are prepared for this shift."*

Such concerns highlight why some educators resist adopting new technologies. A recent 2024 survey indicates notable resistance among Pakistani faculty members towards adopting AI in educational settings, with approximately 40% of educators[3] expressing apprehension about integrating AI tools into their teaching practices due to concerns over job security and a lack of technical proficiency. Over 30%[3] highlighted discomfort with AI, viewing it as a threat to traditional teaching roles rather than a tool for enhancing educational outcomes.

In Pakistan, where traditional methods are cherished like an old, comfy pair of sandals, introducing AI has obviously been met with the kind of skepticism usually reserved for 'diet' biryani. Professional development programmes must address these concerns by providing practical examples of how AI can enhance - not replace - traditional teaching methods. Marketing AI as a friendly sidekick might just ease the fears, especially since burying one's head in the sand won't stop the AI sandstorm from dumping a whole desert on top of it.

Will AI Edu-Tech Leave Female Educators & Villages Behind?

In Pakistan and across South Asia, gender disparities in technology and education are higher due to cultural and societal factors. Female educators often face challenges such as limited access to professional development opportunities and societal expectations that discourage them from engaging with advanced technologies like AI. For instance, in many rural areas of Pakistan, female teachers may have limited exposure to AI training programmes due to mobility restrictions and fewer resources dedicated to women's education.

To tackle these issues, several initiatives have been launched to support female educators in developing AI competencies. Organisations like 'Women in Tech PK'[4] provide platforms for women to access mentorship, networking opportunities, and training in technology fields, including AI. They organise workshops and seminars that specifically cater to female educators and professionals, aiming to bridge the gender gap in technology. Universities such as the NUST have started offering scholarships and specialised programmes for women in AI and related disciplines. By highlighting success stories of women who have made significant contributions to AI in Pakistan, showcasing the work of female researchers and educators in AI can also help to promote inclusivity.

In Pakistan, initiatives like the Punjab Information Technology Board's efforts[5] are striving to democratise AI education, aiming to equip students and faculty in both urban and rural areas with the skills to thrive in a digital future.

These examples illustrate that with thoughtful implementation, AI can be a powerful equalizer! Educators and policymakers must make deliberate choices today, prioritising technologies and practices that promote inclusivity and empowerment. The question isn't just about adopting AI but about shaping it in a way that benefits all students and educators - not just a privileged few!

Towards a Responsible AI-Educated Future in Pakistan

With a 'National AI Policy' nearing Cabinet approval following extensive federal and provincial consultations - an effort which this scribe chaired - Pakistan is gearing up to redefine its educational landscape. Alongside these policy moves, the Higher Education Commission (HEC) - the country's top body overseeing higher education – has also stepped up to the plate and is actively working on comprehensive strategies for higher education, making sure the country is not left behind in the AI revolution. HEC's collaboration with Microsoft is a cornerstone in this journey, focusing on equipping faculty, students, and administrators with practical AI skills. This isn't just about introducing shiny new tech but rather about empowering educators to transform their classrooms with AI-driven tools and innovation challenges. The ultimate aim is to build a robust digital skill


© pexels


© Freepik

set across universities, preparing the next generation for a future where AI is as essential as the ABCs.

But policy is where the real groundwork is being laid. HEC is hammering out clear guidelines to ensure that AI tools like ChatGPT are used responsibly within classrooms and research labs. The emphasis is on maintaining academic integrity, ethical practices, and preventing any misuse of AI in educational contexts.

> Pakistan is not merely dipping its toes into AI; it is taking the right steps toward integrating AI responsibly.

Pakistan is not merely dipping its toes into AI; it is taking the right steps toward integrating AI responsibly. The country is setting a course that ensures these technologies empower rather than overshadow our educators. As these efforts unfold, Pakistan is poised not just to catch up but to lead the way in cultivating. The journey towards a digitally literate, AI-educated future may be challenging, but with the right tools and policies, Pakistan's AI-edu horizon looks bright.

References

[1] https://www.vu.edu.pk/EventDetails?EventID=1216

[2] https://www.cemca.org/news/empowering-educators-ai-integration-training-university-faculty-pakistan

[3] https://ijsse.salmaedusociety.com/index.php/ijsse/article/view/301

[4] https://womenintechpk.com/

[5] https://www.nation.com.pk/22-Nov-2023/pitb-s-tech-odyssey-transforming-punjab-s-landscape-through-innovation

© unsplash

Revolutionizing the Education Industry: **The Power of Technology to Ensure Equal and High-Quality Education for All**

© pexels

Mehedi Hasan Limon
Vice President, Public Sector, Education and Healthcare, Huawei

Mehedi Hasan Limon is a dynamic youth icon, author, and trailblazer in the tech world, renowned for his leadership and innovation across Asia, Europe, Africa, the Middle East, and Central Asia. As Vice President of Public Sector special focus on Education and Healthcare at Huawei, Mehedi is at the forefront of digital transformation, driving initiatives that reshape industries and propel strategic success. A prominent voice at global tech summits, he has authored numerous articles on leadership, technology, and entrepreneurship, inspiring a new generation of leaders. Passionate about EdTech, Mehedi has been a key advocate for government digitization efforts, championing technology to ensure equal access to high-quality education and empower youth to thrive in the digital era.

Equal and high-quality education for all is not only a fundamental human right but also the foundation for a prosperous and innovative society. In today's rapidly advancing world, access to high quality education is essential for every individual and nation, bridging economic and social divides while nurturing the leaders and innovators of tomorrow. The digital transformation underway in the education sector is a powerful tool to achieve this vision, unlocking new opportunities for equitable and excellent learning experiences worldwide.

In an era defined by digital transformation, the education sector stands at the forefront of profound change. From classrooms equipped with intelligent technology, Artificial Intelligence to cloud-based systems that foster seamless learning experiences. As the world faces with challenges like inequality, accessibility, and opportunity, innovative new tech solutions are helping make education equitable, high-quality, and accessible to all.

Huawei is playing a key role in transforming education industry. Through solutions like ICT talent development, Smart Classrooms, Education Networks, Education Cloud, HPDA (High Performance Data Analytics) , and Smart Campus, enhancing how we learn, teach, and manage education. These innovations are opening up opportunities for a more inclusive and high-quality educational experience.

ICT Talent Cultivation: Bridging the Skills Gap

The digital skills gap remains one of the most pressing issues in education today. With technology advancing at an unprecedented rate, the demand for Information and Communication Technology (ICT) professionals has surged across industries. However, many education systems worldwide struggle to prepare students with the necessary technical skills for the modern workforce.

Huawei's ICT Talent Cultivation program addresses this challenge head-on. Through partnerships with universities, governments, and organizations globally, Huawei establishes ICT Academies that provide targeted training, certifications, and hands-on experience for students. By bridging the skills gap, these academies not only prepare students for careers in tech but also empower them to drive digital transformation in their communities.

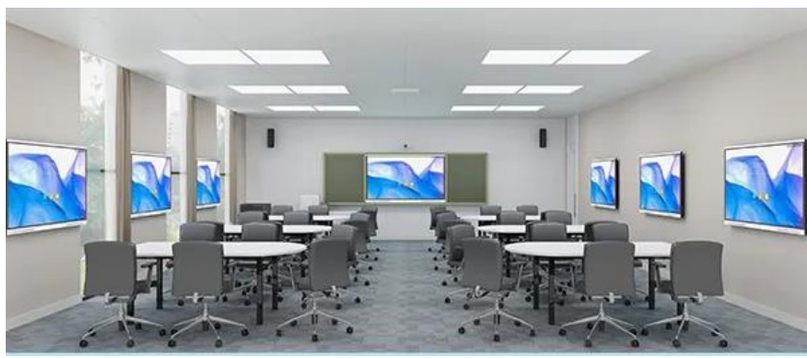
The program's core objectives are to increase digital literacy, promote technical proficiency, and foster innovation. For instance, students participating in Huawei's ICT Academy receive industry-relevant certifications that boost their employability. By embedding ICT into the curriculum, Huawei ensures that students from all backgrounds have access to a world-class tech education, thus leveling the playing field and creating pathways to economic advancement.

During the past 10 years, Huawei ICT Academies have cooperated with 260 universities trained 250,000 ICT talent in Middle East and Central Asia countries. In the near future, we hope to collaborate with our partners continually to cultivate digital talent for a fully connected, intelligent world.

Smart Classroom: Enhancing Interactive Learning

Huawei's Smart Classroom solutions, powered by AI, are transforming traditional classrooms by creating more interactive, personalized, and engaging learning environments that support students before, during, and after class.

Before Class:
AI-powered tools in Huawei's Smart Classroom help teachers prepare lessons tailored to each student's needs. By analyzing past performance and engagement data, the system can suggest resources, recommend personalized content, and help teachers build lesson plans that suit diverse learning styles.



This proactive approach ensures students are better prepared and more engaged from the start.

During Class:

During the lesson, Huawei's Smart Classroom enhances interactivity with tools that support real-time collaboration. Students can participate in live polls, group projects, or digital board activities, whether in person or remotely. AI helps track engagement and provides instant feedback, allowing teachers to adjust their approach on the spot to maximize participation and understanding. This dynamic interaction promotes critical thinking and creativity, keeping students actively involved in learning.

After Class:

After class, AI-driven analytics offer insights into each student's performance and engagement levels, helping teachers identify who may need additional support or further challenges. Students also receive personalized feedback and recommended resources for review or enrichment, fostering continuous learning. These insights allow educators to refine future lessons, creating a cycle of ongoing improvement tailored to each student's progress.

Huawei's AI-enabled Smart Classroom solutions create a comprehensive learning experience that benefits students and teachers before, during, and after class, making education more inclusive, engaging, and effective.

Education Network: Building Connected Campuses

The Education Network forms the backbone of modern educational institutions, ensuring connectivity across classrooms, campuses, and remote locations. In many developing regions, lack of access to high-speed internet and inadequate infrastructure hinder students' ability to access quality education. Huawei's Education Network solutions tackle this by building scalable, secure, and high-speed networks that connect students, educators, and resources seamlessly.

Huawei's network solutions utilize Wi-Fi 7, 5G, and Optical technologies to offer reliable internet access even in remote areas, thereby democratizing access to digital resources. With a robust network in place, students can access digital textbooks, online lectures, and virtual laboratories from any device, while educators benefit from uninterrupted access to digital teaching tools and resources.

Moreover, Huawei's focus on cybersecurity ensures that educational institutions can protect sensitive student data and maintain the integrity of their networks. By creating a secure, connected environment, the Education Network lays the foundation for a more inclusive and digitally-enabled education system.

Education Cloud: Revolutionizing Learning Accessibility

Cloud technology is another essential component of digital transformation in education, and Huawei's Education Cloud offers solutions that revolutionize how learning resources are accessed, managed, and stored. With Huawei's cloud platform, educational institutions can centralize resources, manage large-scale data, and provide uninterrupted access to educational content from any location.

Education Cloud enhances accessibility by allowing students and educators to connect to a centralized platform, where they can access learning materials, assignments, and communication tools. This is particularly beneficial for students in remote or underserved areas, as it removes geographical barriers and allows them to engage with the same resources as their urban counterparts. Additionally, Education Cloud supports virtual classrooms, enabling institutions to transition seamlessly to online learning when needed.

The cloud also offers scalability, enabling institutions to accommodate growing numbers of students and resources without compromising performance. As educational demands evolve, Huawei's Education Cloud provides the flexibility and adaptability needed to meet the changing needs of modern learners.

High-Performance Data Analytics (HPDA): Empowering Data-Driven Decision Making

High-Performance Data Analytics (HPDA) has become an indispensable tool for educational institutions aiming to make data-driven decisions. By leveraging HPDA, institutions can gain insights into student performance, retention rates, and educational outcomes, allowing them to optimize their programs and resources accordingly.

Huawei's HPDA solutions enable institutions to collect, process, and analyze large datasets with remarkable speed and accuracy. This can be especially valuable for predicting student needs, identifying at-risk students, and personalizing learning pathways. For instance, by analyzing patterns in student engagement and performance data, institutions can identify students who may need additional support or intervention, allowing for targeted assistance.

Furthermore, HPDA empowers educational leaders to make informed decisions about curriculum design, resource allocation, and faculty development. By turning data into actionable insights, HPDA contributes to a more responsive, efficient, and equitable education system.

Smart Campus: Transforming Campus Life

The concept of a Smart Campus goes beyond digital classrooms, encompassing the entire educational environment. Huawei's Smart Campus solutions integrate advanced technologies like IoT (Internet of Things), AI, and big data to create a connected, sustainable, and safe campus experience.

Through IoT sensors, cameras, and AI-driven analytics, Huawei's Smart Campus technology enhances campus security, optimizes energy usage, and streamlines campus operations.

Beyond infrastructure, Smart Campus technology facilitates a more student-centered experience by enabling services like digital and automated signin, and real-time campus information through mobile apps. By enhancing the quality of campus life and promoting a safer, more efficient environment, Huawei's Smart Campus solutions contribute to a holistic, technology-driven education experience.

In Summary, as we witness the convergence of education and technology, the promise of an equitable, high-quality learning experience for all becomes increasingly attainable. Through its comprehensive offerings—ranging from ICT Talent Cultivation and Smart Classrooms to Education Network, Cloud and Smart Campus—Huawei exemplifies how technology can address long-standing disparities in education. By providing the tools and infrastructure needed to transform learning environments, Huawei is not only enhancing educational quality but also expanding access for students worldwide.

In today's interconnected world, the impact of digital transformation in education extends beyond the classroom. By empowering students with the skills, resources, and opportunities they need to succeed, Huawei's smart education solutions play a crucial role in shaping a generation of innovators, thinkers, and leaders. As institutions embrace these technological advancements, the vision of equal and high-quality education for all comes within reach paving the way for a brighter, more inclusive future.

Yunxiao Lu(1)

Joon Nak Choi(1,2)

Ivy Shi(2)

Mark Cohen(2)

Streamlining Assessment with AI at HKUST: **Saving Time, Ensuring Fairness, and Personalizing Feedback**

Abstract:

Facing the challenge of providing timely and detailed feedback in a large undergraduate AI course, the Hong Kong University of Science and Technology (HKUST) examined how AI-powered essay assessment could save instructors significant time while delivering more consistent, timely, and detailed feedback to students. Overall, this technology was found to greatly enhance the efficiency and quality of the grading process, but only under close human supervision.

(1) The Hong Kong University of Science and Technology

(2) Learnovate Technologies Limited

Introduction

Providing timely, fair, and personalized feedback to students' writing in large undergraduate courses has long been a challenge for teachers in higher education. The rapid evolution of generative artificial intelligence (GenAI) technology in recent years promises to aid teachers not only by saving time spent grading student essays, which are traditionally time consuming, but also providing more consistent grading as well as more detailed and useful feedback to students. However, 60 percent of students according to a recent survey (Digital Education Council, 2024) worry about the fairness of AI evaluation. Recognizing this dilemma, the Hong Kong University of Science and Technology (HKUST) implemented a human-in-the-loop AI essay grading assistant, Pregrade, to assist the teachers of several undergraduate- and graduate-level courses in drafting high-quality and timely feedback on student writing to be reviewed and approved or edited by instructors in a fraction of the time that it would otherwise have taken them.

Challenges and Solutions

The growth of GenAI has been met with consternation by many in the education sector. Beyond the worry that students will use tools like ChatGPT to complete any writing task for which they have free use of a computer and internet access, educators have been concerned that the hype around GenAI would lead to the adoption of tools that claim to enhance students' learning but actually degrade it by removing the teacher from the equation. While these represent serious potential pitfalls that educators must be careful to avoid, it would be a mistake to conclude that these dangers are the only possible impact of GenAI on education. The emergent literature of the impacts of GenAI on education not only identifies risks but is already laying out constructive suggestions and best practices (Xia et al., 2024). If designed appropriately, GenAI can simultaneously avoid these problems and contribute to tackling long-standing challenges in education such as student assessment.

GenAI promises to resolve a major problem in assessment. On one hand, educators have a duty to provide more detailed feedback to students to improve learning outcomes. Indeed, one of the main advantages of an essay over short answer or multiple-choice exams is that educators can provide detailed feedback that students could learn from – what they did well, what they did not, and how they can improve in the future. On the other hand, such detailed feedback requires so much time and effort to write that it becomes impractical for even the most dedicated and hard-working educators. Compared to multiple-choice or even short answer exams, essays intrinsically take longer to read and grade. Even short essays from a small class of 20 students can take many hours to grade and comment upon. For classes with hundreds of students in a course, grading can only be made manageable by splitting the work among multiple instructors or teaching assistants. This, in turn, introduces the problem of ensuring consistency among multiple graders.

With GenAI, it is possible to assess students' writing based on consistent criteria and provide in-depth feedback to students quickly while the material is still fresh in their minds. It is necessary to have the teacher remain "in the loop" in the educational use of GenAI, however, by reviewing AI-generated grades and feedback before distributing it to students. Otherwise, students would lose confidence in the fairness of grading.

Pregrade – an AI essay grading assistant – is designed and developed to assist instructors in grading by utilizing GenAI. This tool aims to help educators evaluate essays more efficiently by taking a first pass at grading them and drafting personalized feedback. A crucial point is that Pregrade allows instructors to maintain full control by reviewing and adjusting the AI's evaluations as needed, ensuring that instructors would continue to take full responsibility for the grades and feedback. The use of AI, even with human review, nevertheless saves up to 80% of grading time.

Human review of AI-drafted work is a crucial feature of this process, consistent with studies that find that students will accept grading by AI under human oversight – but not grading by AI alone (Tossell et al., 2024). Indeed, having a simple, trustworthy, and easily understood

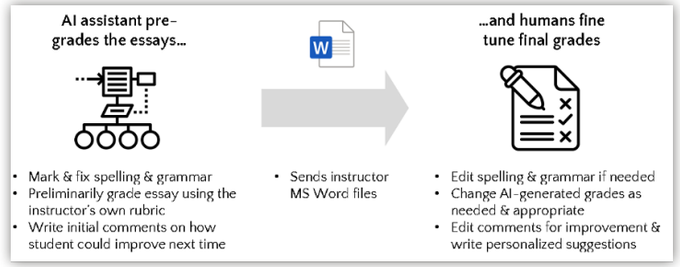


Figure 1: How Pregrade Works

© Freepik

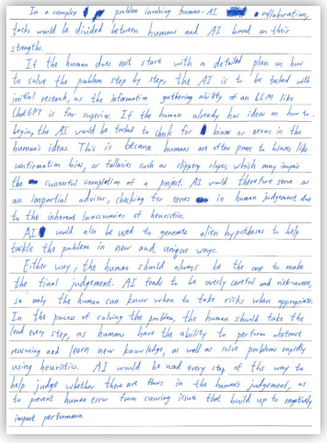
system is crucial for achieving acceptance by both students and instructors (Hall et al., 2023). In the remainder of this article, we will examine how Pregrade was utilized in one particular course at HKUST.

Implementing AI-assisted Essay Grading in a Large Undergraduate Course

CTDL 1902 (AI and Society: Ethics, Cognition, and Critical Analysis) is the first course at HKUST and among the first in the world that promotes AI literacy from a critical thinking perspective. Students are not only taught how to use GenAI tools, but also a common-sense understanding of how these tools work, and how to leverage them to enhance—not degrade—human intelligence. With 120 undergraduate students enrolled this semester and with plans to further scale up enrollment in future semesters, the grading workload for this course is quite large, exemplifying how challenging it is for teachers to grade essays with traditional methods.

To address these challenges, this course implemented Pregrade and found it to be effective. An actual essay from an anonymized student will be used to demonstrate how Pregrade is used in this course.

In this course, students are encouraged to use GenAI to complete a co-authored group essay, while other assessments such as in-person handwritten essays were designed to ensure the authenticity of students' demonstrated learning outcomes. An in-person handwritten essay can ensure authenticity because it eliminates the possibility of using GenAI for assistance in a proctored classroom environment. However, reading and grading handwritten essays can be a difficult and time-consuming process.



In a complex problem involving human-AI collaboration, tasks would be divided between humans and AI based on their strengths.

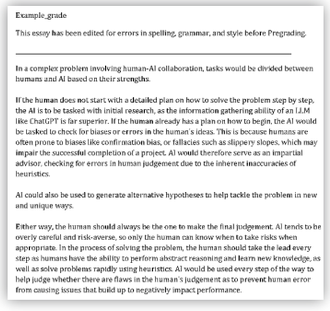
If the human does not start with a detailed plan on how to solve the problem step by step, the AI is to be tasked with initial research, as the information gathering ability of an LLM like ChatGPT is far superior. If the human already has a plan on how to begin, the AI would be tasked to check for biases or errors in the human's ideas. This is because humans are often prone to biases like confirmation bias, or fallacies such as slippery slopes, which may impair the successful completion of a project. AI would therefore serve as an impartial advisor, checking for errors in human judgement due to the inherent inaccuracies of heuristics.

AI could also be used to generate alternative hypotheses to help tackle the problem in new and unique ways.

Either way, the human should always be the one to make the final judgement. AI tends to be overly careful and risk-averse, so only the human can know when to take risks when appropriate. In the process of solving the problem, the human should take the lead every step, as humans have the ability to perform abstract reasoning and learn new knowledge, as well as solve problems rapidly using heuristics. AI would be used every step of the way to help judge whether there are flaws in the human's judgement, as to prevent human error from causing issues that build up to negatively impact performance.

Figure 2: Example of a Handwritten Essay

With Pregrade, the instructors can simply bulk scan test papers into a single PDF file and upload it onto a web portal for recognizing and converting handwriting into text. Pregrade converts every handwritten test paper to a well-formatted Microsoft Word document. During this process, Pregrade can correct spelling and grammar if the instructor chooses to do so.



Example_grade

This essay has been edited for errors in spelling, grammar, and style before Pregrading.

In a complex problem involving human-AI collaboration, tasks would be divided between humans and AI based on their strengths.

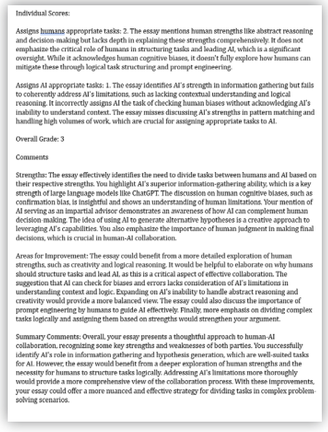
If the human does not start with a detailed plan on how to solve the problem step by step, the AI is to be tasked with initial research, as the information gathering ability of an LLM like ChatGPT is far superior. If the human already has a plan on how to begin, the AI would be tasked to check for biases or errors in the human's ideas. This is because humans are often prone to biases like confirmation bias, or fallacies such as slippery slopes, which may impair the successful completion of a project. AI would therefore serve as an impartial advisor, checking for errors in human judgement due to the inherent inaccuracies of heuristics.

AI could also be used to generate alternative hypotheses to help tackle the problem in new and unique ways.

Either way, the human should always be the one to make the final judgement. AI tends to be overly careful and risk-averse, so only the human can know when to take risks when appropriate. In the process of solving the problem, the human should take the lead every step as humans have the ability to perform abstract reasoning and learn new knowledge, as well as solve problems rapidly using heuristics. AI would be used every step of the way to help judge whether there are flaws in the human's judgement as to prevent human error from causing issues that build up to negatively impact performance.

Figure 3: Same example, converted into text by Pregrade

Converting handwritten essays into text is just the first step towards grading and providing feedback to students. Pregrades graded these text essays using a rubric provided by the instructor, and drafted feedback for the students. Unlike humans, an AI-powered grading assistant like Pregrade has the advantage of being able to provide consistently detailed explanations for the scores given to each essay, regardless of how many there are. This is important because detailed, concrete, and constructive feedback can help students learn what they did correctly and/or incorrectly by helping them improve their understanding of the subject materials and enhancing their ability to apply this understanding to new problems in the future. While humans can strive to consistently provide such feedback, they are nevertheless limited by constraints such as attention span and exhaustion. Pregrade provided such feedback for students consistently. Please see Figure 4 for the feedback that was generated for the essay submitted.



Individual Scores:

Assigns humans appropriate tasks: 2. The essay mentions human strengths like abstract reasoning and decision-making but lacks depth in explaining these strengths comprehensively. It does not emphasize the critical role of humans in structuring tasks and leading AI, which is a significant oversight. While it acknowledges human cognitive biases, it doesn't fully explore how humans can mitigate these through logical task structuring and prompt engineering.

Assigns AI appropriate tasks: 1. The essay identifies AI's strength in information gathering but fails to coherently address AI's limitations, such as lacking contextual understanding and logical reasoning. It incorrectly assigns AI the task of checking human biases without acknowledging AI's inability to understand context. The essay misses discussing AI's strengths in pattern matching and handling high volumes of work, which are crucial for assigning appropriate tasks to AI.

Overall Grade: 3

Comments

Strengths: The essay effectively identifies the need to divide tasks between humans and AI based on their respective strengths. You highlight AI's superior information-gathering ability, which is a key strength of large language models like ChatGPT. The discussion on human cognitive biases, such as confirmation bias, is insightful and shows an understanding of human limitations. Your mention of AI serving as an impartial advisor demonstrates an awareness of how AI can complement human decision making. The idea of using AI to generate alternative hypotheses is a creative approach to leveraging AI's capabilities. You also emphasize the importance of human judgment in making final decisions, which is crucial in human-AI collaboration.

Areas for Improvement: The essay could benefit from a more detailed exploration of human strengths, such as creativity and logical reasoning. It would be helpful to elaborate on why humans should structure tasks and lead AI, as this is a critical aspect of effective collaboration. The suggestion that AI can check for biases and errors lacks consideration of AI's limitations in understanding context and logic. Expanding on AI's inability to handle abstract reasoning and creativity would provide a more balanced view. The essay could also discuss the importance of prompt engineering by humans to guide AI effectively. Finally, more emphasis on dividing complex tasks logically and assigning them based on strengths would strengthen your argument.

Summary Comments: Overall, your essay presents a thoughtful approach to human-AI collaboration, recognizing some key strengths and weaknesses of both parties. You successfully identify AI's role in information gathering and hypothesis generation, which are well-suited tasks for AI. However, the essay would benefit from a deeper exploration of human strengths and the necessity for humans to structure tasks logically. Addressing AI's limitations more thoroughly would provide a more comprehensive view of the collaboration process. With these improvements, your essay could offer a more nuanced and effective strategy for dividing tasks in complex problem-solving scenarios.

Figure 4: Example of Pregrade Grading and Feedback

Even though Pregrade can help teachers draft feedback and grades, it is nevertheless designed to ensure that human instructors maintain their central position in grading. Pregrade produces a Microsoft Word document containing the essay, scores, and comments. The instructors then review this document and edit the scores and comments as needed, using the track changes feature in word processing software to maintain transparency regarding what was AI generated and what was human-corrected. By involving human supervision in the grading process, Pregrade not only ensures that AI errors will not affect the final feedback but also allows teachers to personalize their feedback to each student. This feature is important because, as a practice that almost every teacher has done in the past, personalizing feedback addresses students' unique strengths and weaknesses and guides them toward improvement.

Students have provided positive responses when asked whether Pregrade-generated feedback (after human review and adjustment) was helpful for learning, with most students raising their hands in affirmation. In another course at HKUST, Business Ethics and the Individual (MGMT 2010), the instructor conducted an unofficial survey to collect student feedback on the use of Pregrade. Responses were generally positive. Of the

25% of students in the course who responded to the survey (N = 65), responses averaged 7.4 on a 10-point scale whether they would recommend teachers to use Pregrade.

imperfect. For example, Pregrade generates grades that tend to be monotonic transformations of human grades, but nevertheless differ in absolute value. Nonetheless, despite shortfalls, the integration of GenAI in the grading process at a university-level course is significant, because it demonstrates how GenAI tools, when used responsibly and under close human supervision, can overcome longstanding challenges in higher education.

Conclusion

In conclusion, the implementation of Pregrade at HKUST effectively assists teachers in addressing the challenges of providing feedback to a vast number of students. Moreover, by adhering to the three guiding principles, this tool not only helps instructors provide feedback efficiently but also saves their time and energy, which can be redirected toward delivering high-quality education. While Pregrade represents a successful advancement, it is important to acknowledge that this tool remains

In conclusion, the implementation of Pregrade at HKUST effectively assists teachers in addressing the challenges of providing feedback to a vast number of students.

Works Cited

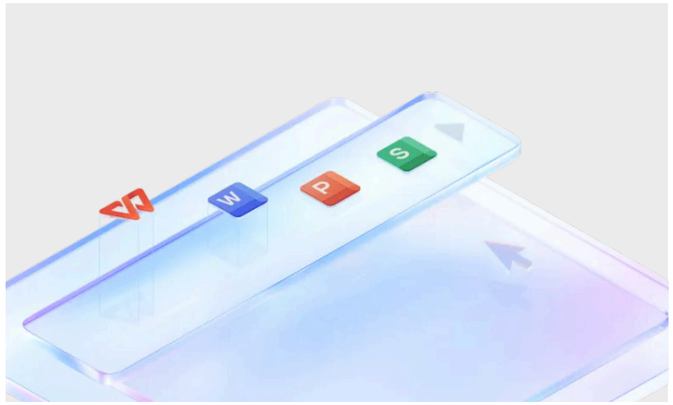
C. C. Tossell, N. L. Tenhundfeld, A. Momen, K. Cooley and E. J. de Visser, “Student Perceptions of ChatGPT Use in a College Essay Assignment: Implications for Learning, Grading, and Trust in Artificial Intelligence,” in IEEE Transactions on Learning Technologies, vol. 17, pp. 1069-1081, 2024, doi: 10.1109/TLT.2024.3355015.

Digital Education Council. “Global AI Education Survey”. 2024.

E. Hall, M. Seyam, and D. Dunlap. “Identifying Usability Challenges in AI-Based Essay Grading Tools,” in Artificial Intelligence in Education, pp. 675-680, 2023.

Qi Xia, Xiaojing Weng, Fan Ouyang, Tzung Jin Lin, and Thomas K.F. Chiu. “A scoping review on how generative artificial intelligence transforms assessment in higher education.” International Journal of Educational Technolology in Higher Education 21(40), 2024. https://doi.org/10.1186/s41239-024-00468-z

Building Digital Solutions for the Education Sector - **Kingsoft Office**



Kingsoft Office adheres to the brand concept of "Blooming the power of wisdom" and has become a leading office software product and service provider in China. Over the past 36 years, Kingsoft has rooted deeply in providing optimal office software, from creating the computer "Chinese word processing era" to leading the new way of working for the future, and has committed to providing efficient, reliable, relaxed, and pleasant office work experience. Kingsoft Office strives to provide stable and innovative products, simplify workflows, and create a green office environment while also delivering better educational tools and cultivating the ICT capabilities of teachers and students. Kingsoft Office highly values paperless workflow, and ensures data security through digital encryption and cloud storage of office documents. At the same time, the cloud computing technology used by the WPS 365 cloud document can realize resource sharing and dynamic allocation, improve the server's utilization rate, thereby reducing the number of physical servers and the total occupied space, and help enterprises reduce power consumption.

Kingsoft Office includes WPS Office, WPS 365, WPS AI, and other office applications, forming a comprehensive intelligent office suite. The Suite services cover more than 90% of countries and regions worldwide. As of June 30, 2024, the monthly active devices of Kingsoft Office's main products exceeded 602 million, compatible with mainstream operating platforms such as Windows, Linux, macOS, Android, iOS, HarmonyOS, etc.

KINGSOFT OFFICE
A KINGSOFT COMPANY

Services in the Educational Sector

Kingsoft Office's light document and online writing effectively promote the paperless office process, from document writing to grading communication, and even paper review and contract signing can be achieved through WPS. Kingsoft Office's teacher "duo-advancement" training system aims to improve teachers' ICT capacity and deeper understanding of the office industry while incorporating the latest technology into the research, teaching, training, and education process. It also provides OER resources on office skills to further reduce the cost of learning. Regarding information security, WPS has put users first, maintaining office data security and privacy compliance by cooperating with several of the world's leading Internet security companies to further enhance the security of user information.

In 2023, Kingsoft Office released WPS AI, an intelligent office application with large language model capability, which is embedded in the four mainstream office components of forms, text, presentation, and PDF to optimize office workflows such as content generation, content understanding, and command operation for users. WPS AI Enterprise edition also comprehends the logic of enterprise documents, helps generate an internal knowledge base, and supports agent-based Q&As of internal information.

In terms of promoting educational equity, the Kingsoft Office actively supports grass-roots education initiatives in many remote areas. It solves the problem of scarcity and quality of educational resources through digitalization. For example, in Yunxi County, Hubei Province, more than 3,000 teachers in the county have successfully realized online collective lesson preparation with the help of WPS 365, and successfully built a rich school-based resource library, including teaching plans, tutoring notes, listening records, teaching reflection, and other conventional teaching materials, as well as high-quality courseware, etc. These resources are carefully classified and stored in the cloud. It enables teachers in the whole town to consult and reuse online anytime and anywhere, forming a community of practice and peer-coaching, which greatly promotes teacher communication and cooperation.

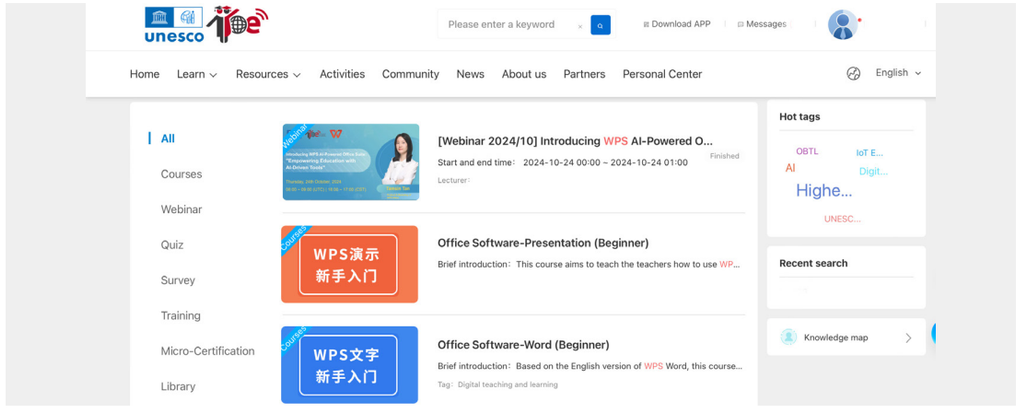
Up to now, Yunxi County Teaching and Research Office has established more than 30 different teaching and research teams on WPS 365, including 5 county-level teams, 18 township teams, 3 master teacher studio teams, and 2 provincial teaching and research teams, which have produced a total of 156,000 team documents and 220,000 personal documents.

Kingsoft Office also launched the WPS 365 education edition to curate a digital technology-integrated "smart campus." For example, Xi 'an Jiaotong University, an institution with a century-old history, realizes intelligent administrative management and logistics operation and maintenance through WPS 365, human resource arranges on vacation management and task progress tracking. The logistics department can provide data-based operation and maintenance suggestions to the university president and leaders to help decision-making. WPS 365 Education Edition also provides a safe document storage and management platform for colleges and universities, which can build an intelligent knowledge base, and teachers and students can quickly obtain campus information by asking AI questions as needed.

Reaching Overseas Market

In terms of overseas business, Kingsoft Office launched the overseas version of WPS AI through cooperation with Amazon Cloud Technology. Based on the Anthropic Claude 3 series model supported by Amazon Bedrock, WPS AI provides users with features including semantic checking, content rewriting, document embellishing, and one-click PPT generation. Since the start of the test, the number of AI-driven overseas products has exceeded 200 million monthly active devices, and AI functions are also loved by overseas users.

Kingsoft Office has long devoted to the field of education and actively promoted the cultivation of college talents through multilateral cooperation between universities and enterprises. For example,



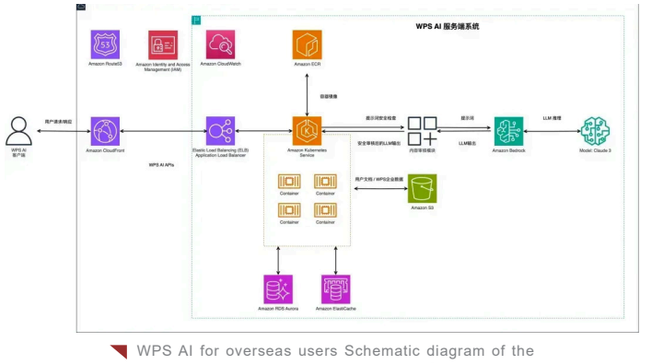
IIOE Courses and Webinar Supported by WPS

the "WPS Skills Online training" activity is sponsored by the Big Data and Artificial Intelligence Professional Committee of the "Belt and Road" and the BRICS Skills Development International Alliance. This public welfare training activity aims to promote WPS to South African institutions, introduce the WPS education training system to overseas users, and lay a solid foundation for future international education exchanges. WPS skills training will also help South African teachers improve their teaching quality and work efficiency, build a bridge of vocational skills education between China and South Africa, foster deeper and more practical cooperation in the internationalization of programs, and promote the integration of enterprise practices in educational training and talent cultivation.

In 2024, Kingsoft Office supported the Southeast Asia Regional High-Level Policy Dialogue 2024 on "Leading the Efficient Integration of Generative AI and Higher Education" organized by the International Centre for Higher Education Innovation under the auspices of UNESCO(UNESCO-ICHEI) in Jakarta, Indonesia, highlighting the responsibility of enterprises to support bridging the digital divide in education. Cooperation with universities and enterprises plays a crucial role in the digital transformation process of higher education. On the IIOE platform of UNESCO-ICHEI, WPS has delivered a series of key training courses benefiting 724 students from 72 countries and regions. With the development of new technologies, WPS will continue to support and serve users in the field of education through webinars, open courses, certificate courses, etc.

Kingsoft Office always adheres to the principles of "technology establishment" and "user-first", realizes scientific and technological independence with research, brings efficiency and reliability with professionalism, realizes win-win cooperation with an open, services-oriented, and user-first approach, strives to become a global leader in office services.

Mr. WANG Jianing, Director of WPS Office Product Ecosystem Partnership, WPS Software PTE. LTD, Spoke at the Policy Dialogue



WPS AI for overseas users Schematic diagram of the product architecture based on Amazon Web Services

03

Digits and Tales

- Expert Insights: 2024 High-Level Regional Policy Dialogue in Central Asia

Expert Insights: **2024 High-Level Regional Policy Dialogue in Central Asia**

On June 24, 2024, the High-Level Regional Policy Dialogue in Central Asia themed "Facilitating GenAI-driven Higher Education Transformation" was successfully held in Tashkent, Uzbekistan. The event brought together more than 220 crucial higher education stakeholders from 14 countries in Central Asia and beyond. The Policy Dialogue was pivotal in fostering constructive exchanges, consolidating promising cases, and providing recommendations to higher education stakeholders in the region and beyond. Furthermore, it supports the creation of relevant policies and action plans for GenAI-driven higher education governance and teaching personnel's professional development at a wide range of levels, including regions, countries, institutions and individual levels.

Dr. Sultanov Djamshid
Vice-Rector for Academic Affairs at TUIT, Uzbekistan

"The policy dialogue offers a space for stakeholders in Central Asia and beyond to exchange valuable insights and explore the integration of AI into higher education. It's time to consider how to pioneer the AI paradigm shift, empowering humans to focus on high-value creations that demand creativity, critical thinking, and emotional intelligence."

Prof. JIN Li
Director of UNESCO-ICHEI, Vice President of Southern University of Science and Technology, China

"The policy dialogue provides multiple stakeholders with a platform to share innovations and form partnerships to shape the future of higher education. We hope institutions and organisations from Central Asia and beyond can become part of the IIOE network and collaborate on the IIOE Micro-Certification Project for Higher Education Workforce Digital Competency Building, addressing the urgent need for upskilling and reskilling teachers and leaders in the GenAI era."

Ms. Sara Noshadi
Director of UNESCO Tashkent Office

"A multifaceted approach and collaborative efforts between stakeholders are needed to address the challenges of AI in higher education, enhancing investment in digital infrastructure, capacity building, and policy development, and fostering a culture of innovation and acceptance across Central Asia."

Mr. Atayev Azat
Deputy Minister of Education of Turkmenistan

"The Ministry of Education of Turkmenistan, in collaboration with the UNESCO Institute for Information Technologies in Education and experts from leading universities in China, has developed and adopted a Cooperation Roadmap for 2024-2025, enhancing the digital transformation of higher education in Turkmenistan."

Mr. Abdullaev Sherzod Shavkatovich
Chief Specialist of the Department of ICT Implementation and Digitalization of the Ministry of Higher Education, Science and Innovation; Secretary of the Advisory Council on AI, Uzbekistan

"It is crucial to recognise the strategic importance and investment needed to develop Large Language Models (LLMs) across the country. Uzbekistan is actively collaborating with international experts to advance its LLM initiatives and promote technological development."

Mr. Borhene Chakroun
Director of Policies and Lifelong Learning Systems Division, UNESCO HQs

"*Global Convention on the Recognition of Qualifications concerning Higher Education* plays a pivotal role in education equity, inclusivity, and lifelong learning. Considering AI's growing influence on higher education, the convention promotes the recognition of qualifications and academic mobility, thus fostering innovation and preparing students for the future job market."

Prof. Dr. Isak Frumin
Head of Observatory of Higher Education Innovations, Constructor University, Germany

“ Institutions need to prioritise the implementation and practical application of new technologies, ensuring effective governance throughout the process. Higher Education Institutions (HEIs) should focus more on seizing opportunities rather than becoming overly concerned with potential risks and challenges. ”

Dr. Mambetakunov Ulanbek Esenbekovich
Former Minister of Education of Kyrgyzstan; Professor at Kyrgyz National University, Kyrgyzstan

“ Kyrgyz HEIs are implementing regional initiatives to introduce AI in higher education. Some institutions have actively promoted the digital transformation of higher education through AI Center, Smart Campus and other programmes, integrating AI technologies in the management of university infrastructure and the educational process. ”

Mr. Makhatov Nursultan
Director of Digitalization Department of the Ministry of Science and Higher Education, Kazakhstan

“ The Ministry has been constructing AI infrastructure and ecosystem through Supercomputer, KazLLM and the National AI Platform. It is significant to enhance national data collection and create an LLM in the Kazakh language to promote intercultural communication, data security, education and research. ”

Ms. Saprykina Anastasia
Head of the Division for the National Technology Initiative Department of Technological Entrepreneurship and Technology Transfer of the Ministry of Science and Higher Education, Russia

“ In Russia, university-industry collaboration plays a crucial role in AI talent cultivation and future employment, as well as synergy from investments in science, education, innovation and management in HEIs' AI strategies. ”

Prof. Elov Botir Boltayevich
Head of Department at Tashkent State University of Uzbek Language and Literature, Uzbekistan

“ The future of AI in education is not just about introducing new technologies; it is about changing our approach to teaching and learning so that it is as dynamic and diverse as the students we serve. Notably, a whole-of-government approach is needed to coordinate the development, agreement and implementation of Generative AI regulations. ”

Ms. SU Rui
Chief of the Knowledge Production and Communication Centre of UNESCO-ICHEI

“ *The White Paper on Higher Education in the Era of Artificial Intelligence* endeavours to explore the current approaches and future directions for the effective use of AI technologies in teaching and learning in higher education, and advocates for the multilateral collaboration of higher education stakeholders to jointly develop educational resources, and capacity building, thereby forming policy recommendations and practical consensus. ”

Mr. Aneel Salman
GDCL-IPRI Chair of Economic Security, Islamabad Policy Research Institute, Pakistan

“ AI has a significant impact on the transformation of education, and there is an urgent need to improve teachers' AI literacy and pedagogical skills. It is also imperative to address data governance and cybersecurity issues and formulate inclusive AI policies in developing countries like Pakistan. ”

Dr. Terentyev Evgeny Andreevich
Director of Institute of Education, Higher School of Economics (HSE), Russia

“ HSE students are actively embracing Generative AI in their learning process. The integration of AI into education has been recognized as the strategic direction for our university's development over the next five years. ”

Prof. Tsatsanashvili Mariam
Director of the Institute for Research on Public Administration at Georgian Technical University

"Georgian HEIs are introducing Generative AI into educational and scientific processes. The responsible use of AI can unleash human potential. It is crucial to foster international partnerships through fundraising and collaboration to enhance AI projects and initiatives."

Ms. Karimova Venera
Associate Professor of Department of System Analysis at Moscow Institute of International Relations (Tashkent branch), Uzbekistan

"The effective integration of AI into higher education can enhance the quality of management, administration, and teaching processes in HEIs. The practical application of AI in executive training can contribute to the creation of innovative educational ecosystems."

Mr. Mahmudov Recep Bayramovich
Head of the Department of Digital Systems and Information Security at the Ministry of Education of Turkmenistan

"Significant progress has been made in education under the National Strategy for Innovative Development of Turkmenistan. Establishing robust ethical guidelines and ensuring accountability, along with enhancing transparency in AI governance, are essential for the responsible use of Generative AI in education."

Ms. Murovana Tatiana
Programme Specialist from UNESCO IITE

"From 2024 to 2026, the second phase of the Joint UNESCO IITE & UNESCO-ICHEI Project, "Digital Transformation of Higher Education in Central Asia", aims to facilitate the effective application of GenAI in higher education teaching, learning, and management in Central Asia and other Russian-speaking countries."

Mr. SIT Fung
Assistant Director of UNESCO-ICHEI

"UNESCO-ICHEI has launched the IIOE "1+X" GenAI course series this year, covering fundamental courses and domains like pedagogy, governance, operation and industries, etc. Meanwhile, the IIOE Micro-Certification Project for Higher Education Workforce Digital Competency Building is making continuous efforts to assist higher education workforces in upskilling and reskilling, which allows HEI partners to co-develop IIOE micro courses, and customise and localise Micro-Certification."

Dr. Normatov Sherbek
Head of Department of Information Library Systems at TUIT, Uzbekistan

"There is significant potential for training teachers in AI with the CreateView Smart Classroom—a collaborative effort between Tashkent University of Information Technologies (TUIT), UNESCO-ICHEI, the Southern University of Science and Technology (SUSTech), and the EdTech company CreateView. It integrates modern electronic devices and software solutions to facilitate and assist in teaching and learning.

Mr. Mehedi Hasan Limon
Vice President of Education & Healthcare of Huawei Middle East and Central Asia Enterprise Business Group

"The AI-empowered Huawei smart education solution includes smart classrooms, campus ICT infrastructure, scientific research, and talent development, which is conducive to accelerating the digital transformation of higher education across the region."

Ms. Alpysbayeva Meirgul
National Education Programme Specialist, UNESCO Almaty Regional Office

"*The UNESCO ICT Competency Framework for Teachers* serves as a comprehensive tool to guide teacher training on the effective use of ICT across the education system. By providing clear guidelines and standards, it supports the professional development of educators, ensuring they are well-equipped to leverage digital tools and resources in their teaching practices."

Prof. LIANG Jiansheng
Former Executive Deputy Director of UNESCO-ICHEI

"The Policy Dialogue is a fertile ground for generating new ideas, fostering cooperation, and exploring future directions in higher education. The IIOE Micro-Certification Project for Higher Education Workforce Digital Competency Building is committed to enhancing the digital competencies and AI literacy of the higher education workforce."

Prof. Rakhmatullaev Marat
Professor of TUIT, Team Leader of Higher Education Reform Experts in Uzbekistan

"The 2024 High-Level Policy Dialogue in Central Asia facilitated cooperation and exchange among multiple stakeholders and strengthened the collective efforts necessary for advancing higher education in the region and beyond."