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Connecting Leaders Online for
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Teaching and Learning with Generative AI

Perspectives from the Guangdong-Hong Kong-Macao Greater Bay Area

CLOUD - Connecting Leaders Online for University Digital Transformation

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As one of the most open and economically dynamic regions in China, the Greater Bay Area continues to generate innovative practices in talent development.



Teaching and Learning with Generative AI: Guangdong–Hong Kong–Macao Greater Bay Area

Introduction

The wave of Artificial Intelligence is lapping at the embankment of higher education with unprecedented vigour. As access to knowledge is no longer a challenge, the traditional teacher-student relationship is undergoing a qualitative change and students can acquire systematic and cutting-edge domain knowledge supported by technological tools.

In this issue of *CLOUD*, the editorial team adopt a local lens to explore innovative practices emerging from the higher education sector in the Greater Bay Area—including Guangdong, Hong Kong, and Macao—where UNESCO-ICHEI is located. These practices reveal a new paradigm of pedagogical relationships shaped by the evolving landscape of education.

The choice of this topic stems from thoughtful consideration across three dimensions.

The first one is the philosophy of education

between breakthrough and establishment. When AI can generate academic papers, write complex codes and even design experimental programmes in a moment, the traditional education model centred on knowledge transfer is facing fundamental challenges. From the emergence of ChatGPT to the iterative upgrading of multimodal big models, generative AI not only reshapes the way of knowledge production and dissemination, but also reconstructs the essential relationship between teaching and learning at a deeper level. As China's science and technology innovation highland, the response strategies of its universities in the Greater Bay Area sets the tone for higher education institutions in the region and beyond.

Secondly, the Greater Bay Area has the quality of being compatible with the local environment. The Greater Bay Area is one of the most open and economically vibrant regions in China, and has historically been a hub for China's access to the sea and international exchanges. Therefore, the Greater Bay Area is constantly developing new practices in terms of economic

modelling, industrial structure, and talent cultivation. For example, the intensity of R&D investment in the Greater Bay Area has reached 3.4%, with a number of science and technology innovation indicators leading the country (Data from China Economic Network). According to the latest data from World Intellectual Property Organization (WIPO: Global Innovation Index 2024), the "Shenzhen-Hong Kong-Guangzhou" technology cluster has been the runner-up in the Global Innovation Index for four consecutive years. In this fertile land for innovation, "AI+" is becoming an innovation engine for promoting regional collaborative innovation and high-quality economic development.

Thirdly, it is in consideration of a return to the basics of human education. In the context of major changes in the industrial structure, economic model and education development in the Greater Bay Area, institutions such as the Southern University of Science and Technology, the Hong Kong University of Science and Technology, the Shenzhen University of Advanced Technology and the City University of Hong Kong continue to make breakthroughs in scientific research, technological innovation, the transformation of scientific research results, and innovation and entrepreneurship.

The practice of school-enterprise cooperation exemplified by BGI Group and BGI College represents a new mode of integration of industry and education in cultivating talents in urgent need. These innovative practices not only break the traditional "teaching and learning" paradigm and give rise to diversified teacher-student relationships, but

also show the perseverance and return to the essence of education, that is "nurturing people".

In the "Focus" chapter, this issue of *CLOUD* presents the new interactions and explores the role of AI technology in these interactions through multiple three-dimensional perspectives, such as the practice layer of institutions and mentors in the Greater Bay Area, and student experience.

Our "Wide Angle" chapter also explores how academic institutions and organizations worldwide are rethinking teacher-student relationships and their needs in the AI era. These international perspectives offer insights for the UNESCO-ICHEI, partners, and readers seeking to navigate this evolving educational landscape.

In the "Frontier" chapter, we spotlight the UNESCO-ICHEI's latest milestones—from freshly published research reports to outcomes from global forums and newly launched IIOE courses. These concrete achievements not only strengthen our connection with readers but also illustrate emerging educational trends through real-world examples.

Let this special issue serve as a catalyst for sparking intellectual creativity through the meeting of minds, and for collaboratively drafting an educational roadmap through meaningful exchange. We are excited to receive your insights and constructive feedback, and warmly invite you to join this pivotal conversation about generative artificial intelligence and the future of higher education!

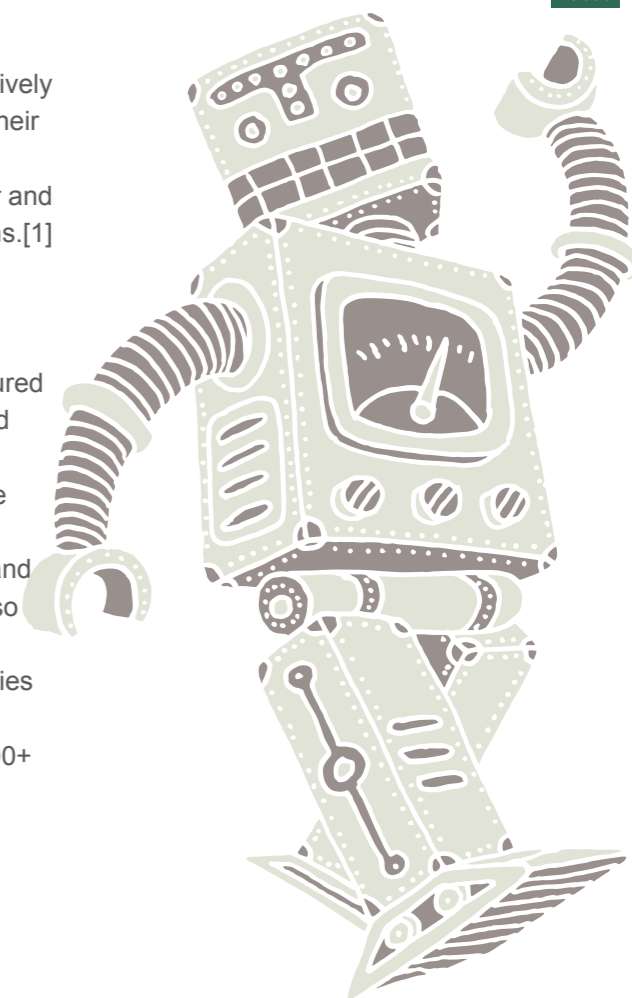
Southern University of Science and Technology – Extending Classrooms to Laboratories: Cultivating Top-tier Innovative Talent Through "Immersive Research"

In March 2025, a team of postgraduate students from the Department of Mechanical and Energy Engineering at Southern University of Science and Technology (SUSTech) published their paper on sodium-

ion battery research. Their findings captured attention when featured in the Science Times, drawing significant industry interest. These substantive research results entered the corporate radar. Looking back at their

development journey, these students actively participated in research projects led by their mentors, which cultivated their research capabilities and helped them to go faster and further in their studies and research paths.[1]

In the spring breeze of China's higher education reform and development, Shenzhen, a city of innovation, has nurtured the pioneering SUSTech. As a young and dynamic research-oriented university, SUSTech integrates the rigour of science and engineering with the vitality of the humanities. With science, engineering, and medicine as its core pillars, SUSTech also fosters the collaborative development of business studies and distinctive humanities and social sciences. As of late 2024, around 5,300+ undergraduates and 6,700+ postgraduates explore innovation and pursue their ideals within its walls[2].



Educational Philosophy and System that Breaks Departmental Barriers

large-scale exploration and practice in cultivating innovative talents for the new era.

SUSTech adheres to a "student-centred growth" educational philosophy, breaking through traditional barriers between departments to construct an integrated system that combines general and specialised courses, education and scientific research, as well as industry and academia. Through the comprehensive implementation of innovative mechanisms such as the **faculty mentorship system**, **residential college system**, and **credit-based curriculum**, the university is conducting

Residential College System

Unlike traditional universities, where majors are determined upon admission, SUSTech has innovatively adopted a residential college system. After enrollment, students are given up to two years to explore and decide on their academic paths. The residential colleges foster a close-knit community among students and mentors,



providing numerous informal learning opportunities that complement formal teaching and coursework. This enriches students' knowledge across diverse fields and broadens their horizons, encouraging their interest in multiple disciplines. Meanwhile, the interaction between faculty members and students from different academic years also plays a vital role in shaping students' overall competence, interpersonal skills, cultural literacy, confidence, and sense of responsibility. [3]

Faculty Mentorship System

Principal Investigator (PI) across teaching and research tracks are allocated to residential colleges following a principle of relative balance, serving as college mentors. These faculty mentors take on the role of shaping students' character development, academic adaptation, course selection guidance, major choices, and life planning. Once students enter their specialised training phases, all undergraduates participate in academic mentors' research projects. This enhances their foundational

research abilities (problem-solving, stress management, and teamwork), professional research skills (scientific hypotheses formation, data analysis), and scholarly growth potential—building a reservoir of strength for their academic careers. Within this unique system, mentors themselves become relatively independent individuals, empowered to spearhead cross-departmental collaborative research.

“
At SUSTech, knowledge is never confined to the classroom—it sparks in the soft glow of lab instruments, flows through intellectual exchanges in a mentor's office, and shines most vividly in the bright, passionate eyes of students deep in late-night conversation in the college halls.



Source: SUSTech News

After the 2023 National Highest Science and Technology Award ceremony, the lights in Academician Qikun XUE's laboratory remained steadily aglow. This scholar—who also holds the roles of President of SUSTech and physicist—continues to cherish a particular "moment of true authority": competing with his students in needle-tip fabrication techniques.

- **Breakthroughs in fundamental scientific research cannot be achieved by planning alone.** They require students to possess focus, curiosity that lifts the fog and a sense of mission to persevere and tackle problems boldly. [4]
- **The mentor's role is to cultivate a scientific spirit in students.**

Qikun XUE once shared:

"Although my students may surpass me in areas such as reading speed, English proficiency, and physics knowledge, it is scientific spirit that I, as a mentor, must focus on cultivating. Only this way can I guide them more effectively.[5]

Faced with significant obstacles or slow progress in experiments, how do we keep students persistent? I believe encouragement is indispensable. We must let them know they're doing well enough. Meanwhile, communication with students is crucial—by analysing problems together and finding solutions, we can overcome difficulties as a team."[6]



Mentors Guiding Students to Continuous Breakthroughs

In April 2025, exciting research news from the Department of Electronic and Electrical Engineering at SUSTech drew campus-wide attention. A team of undergraduate students achieved a breakthrough in their paper *Active Terahertz Nonlocal Metasurfaces With Liquid Crystal Elastomers*. Under faculty guidance, the students took primary responsibility for the project's theoretical research, computation, sample preparation, experimental testing, and data analysis. [7]

This model of research-led education has become a distinctive feature across



“Scientific research is not a solitary pursuit, but a journey of continual struggle with problems—explored together with mentors and peers.”

departments at SUSTech. In the Chemistry Department, for instance, PI Professor Haiping XIA guides students in working with dragon-shaped molecular models—“Carbolog Chemistry” is not only a cutting-edge research topic but also a vivid tool for cultivating scientific thinking. At SUSTech, it is common for students to proactively engage with their mentors in the pursuit of research. Fostering innovation, critical thinking, and interdisciplinary collaboration is a core focus of the Department of Chemistry. Since its founding, SUSTech chemistry undergraduate alumni have contributed to over 150 papers in leading journals, and as first authors in nearly 30 papers. [8]

The innovative residential college system further sparks interdisciplinary synergy. For example, a materials science professor mentors biology students in developing AI diagnostic tools. At SUSTech, faculty evaluation metrics allocate up to 30% weight to “student breakthrough achievements”. As one professor puts it, “Here, authority doesn't come from titles, but from the ability to keep pace with students' intellectual leaps.”

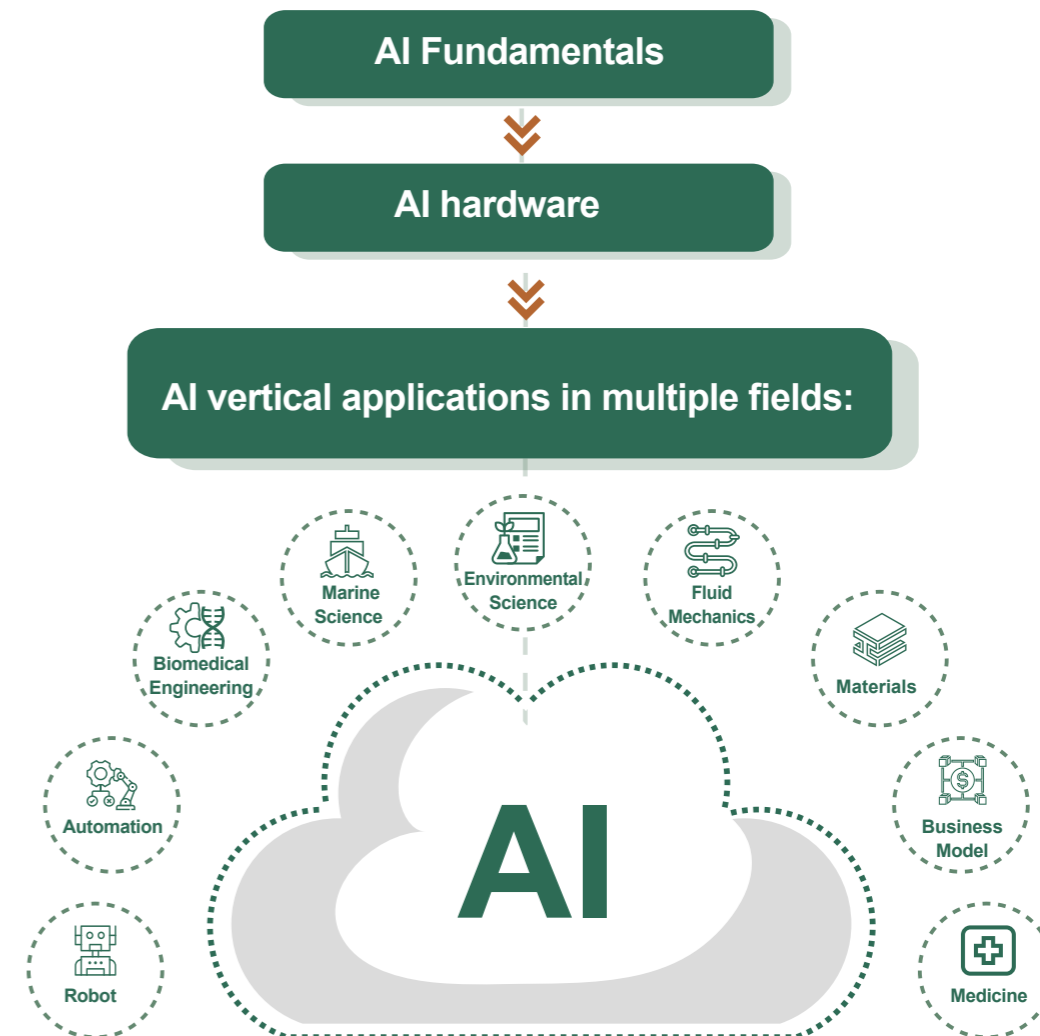
Source: SUSTech News

Beyond solid theoretical grounding, there is heightened focus on developing students' inquiry and innovation skills—equipping them with capabilities in fundamental research, applied research, and science and technology management. At SUSTech, mentors take an interest-driven approach, guiding students break through perceived limits, allowing them to thrive through inquiry-based research.

New Developments in the Age of Artificial Intelligence

Entering the era of artificial intelligence, the relationship between teachers and students in higher education is undergoing profound changes. Against this backdrop, SUSTech has explored its journey in AI education and AI talent cultivation since 2016. After

Curriculum Design Ideas



nearly a decade of development, artificial intelligence education has blossomed across all 28 departments, with over half offering specialised or general courses in AI, machine learning, and deep learning. As AI education continues to deepen, SUSTech has established programmes in Automation, Intelligent Science and Technology, Robotics Engineering, and Data Science—providing diverse development pathways for students with varied interests.

In August 2024, the university officially launched the "Advanced Institute of Artificial Intelligence", integrating existing AI talent and resources while building bridges for deep university-enterprise collaboration. [2]

On 17th February 2025, as the spring semester began, the new general education course Artificial Intelligence and Applications held its first lecture. Aimed at first-year students, the course features collaborative teaching from 14 faculty members from different departments—including statistics, computer science, and microelectronics—covering both the foundational logic and vertical applications of AI. It is designed

to cultivate interdisciplinary thinking and help students understand and apply AI technologies across a wide range of disciplines—nurturing a new generation of innovative talents equipped to meet future societal needs. [9]

From the "faculty mentorship system" to the "residential college system", from "project-based learning" to "immersive research", students' growth is no longer a straight line from classroom to career. Instead, it becomes a multidimensional journey—one deeply intertwined with research and guided by close collaboration with mentors. Here, the traditional barriers between "teaching" and "learning" are continuously broken: those who lecture are also those who ignite the flames of thought; those who seek knowledge in classrooms are equally pioneers in the frontiers of innovation.

This cutting-edge institution demonstrates a fresh educational narrative: It is no longer just about organisational structure, but a shared journey of exploration into the unknown, hand in hand between faculty and students.

The Hong Kong University of Science and Technology —Competitions and Startup Incubators: Developing Young Leaders with Science and Technology talent in the Greater Bay Area

Students of the Hong Kong University of Science and Technology (HKUST) frequently make fun of Clear Water Bay in Sai Kung as a peaceful place where you can study in depth and explore extensively. Over 1800 active startups (as of May, 2025) have been subtly fostered in this pristine

academic land since the establishment of HKUST in 1991. These include nine unicorn companies and thirteen new startups with successful exits (IPO or M&A), as well as industry leaders like DJI, which controls 80% of the global market share, their combined economic value exceeds HK\$400 billion;

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▼ The HKUST-SINO One Million Dollar Entrepreneurship Competition 2024

Pudu Robotics, a unicorn company, designs, develops, manufactures and sells robots in 60 countries and regions; ChargeSpot, the world's largest multinational mobile power sharing platform, has been listed in 2022. With a market share of roughly 80% of the worldwide market, DJI is already a major player. The outcomes of scientific research are quite difficult to implement in the market, caught in the "valley of death" between academia and the business sector, even though many universities focus on encouraging innovation and entrepreneurship. This raises the question of what HKUST'S beliefs and procedures are that help students and graduates avoid these "valleys of death"?

Startups Grow Up in a Project— One Million Dollar Entrepreneurship Competition Becomes an Incubator

Preparing individuals to work and prosper in the future society is one of the main

challenges of higher education. Globally, some universities are dedicated to producing professionals who can "adapt to the workplace," while others seek to produce trailblazing entrepreneurs who can "open up new horizons." With its advanced exploration of curriculum, institutional setup, student support, and other areas, HKUST is unquestionably in the latter group. Professor Yike GUO, the Principal Vice-President and Chair Professor of Computer Science and Engineering at HKUST, stated in an interview that HKUST has successfully incubated 10 unicorns and ranked second in China in terms of incubation capacity of Shenzhen technology unicorns by New Fortune in 2022, with the three unicorns having a total valuation of RMB 233.35 billion. As of early 2024, one-third of HKUST's patents have been licensed to third parties, a licensing ratio comparable to that of the world's top research institutions.

The entrepreneurial ecosystem is meticulously responsible for this accomplishment.

"One Million Dollar Entrepreneurship Competition" has produced a large number of unicorns and startups. Established in 2011 at the Clear Water Bay campus in Hong Kong, the competition is an independent brand of the HKUST. Since 2016, it has spread to several mainland cities, including Shenzhen, and has drawn over 1,000 teams annually, nurturing many teams with business prospects. Industry leaders like DJI, EcoFlow, and NARWAL have all started their first step on this stage. **HKUST continues to connect entrepreneurial projects with resources like industry, capital, technology, and talent** in order to create the next commercially viable enterprise.

Such entrepreneurship competitions are known for their 'realism'. Students and entrepreneurs are constantly encouraged to find solutions on their own, while the institutions take the responsibility to build a platform by bringing together resources from all aspects to support entrepreneurs continuously. In addition to encouraging students to make technological advancements, schools and mentors are shedding their traditional roles as teachers and taking on the roles of "angel investors" and "entrepreneurial guides." They also help students' entrepreneurial ideas become viable businesses that can generate revenue through proof-of-concepts, vertical thematic incubation, and accelerators. From knowledge transfer to 'venture capitalists' and connecting the dots, the core competencies that schools and professors are looking for in their students are more like the **emotions and mindset that successful**

entrepreneurs should have, whether they have a big goal, whether they are able to gather a group of people, and whether they are brave enough to take risks. [5]





The New Engineering's Educational Philosophy: A "Testing Ground" for individual Growth

The 'Godfather' of DJI, Professor Zexiang Li, is a professor at the Department of Electrical and Computer Engineering of HKUST, a business mentor, and a successful entrepreneur. As early as 1999, when he taught at HKUST, he founded Google Technology, which provides leading motion control products for the interconnected smart manufacturing sector. It was this entrepreneurial experience that gave him an insight into an educational dilemma: students trained in traditional engineering disciplines are often eager to go to Silicon Valley or Wall Street, but are not interested in industrial innovation. On the contrary, what is scarce in the market is those talents who have both innovation ability and practical wisdom, and who dare to create new value with technology. Therefore, LI Zexiang began to look for a new paradigm of engineering education that better meets the needs of industry, which was later condensed into 'New Engineering' education. The core of 'New Engineering' education is to cultivate

'people who can use technology to create new things'. Behind this concept lies a profound knowledge of the laws of economic development. Development relying solely on demographic dividends is facing the challenge of change, and the only way to support the next stage of economic growth is to rely on scientific and technological innovation to reform traditional industries and transform them. [6]

LI Zexiang once explained his education philosophy - to become 'people who create new things with technology', entrepreneurs not only need to have market insights, through market research and design thinking to discover products and verify hypotheses but also need to have the wisdom of integration, to melt technology, supply chain and other elements into product prototypes, supply chain and other elements into product prototypes. The process of creating user-oriented C-end products is an important part of the new engineering education. Based on project-based learning, students are trained to discover market demand, define products, integrate supply chain resources, and carry out product development. This industry-based engineering training model is more like the 'Big Field Model', in which students are regarded as seeds of entrepreneurship,

and entrepreneurial practice is compared to a test field, where the growth cycle of entrepreneurship is monitored, and irrigation, fertilization, pest control, and weeding are carried out at the right time. 'We cooperate with schools to carry out new engineering education, start selecting entrepreneurial talents from freshman year or even earlier, interact with entrepreneurs in depth, take them to internships in startup companies, participate in all kinds of exhibitions, inspire them to discover business opportunities and put them into practice, and participate in their entrepreneurial process in depth, to help them grow up from zero.' To a certain extent, this also reflects Professor Li's philosophy of cultivating top-notch talents - to create fertile soil for innovation, so that outstanding talents can grow naturally. In this carefully plowed 'experimental field', breakthrough innovative talents will eventually achieve their goals and succeed. [7]



Inspired by the comparative study of Silicon Valley and the Guangdong-Hong Kong-Macao Greater Bay Area by Woo Chia-Wei, President of HKUST's School of Creativity, Professor Zexiang Li pointed out that the Greater Bay Area's regional integration and complete industrial chain have enabled it to demonstrate unparalleled competitiveness in the field of hardware entrepreneurship. The speed of products from design, R&D to mass production is ten times that of Silicon Valley, while the cost is one-tenth of Silicon Valley. This amazing efficiency advantage is vividly evidenced on the Kickstarter enterprise crowdfunding website - companies that make good use of the supply chain in the Guangdong, Hong Kong and Macao Greater

Bay Area are able to deliver their products, while the success rate outside the Greater Bay Area is only 25 per cent. [8]

AI is more than technology, it's a cross-border mindset

In the face of the artificial intelligence era, HKUST has once again shown its wisdom by operating schools with strong industry ties and establishing industrial AI research centers in a variety of industries and fields, including AI for Fashion, AI for Sustainability, AI and Entrepreneurship, Art and Machine Creativity, etc. It is dedicated to using technology as the foundation to solve potential future societal issues [9]. The most immediate impact about AI on the education sector is the change in the accumulation way of knowledge. "Teach people to interact with intelligent machines to learn more quickly. Guo Yike, chief vice president of HKUST and

director of the Hong Kong GAI Research and Development Centre, emphasised that AI talent training should be based on the belief that "excellent students out of the master professor," that AI is the world of the young, and that "a lot of things are students teach me." "This change is bound to happen," he said. [10]

HKUST is changing university education from "imparting knowledge" to "activating creativity" through the encouragement of entrepreneurship events, the close integration of industry, academia, and research, and the full-cycle support of mentors. In addition to serving as narrators, professors now serve as "coaches," "investors," and "partners" for students as they pursue entrepreneurship. In practice, HKUST has interpreted the Book of Rites' assertion that "teaching and learning are mutually reinforcing" as follows: cooperation, trust, and overcoming challenges are used to rebuild the boundaries between teaching and learning.

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Beyond teaching, professors now coach, invest in, and partner with student entrepreneurs.

City University of Hong Kong – Students' Angel Investors – HK Tech 300 Inspires Youth Innovation



Silicon Valley, Shenzhen, Hong Kong, and Singapore are the four cities with unique characteristics in the world map of technology and innovation. Stanford University, located in Silicon Valley, has not only nurtured many Nobel Prize winners but is also good at transforming research breakthroughs in the laboratory into market-recognised products, thus incubating many unicorn enterprises. Singapore, on the other hand, is known for its rigorous academic tradition and has been steadily promoting industrialisation under the premise of ensuring the quality of scientific research. Shenzhen has shifted its path,

with its technology manufacturing industry developing much faster than R&D at local institutions, thus attracting many China's top-ranked institutions to set up research institutes and reach out to the industry. [1]

Hong Kong and the City University of Hong Kong (CityUHK) are working in tandem to attract talent, conduct industrial research, and efficiently utilise the advantages of their location to realise the industrial transformation of university achievements. As Professor Freddy Boey, President of the CityUHK, said in an interview with Xinhuanet, "We need to change the model of the

CityUHK to work closely with companies to move faster from basic research to industrial practice. I hope that in the next ten years, CityUHK will build such a platform, so that young people will not only dare to innovate, but also have the ability to start up startups, forming an entrepreneurial ecosystem of 1,000 people. At the same time, we will also strengthen cooperation with overseas universities to establish a 'high-speed corridor' connecting Hong Kong with the world, and then radiating from Hong Kong to the Mainland." Such a unique vision and perspective has brought CityUHK a different model of nurturing in the Greater Bay Area. [2]

Fostering Innovative and Entrepreneurial Talents

A "passionate inventor", Professor Freddy Boey's career has been characterised by a dedication to turning Deep-Technology into practical applications. From cardiovascular therapies to surgical transplants, he has not only founded companies to commercialise his technologies but has also contributed to the advancement of research and competitiveness of the materials engineering discipline during his tenure at the National University of Singapore (NUS). During his tenure at NUS, he has brought about a quantum leap in the level of research and competitiveness of the Materials Engineering discipline. Since joining the CityUHK, he has promoted the Master of Science in Venture Creation programme, the establishment of



CityUHK Academy of Innovation, CityUHK Institute of Digital Medicine, as well as Hong Kong Institute of AI for Science, which focuses on research and work in the area of "AI for science". He firmly believes that "Hong Kong needs a large number of start-ups, and even though most of them may fail, the successful few will provide well-paying jobs for Hong Kong's local young people and mainland students."

Instead of focusing on producing a few unicorns or turning a profit, universities encourage R&D locally and assist the establishment of businesses in order to create a virtuous cycle of talent development. **The foundation of a sustainable R&D ecosystem, which is essential to the steady development of a nation or city, can be established over ten years by nurturing 50 to 60 young entrepreneurs annually.**

The quest to realise this vision begins in 2021. "HK Tech 300" is a CityUHK-organised entrepreneurship programme that offers funding, networking, platforms, and research assistance at five distinct stages of project maturity, namely, free team formation, training, seeding, nurturing, and development. Deacon, the founder of GABES, a smart fire emergency response system, acknowledges that the founding team, mostly made up of school students, benefited from the seed funding and angel investment provided by CityUHK, which accelerated the product development and application, and successfully launched the product overseas with the support of the university. [3] Taking Vitargent (International) Biotechnology Limited (Vitargent), a recipient of CityUHK funding, as an example, the company is a pioneer in the field of chronic and acute toxicity testing technology by utilising CityUHK-authorized "transgenic medaka fish" and "zebrafish" embryos. Its clients include global major cosmetics and skincare companies, food companies, leading testing laboratories and government departments. Since 2021, the "HK Tech 300" programme has trained over 1800 aspiring entrepreneurs and incubated more than 740 start-up projects, of which over 190 start-up companies have received up to HK\$1 million from angel funds or venture capital investment.

According to CityUHK's *Strategic Plan 2025-30: Innovating into the Future*, CityUHK will place greater emphasis on transforming the campus into a dynamic Sandbox - setting themes oriented towards solving social problems, providing students with ample exploration environment and development space, and better supporting the germination



Classroom scene of CityUHK

and growth of students' ideas. Through the establishment of interdisciplinary research institutions and leveraging the university's sandbox function, students can drive the transformation of individuality in areas such as digital health, artificial intelligence, and materials science.[4]

The Focus of Educational Philosophy is "Discovery"

Successful entrepreneurship often starts with a keen insight into market demands

Recruitment and Training

Information sessions and networking events are organised to support the formation of project teams. All eligible participants will receive funding to attend the training courses.



Nurturing

Participants will learn to prepare business plan pitches, manage intellectual property licensing, and develop minimum viable products (MVPs). Selected project teams may receive angel funding to support the development and validation of their business models.



Seeding

Each selected project team will receive seed funding to help turn their ideas into start-up ventures.



Development

Startups that successfully apply for additional external funding (e.g., from ITC, HKSTP, and Cyberport) may receive further financial support to develop into innovative technology companies.



or a deep understanding of the issues that need to be resolved.. CityUHK's education reform is centred on its Discovery-Enriched Curriculum (DEC). Whether in the arts, sciences, or law, the programme encourages creative inquiry into the educational process. In the School of Law, for example, students not only refine their critical thinking, but also gain practical wisdom through diverse learning opportunities, including independent research projects, editing law reviews, and practice internships. With the help of this discovery-based learning approach, students can develop innovative solutions to real-world problems. When such a teaching model and entrepreneurship stir each other, students are endowed with more vigour and richer resource support; and this self-driven sense of achievement is like an unquenchable flame that ignites students' motivation for self-development.

The Academy for Innovation, established in 2024, is an integrated college program spanning the undergraduate, master's, and doctoral levels. This Academy aims to better assist students in understanding the business environment and business practices, excelling "discovery" beyond flashes of ideas but to take root and transform into practical business applications. Professor YANG Michael, the senior vice president of City University of Hong Kong, stated, "With the joint efforts of the government, industry, academia, research, and investment, innovative ideas can be transformed into practical applications, providing innovative solutions to global issues and promoting social development." Professor YANG also encouraged students, saying that the courses of the Academy for Innovation are an important step in launching students' entrepreneurial and innovative



HK TECH300

journeys. Student from the inaugural class, WU Haoxian, believes that in his current blockchain technology startup venture, he has discovered new opportunities, but he urgently needs to link with various sectors and stakeholders, in order to implement his ideas, and improve his business capabilities. [5]

Additionally, CityUHK intends to establish an "IP Trading Platform", which will provide convenience and inject new vitality into the alumni resource network. The platform is not only committed to promoting the application of patent results, but also aims to cultivate students' ability to explore solutions to problems independently. In addition to research and development, students are given more freedom to identify problems that have commercial value, integrate resources, and collaborate with groups of CityUHK professors and PhD students to create development opportunities that can be implemented in reality.[6]

Building Science-Technology Models in the Greater Bay Area: A Two-Way Integration of the Hong Kong Model and Dongguan's Advanced Laboratory

In April 2024, CityUHK brought regional resonance into a new chapter under the leadership of Vice-President (Mainland Strategy) and Executive President of City UHK (Dongguan), Chun LU, who formally set up a collaborative institution with the Mainland on the shores of Songshan Lake in Dongguan, bringing closer the distance between cities and industries.

Songshan Lake Science City, as an early start-up area for a comprehensive national science centre in the Guangdong-Hong Kong-Macao Greater Bay Area, has brought

together several national scientific research infrastructures, including the Songshan Lake Materials Laboratory, the Southern Light Source Research and Testing Platform, and the Advanced Arrhythmic Second Laser, over the past year, and formed an ecology of synergistic innovation among large scientific devices, new research and development institutes, and hi-tech enterprises. The cities in the Greater Bay Area have well-developed industrial chains and strong industrial clusters, which can provide application scenarios for the transformation of scientific research results, and the advantageous resources of the two places complement each other and converge the elements of innovation. CityUHK (Dongguan) uses the faculty and training model of CityUHK's main campus to lead students from the Greater Bay Area and the Mainland to join the team of creating value for society and to link entrepreneurial forces, HK Tech 300, and industrial chains across the region in the era of accelerated development of AI.

This is precisely what LU Chun of the CityUHK (Dongguan) thinks: internationalised education is about

developing future talents with a global perspective and cross-cultural communication skills, not just about bringing in foreign faculty and students. "By using an innovative educational model, we hope to improve students' international competitiveness and help them comprehend the various academic and cultural backgrounds throughout the world. By collaborating with top international universities and businesses, CityUHK (Dongguan) will play a significant part in this process by giving students additional chances for research, internships, and academic exchanges." [7][8] CityUHK is extending its influence and capabilities through the Dongguan Campus, further solidifying its presence in the Greater Bay Area and beyond. By establishing the Institute of Digital Medicine (IDM), excel research excellence through RAISE+ Scheme Funding (Research, Academic, and Industry Sectors One-plus Scheme), CityUHK further demonstrates global impact, forge strategic partnerships, and addresses societal challenges through collaborative innovation and research for the future society. [4]

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Shenzhen University of Advanced Technology — Vertical Innovation and Research Transformation: Unlocks the Practical Code of “Integrating Research and Education, Bridging Industry and Academia”

In Shenzhen, “industrialisation” is a deeply embedded demand in both research and education. In the future, high-tech enterprises that successfully commercialise research outcomes will become major profit-generating forces in the market. Universities and research institutions with Shenzhen’s distinctive “industrial DNA” will serve as the core “factories” producing such enterprises, while also supplying talents for cutting-edge interdisciplinary innovation.

At a scientific research conference in April 2025, Shenzhen University of Advanced Technology (SUAT)—a university initiated in 2018 and officially established in 2024—showcased six cutting-edge innovations in the field of artificial intelligence during the inauguration of its “AI+Industry Innovation Centre”. These breakthroughs spanned areas such as large-scale models,

multimodal data integration, and intelligent hardware, sparking keen interest from industry investors. What makes this new research-oriented university unique? How does it manage to swiftly translate scientific research into practical applications and nurture future-oriented talent through the integration of science, education, and industry? [1]



when something is missing in the chain, we conduct research to fill that gap,” said Jianping FAN, President of SUAT. “At the same time, we continue to explore new strategies to address bottlenecks and pain points in industry, deepening the integration of innovation and industry chains. Our growth is symbiotic with the city of Shenzhen.”[2]

completed China's first 3T human magnetic resonance imaging (MRI) system after years of joint research—marking a significant breakthrough in the development of high-end medical equipment. [3]

In 2022, even during its preparatory phase, SUAT had already achieved impressive results. Shanghai United Imaging Healthcare Co., Ltd., in collaboration with SIAT,

“From theoretical prototyping to product validation, and finally applying the technology to MRI systems for real-world clinical use, the process required years of refinement,” shared Chao ZOU, a member of the project team. [4] The project began in 2009, and many team members joined

From Laboratory to Production Line: Building a Complete Innovation Ecosystem

SUAT was founded with a unique background. Backed by top-tier research institutions such as the Shenzhen Institutes of Advanced Technology (SIAT) under the Chinese Academy of Sciences, the university is committed to constructing a full-cycle innovation ecosystem that spans basic research, technological breakthroughs, industrialisation of results, tech finance, and talent development—deeply integrating science, industry, and education.

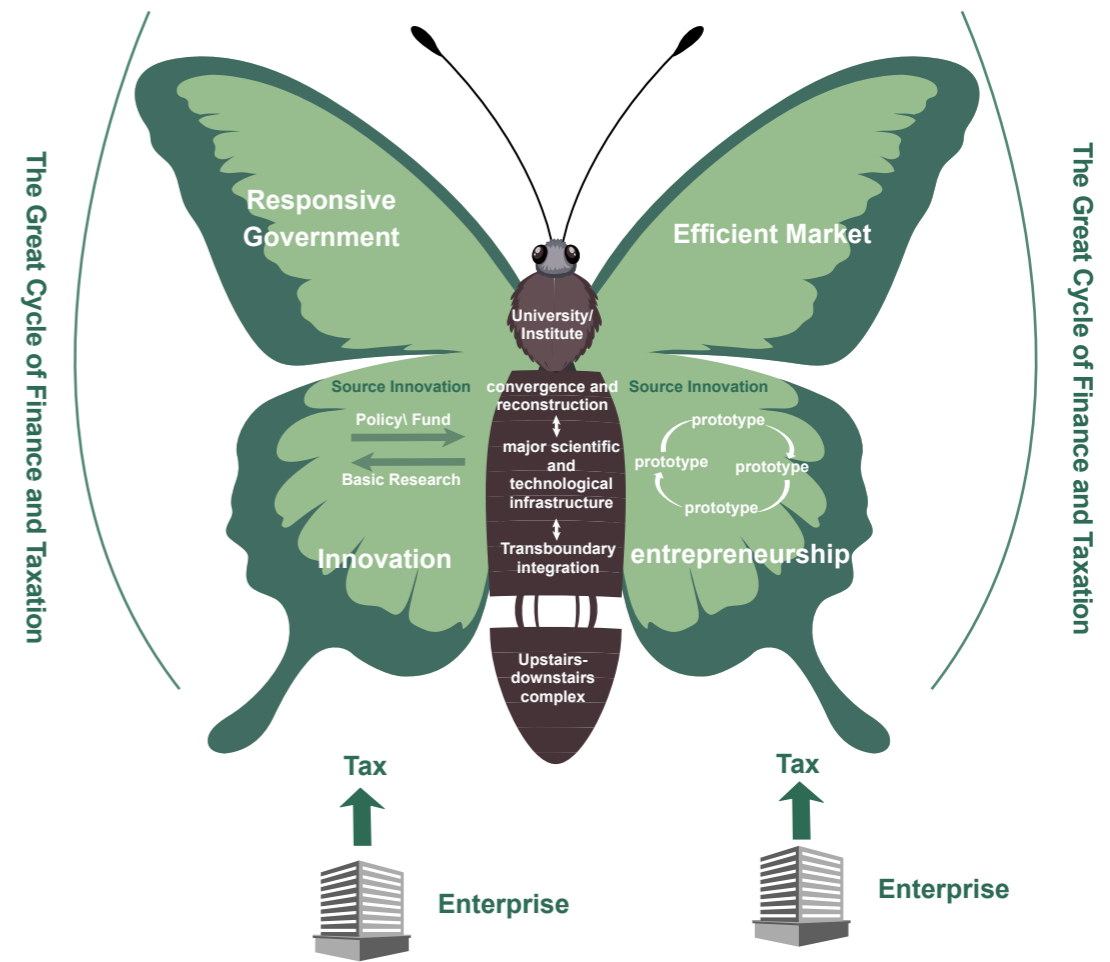
of Synthetic Biology, co-established with the National Centre of Innovation for Biomanufacturing, is dedicated to translating synthetic biology research into market-ready applications, serving sectors such as biopharmaceuticals and green manufacturing.

“Innovation is constantly driven by the evolving demands of industrial chains—

By developing platforms such as proof-of-concept, pilot-scale testing, and industry innovation centres, SUAT accelerates the transformation of scientific achievements, ensuring that innovation doesn't stop at the lab bench. For instance, the Faculty



Innovation Dynamics System



the "Butterfly Model" at SUAT

as master's or doctoral students — or fresh graduates — and have since grown into nationally recognised talents.

In the medical field—where research rigour and industrial collaboration are paramount—students and early-career researchers gained hands-on experience tackling urgent industry needs. This project resulted in over 500 patents, with more than 40% patents successfully commercialised.

This innovative model in the field of medical devices is called the “Butterfly Model” by SUAT. It involves collaborative innovation among SUAT, SIAT, national technology innovation centres, and other stakeholders to build a robust innovation ecosystem. Research institutes and universities serve as the “nerve centre”, equipment and open platforms act as the “butterfly body” supporting the development of enterprises, national technology innovation centres

and industrial parks play an innovative role as the “butterfly tail”, and the market and policy environment act as the “butterfly wings”, achieving the “metamorphosis” from scientific research to industry. [5]

Talent Development Rooted in Original Innovation

The innovation path of SUAT is driven by deep integration with industry and interdisciplinary collaboration. Students grow into researchers through hands-on projects, with teaching based on real-world industrial challenges and research anchored in practical value. [2]

At the same time, many industry-driven disciplines are inherently cross-disciplinary. SUAT adopts a flexible “academia–



engineering–entrepreneurship” model, which not only provides freedom for the growth of talents, but also sets the cultivation goals for versatile talents.

SUAT encourages joint laboratories and collaborative projects with industry, alongside incubation mechanisms and industrial park development. SUAT champions a “no science–engineering divide” philosophy—blurring traditional STEM boundaries and empowering students to tackle problems through cross-disciplinary thinking and frontier innovation.

According to Academician Yi PAN from the Faculty of Computer Science and Control Engineering at SUAT, the faculty aims to cultivate AI professionals equipped with solid subject expertise. Guided by the concept of “knowledge empowerment”, “the Faculty seeks to embed disciplinary knowledge into large models, creating meaningful intersections between academic fields and artificial intelligence[6]”.

Meanwhile, Professor Jinlin TANG, Head of the Department of Computational Biology and Medical Big Data, emphasises that in today’s computer-driven era, students must possess a spirit of inquiry and the courage to question assumptions. They are encouraged to think critically and solve problems independently. University lecturers, he notes, serve as the paving stones—leading, guiding, and passing on not only professional knowledge but also the resilience and spirit that transcend disciplines [7].

Talent Development Rooted in Original Innovation

Recently, SUAT has started the recruitment for undergraduate student for the class of 2029. In line with the era of AI, Prof. Fan Jianping and Professor WANG Song from the Faculty of Computer Science and Control Engineering expressed their future



visions respectively. FAN Jianping, in an interview with the Shenzhen TV Bay Area Living Room program, stated that SUAT is accelerating its support for students to fully their potential and interests for their future aspiration, whether it is in research, industry, or entrepreneurship, in order to cultivate scientists and innovative entrepreneurs that devotes to national strategies and their local community. Mr. WANG Song introduced that in the era AI technology, emerging industries has vast opportunities for new jobs; however, the field of AI is also developing rapidly and constantly changing, and require practitioners to learn on-the-go, with the

latest knowledge in order to stand firm in the fierce competition. "We cannot diminish the momentum of exploration of young people, including their curiosity and creativity. Teachers cannot use their own experience to limit students' horizons and thinking." Students have the freedom and flexibility of course settings and sufficient opportunities for exploration in the campus environment, as well as high-quality research and course resources. Through autonomous learning and exploration, they can better pursue excellence according to their own interests. [8]

BGI College - A Frontier Institute for Industry-Education Integration: Shaping Life Science Talents in Practice

Can life adapt to environments more extreme than the fourth pole?

Can we map all types of rice germplasm resources worldwide?

Can carbon-based life be counted in one table like the periodic table of elements, and can biological intelligence be explored?

As an organisation with profound accumulation in the field of genomics, BGI Group and BGI College are leading scientists, industries, and talents to the peak in the life science field. As an emerging field, life science data and research intelligence still require a large number of highly educated professionals, and BGI College has explored a unique way to acquire these talents.

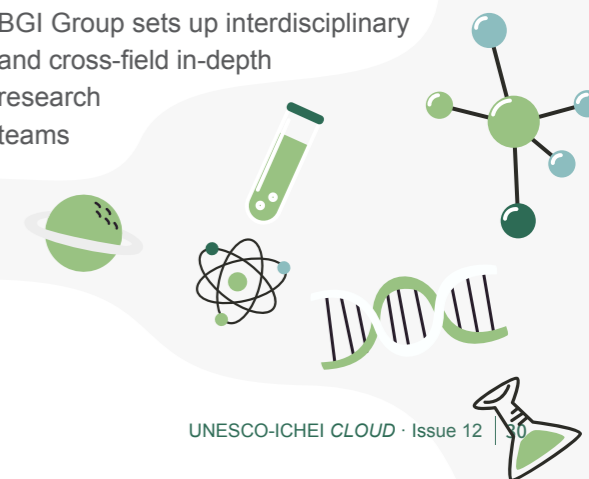
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Cultivating Interdisciplinary Capabilities Based on Big Science Problems

Starting from the fundamental questions and needs of life sciences, BGI Group sets up interdisciplinary and cross-field in-depth research teams





BGI Group and BGI College have formed an innovative talent training model in line with the development of genomic science, and continuously deliver top-notch talents who bridge scientific research and industrial transformation. Since 2009, BGI College has started the mode of joint undergraduate training with universities. Through more than ten years of efforts, BGI College has established a "3+1+X" integrated talent system, bridging undergraduate, master's, and doctoral education with over 60 universities in China. This system introduces students who have completed three years of undergraduate studies to the forefront laboratories of genomic research and cultivates high-level innovative talents in the process of scientific innovation. It also enables students to acquire the ability to master cutting-edge science in industrial resources

Jin Xin, a representative of the inaugural class of the Innovation Class of South China University of Technology, greatly benefited from the program. In 2014, at the age of 27, he achieved "triumph" by publishing in all three top-tier journals of CNS (Cell, Nature, and Science). He pointed out that although traditional university education has a comprehensive system for learning, it in way constrains the flexibility for cross-disciplinary study. Particularly in the rapidly developing emerging fields like bioinformatics, university teaching sometimes struggles to keep up with the pace of technological iteration. In contrast, BGI College, with its unique advantage of "deep integration of industry, research and education", not only has a strong fundamental research team, but also has established an efficient transformation chain from research to application. This model enables the latest research results to be quickly integrated into teaching practice, allowing students to access and master cutting-edge technologies in the industry at the earliest possible time.

to promote collaborative research. At the same time, BGI attaches great importance to the independent construction of basic research instruments and equipment and other underlying tools and organises large-scale teams to make focused breakthroughs and efficiently achieve high-quality research results. In terms of talent cultivation mode, BGI supports selected undergraduates to participate in high-level scientific research at an early stage and achieve high-level scientific research results.

New Horizons'[1][2], Lewis Lusuwi, a BGI Group engineer from Zimbabwe, shared that while thalassemia is difficult to treat, it can be prevented and controlled. Through genetic testing technology, thalassemia can be prevented at the source. Through nearly 20 years of efforts in talent, scientific research accumulation and industrial accumulation, BGI Genomics, a subsidiary of BGI Group, has been able to tackle the automated detection of thalassemia through underlying innovations and has now completed thalassemia genetic testing for more than 1.74 million people.

BGI Group is headquartered in Yantian District, Shenzhen. In Southern China, especially in Guangdong and the Greater Bay Area, there are around 30 million people who carry the thalassemia gene. In the documentary film 'China Next, the Bridge to

The work behind this could not be done without a highly educated team with both precision medicine and smart manufacturing capabilities. Relying on this vision, the



and research paradigms, and continuously expand the team for frontier research in life sciences.

Xu Xun, Chief Scientist of BGI Group, said, "BGI's strength is not to do pure business, but to construct a complete and stable ecosystem. From the perspective of constructing an entire ecosystem, our vision is that whichever pillar is missing in the system, we will fill it." From the perspective of industry development, genetic disease research is unsustainable without the accumulation of a large range of samples and the support of a large number of talents.[3]

Competency-based Certifications for the Job Position

If the goal of higher education is to cultivate talents who can be competent in the industry, in the exploration and practice of BGI College, the "Competence-based Certifications for the Job Position" model can be said to be a flexible mechanism to break through the boundaries of institutions. Relying on the powerful scientific research platforms, major scientific research projects and rich scientific research resources of BGI Group, BGI College carries out innovative joint education and advocates the innovative education concept of "bringing disciplines, industries, and talents with projects". After years of exploration and practice, BGI College has formed a special education system and an innovative talent cultivation model in line with the development of genomic science and cultivated a large number of top-notch talents throughout the entire process of science and industry, thus accumulating a strong reserve force for the development of the life science industry.

BGI College adopts project-driven teaching in the training of talents from universities and research institutes, embedding real industry and research topics, and regularly updating teaching cases to

ensure that the course content is in sync with the cutting edge of the industry. Taking industrial employment needs as a guide, certificate courses for positions in the upstream, midstream and downstream of the gene technology industry, such as genetic sequencing engineers, bio-intelligent computing engineers, genetic data analysts and genetic counsellors, have been set up. Students or learners who wish to upgrade their skills will be able to obtain a certification issued by BGI College after passing the assessment, thus enhancing their competitiveness in employment. Entering the era of artificial intelligence, BGI College has further joined hands with the University of Chinese Academy of Sciences and other organisations to set up cross-disciplinary directions such as 'Artificial Intelligence + Life Science' and 'Artificial Intelligence + Agriculture', and strive to crack the bottleneck of talent cultivation between industry and higher education to cultivate composite innovative talents for the future technological breakthroughs. BGI College is striving to break the bottleneck between industry and higher education in talent cultivation, and to cultivate composite innovative talents for future technological breakthroughs.

Although BGI College is not an educational institution in the traditional sense, it has



opened up an innovative path in the field of talent cultivation with its global cutting-edge technology strength. BGI transforms the concept of project-based learning into a solid practice in the education field, honing students' ability to solve practical problems.

This innovation is reflected in multiple dimensions: in terms of training mechanism, BGI collaborates with institutions in the Greater Bay Area and around the world





and Serbia, and has trained a total of 232 undergraduate and graduate students from overseas. Under the two-way path of "bringing in" and "going out", BGI College has built an extensive global talent network. This kind of transnational cooperation breaks the traditional boundaries of institutions and disciplinary barriers and makes "teaching" and "learning" more globally resilient and open. This model not only meets the needs of industrial development, but also provides a useful reference for talent cultivation in higher education. [4]

According to Maryame Lamsisi from the Pasteur Institute of Morocco, this training experience not only established a solid foundation in genomic technologies and advanced experimental techniques, but also equipped her with systematic thinking in disease surveillance and prevention.

to implement a "dual mentorship system", whereby institutional mentors ensure academic standards and corporate mentors lead cutting-edge innovation and practice. More than 50 per cent of the students participating in the joint training programme choose to pursue a doctoral degree; more than 30 per cent of them stay at the BGI after graduation for further studies or employment, and at the same time, they also send high-quality talents to their own industries and fields. In terms of international collaboration, taking Serbia as an example, the BGI-Research Serbia Team has not only expanded its research team and strength, but also built a strong beam for the exchange of Chinese and Serbian students since the launch of the Stereo-seq technology research in 2022. As of 2024, BGI College has established educational cooperation with 17 universities in 11 countries and regions, including Denmark, Poland, Thailand,



public health strategies, this learning experience has provided me with the professional capabilities to address future health challenges," she stated. Abdelrahman Amir from Alexandria University in Egypt was deeply impressed by BGI's spirit of knowledge sharing. "Here, I witnessed how research institutions transmit the wisdom accumulated over many years," he remarked. What he particularly treasures is the practical knowledge of perennial rice and sand-to-soil transformation technologies, which he will take back to Egypt and may bring new possibilities for sustainable agricultural development in the Middle East and Africa.

Facing the era of artificial intelligence, BGI College is playing a more active role in the industry and exerting cutting-edge influence, collaborating with institutions such as the School of Artificial Intelligence of the University of Chinese Academy of Sciences, and exploring the trends and possibilities of AI+BT (Artificial Intelligence plus Biotechnology), contributing its wisdom and

strength to the cause of life and health. This exploration is being extended to a broader international arena. In collaboration with the International Centre for Higher Education Innovation under the auspices of UNESCO, BGI College will launch micro-certificate programmes in AI+BT, AI+Agriculture and other areas on the International Institute of Online Education (IIOE) Open Digital Learning Platform, to support universities, educators and students in the Global South to master cutting-edge developments in the life sciences. Through the international cooperation model of "joint construction of research platforms + joint talent training + technology and industry transformation", learning deepens research and accelerates production. What BGI College is exploring is not only a new model for talent cultivation, but also a systematic project that integrates education, research and industry. It puts students in the loop of the real world, so that 'learning' is not only about grades and papers, but also about producing value, connecting with society and serving the future.

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Bridging Cognitive Gaps Toward Co-Development: Pathways for Teacher–Student Collaboration in the Age of AI as Identified in the DEC Report

Initiated by SuperCharger Ventures, the world’s largest EdTech accelerator, and supported by nearly 80 leading universities, the Digital Education Council (DEC) is a global community committed to driving sustainable innovation and AI adoption in higher education and workforce development. DEC brings together the diverse perspectives, knowledge, and experiences of its international member institutions to support the transformation of education.

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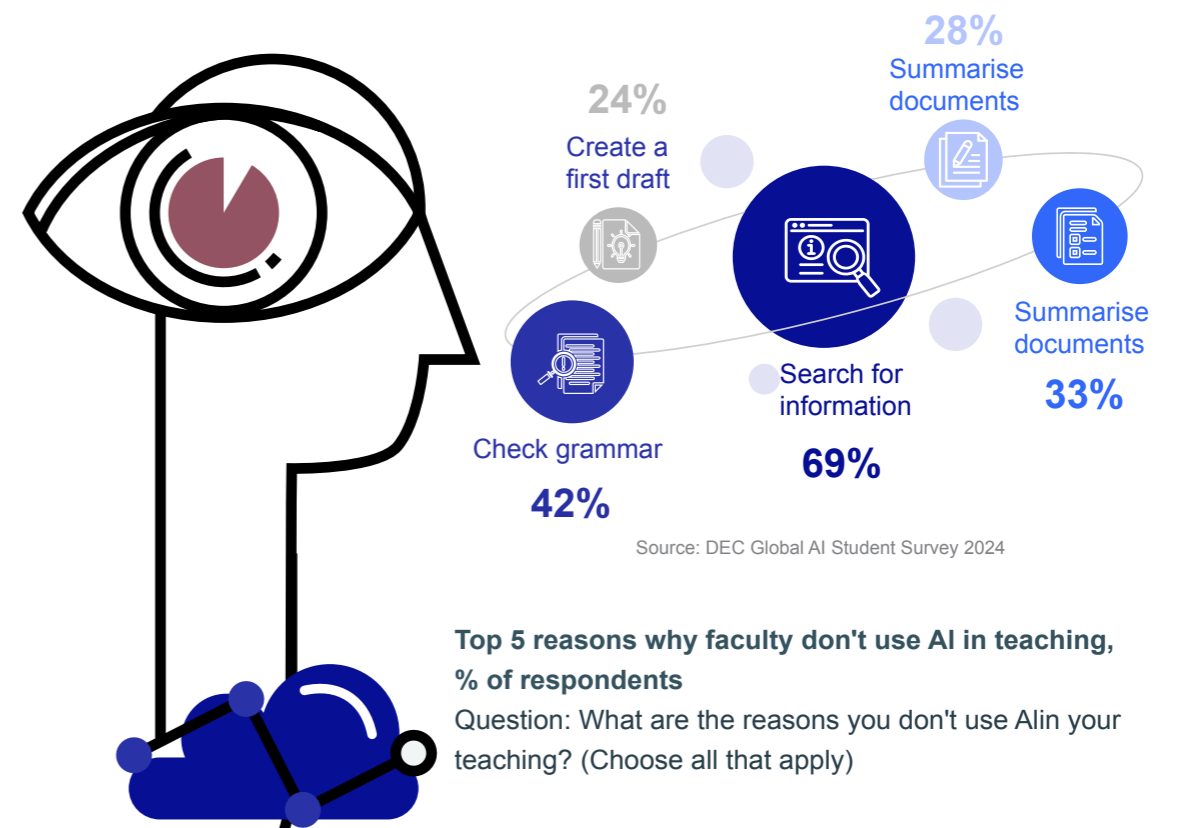
The Current State of AI Usage in Higher Education

According to the *DEC Global AI Student Survey*, 86% of students reported using AI

tools in their studies, with 54% employing AI weekly or more frequently. The most popular AI tools are ChatGPT (66% usage), Grammarly and Microsoft Copilot (25% usage each.) The technology landscape in 2025 may reflect increased adoption of

Information searching tops the list for AI use cases among students, followed by grammar checking

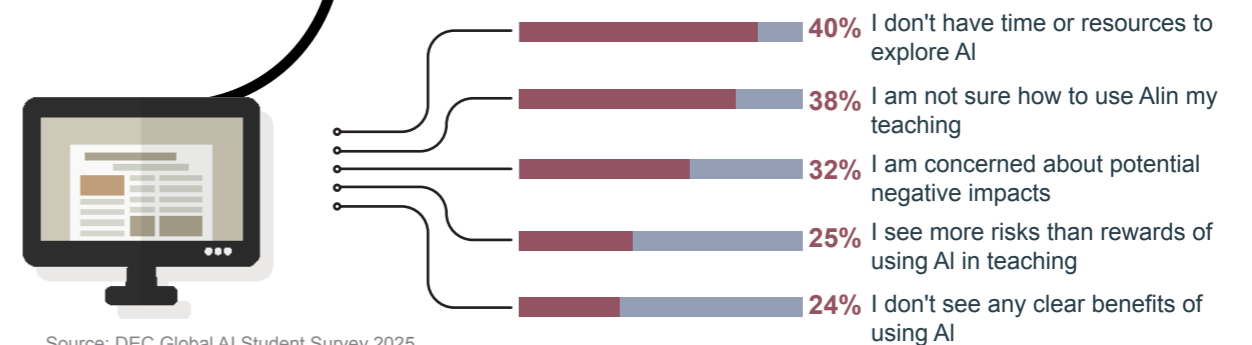
Question: What do you usually use AI tools for (Select all that apply)?



Source: DEC Global AI Student Survey 2024

Top 5 reasons why faculty don't use AI in teaching, % of respondents

Question: What are the reasons you don't use AI in your teaching? (Choose all that apply)



Source: DEC Global AI Student Survey 2025

open-access AI tools such as Deepseek or more advanced platforms like Gemini Advanced or ChatGPT's deep research capabilities. 69% of students reportedly utilised AI for information retrieval, 42% for grammatical verification, and 33% for document summarisation. These results indicate widespread and active AI adoption among students.

Among faculty, AI adoption remains more conservative. 61% of educators employ AI for creating instructional materials, while 88% report only occasional or moderate usage. The principal barriers to AI adoption in teaching and learning contexts include insufficient time, difficulty in integrating AI into existing practices, and concerns regarding data privacy and potential misinformation.

AI Readiness: Confidence Gaps Between Faculty and Students

Perceived AI literacy and readiness levels among faculty and students remains room for improvement.

40% of faculty members self-identify as beginners or unfamiliar with AI applications in teaching, while only 4% consider themselves to have reached expert proficiency. This

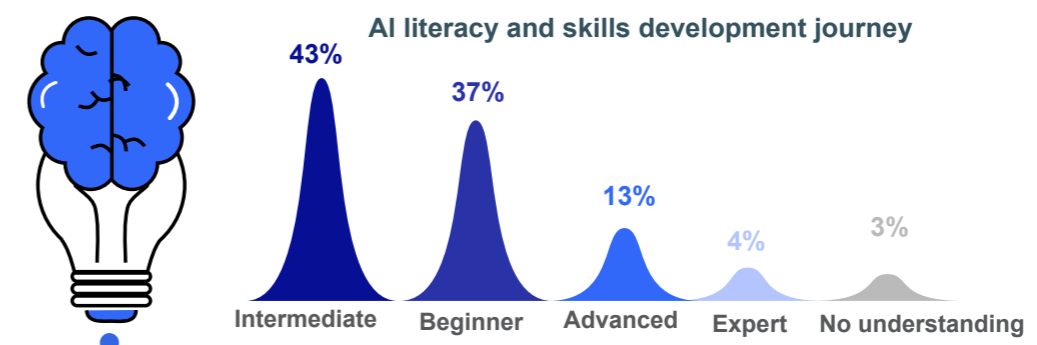
“
58% of students report deficient AI knowledge and skills, while 48% do not feel adequately prepared for AI-integrated workplace environments.”

”
situation suggests institutional gaps in AI literacy and skills training. Over 70% of students believe higher education institutions (HEIs) should provide AI literacy training, a sentiment shared by faculty members — currently, training resources are severely lacking, with only 6% satisfied with the AI literacy resources at their institution.

Existing AI literacy training in HEIs is inadequate, requiring urgent development of systematic curricula. HEIs should establish training courses to disseminate foundational knowledge and address the challenges of AI application in teaching. These initiatives would help faculty and students understand and critically apply AI technologies, facilitating meaningful AI integration into educational practice.

Faculty's AI proficiency, % of respondents

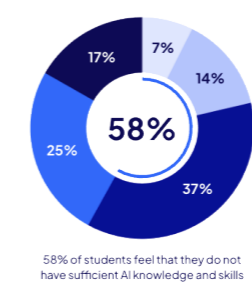
Question: Where are you in your journey of developing Alliteracy and skills



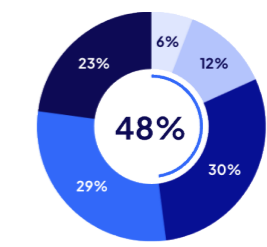
AI Competencies

Student AI knowledge and skills
Question: To what extent do you agree or disagree with the following statement:
I have sufficient AI knowledge and skills

Student AI workplace readiness
Question: To what extent do you agree or disagree with the following statement:
I feel prepared for a future workforce that heavily utilises AI



58% of students feel that they do not have sufficient AI knowledge and skills



48% of students do not feel adequately prepared for an AI-enabled workplace

Strongly Disagree
1
2
3
4
5
Strongly Agree

“
Are higher education institutions genuinely preparing faculty and students to prepare for navigate the emerging AI era?
”

value, leading to a decline in the quality of teaching or a convergence of teaching styles. . Additionally, 52% of students worry that AI dependence could negatively impact their academic performance.

Teachers are equally worried: over 80% indicating concerns about students' ability to evaluate AI-generated content, and students are prone to over-reliance on it.

While 65% of educators view AI as an educational opportunity, 35% focus more on its challenges. Therefore, HEIs will need to strike a balance between integrating AI applications and preventing overdependence. It is important to set rigorous guidelines to ensure quality education. Besides, AI literacy training will also empower students and faculty to reconcile AI tools with core competencies such as critical thinking and creativity.

DEC defines AI literacy as “the essential knowledge and skills needed to understand,

interact with, and critically assess AI technologies” and “the ability to use AI tools effectively and ethically, evaluate their output, ensure humans are at the core of AI, and adapt to the evolving AI landscape ”. HEIs should blend AI skills with the unique critical thinking and creativity of human beings, empowering both teachers and students to better navigate educational transformation.

AI Readiness: Confidence Gaps Between Faculty and Students

To address concerns and manage risks, HEIs need to establish clear, inclusive, and effective AI policies. Research indicates significant deficiencies in institutional AI governance: 80% of faculty consider existing guidelines inadequate, while 93% of students anticipate policy improvements.

Literacy Dimensions	Competency Level		
	Level 1	Level 2	Level 3
Dimension 1 Understanding AI and Data	AI and Data Awareness	AI and Data in Action	AI and Data Optimisation
Dimension 2 Critical Thinking and Judgement	Question AI Output	Evaluate AI Output	Challenge AI Output
Dimension 3 Ethical and Responsible Use	Understand Risks	Apply Responsible Practices	Shape Responsible Practices
Dimension 4 Human-Centricity, Emotional Intelligence, and Creativity	Awareness of Human-AI Interaction	AI as Collaborative Tool	Develop Human-Centred AI Practices
Dimension 5 Domain Expertise	Applied AI Awareness	AI Application in Professional Contexts	Strategic AI Leadership

Source: DEC AI Literacy Framework

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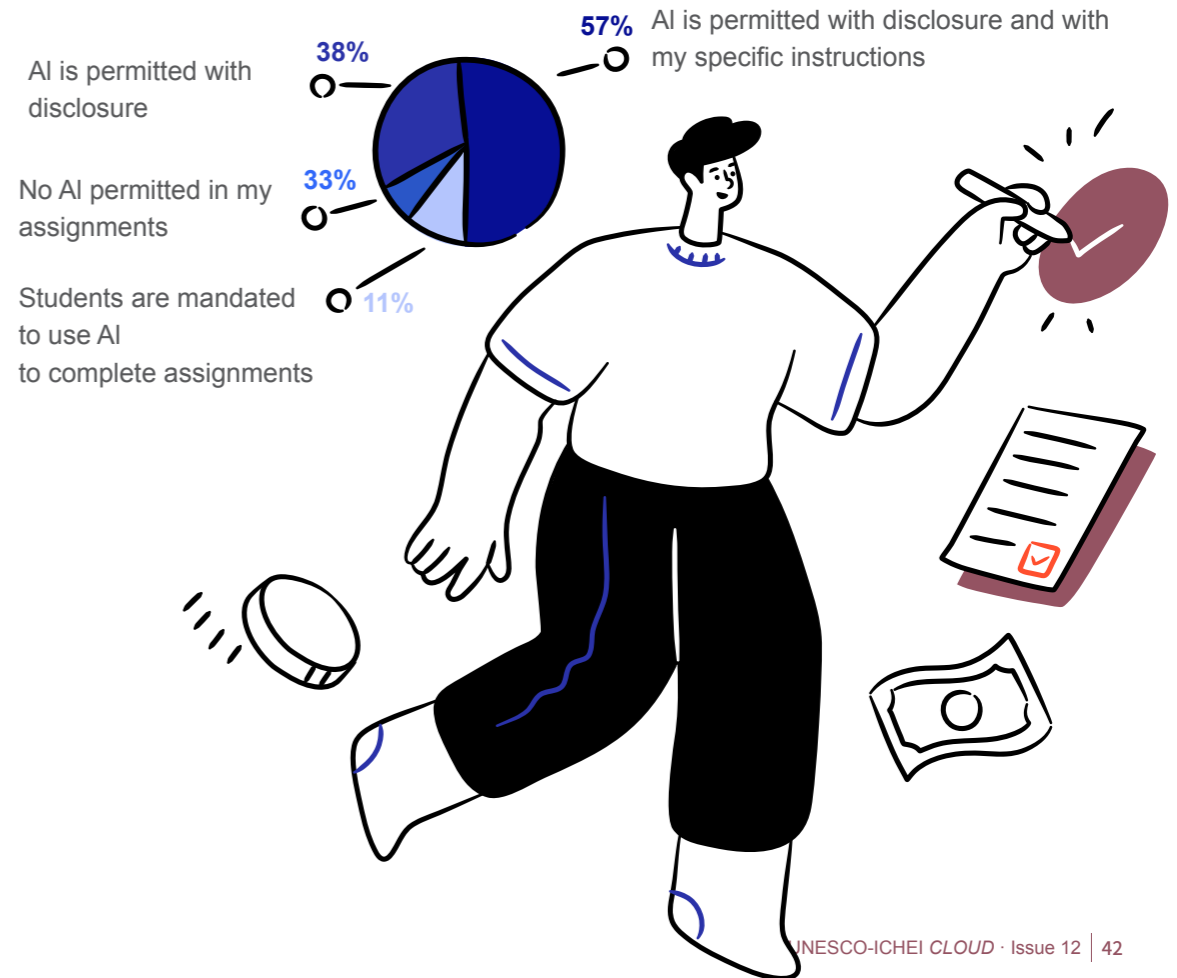
One of the top barriers to faculty implementation of AI in teaching is the absence of clear usage guidelines.

”

Consequently, HEIs need to develop explicit standards for AI applications in teaching and learning. However, only 6% of faculty believe AI policies have been clearly outlined by their institutions. In the process of policy refinement, faculty members favor an "appropriate use" model, which requires students to disclose AI utilisation in assignments according to course specifications.

Top preferred AI use policies in assignments, % of respondents

Question: Considering your assignments to your students, in which of the following way would you prefer to design your assignments (Choose all that apply)



To safeguard educational quality and mitigate risks related to data privacy and misinformation, HEIs should provide guidance for student AI usage. Specific measures may include offering lists of secure

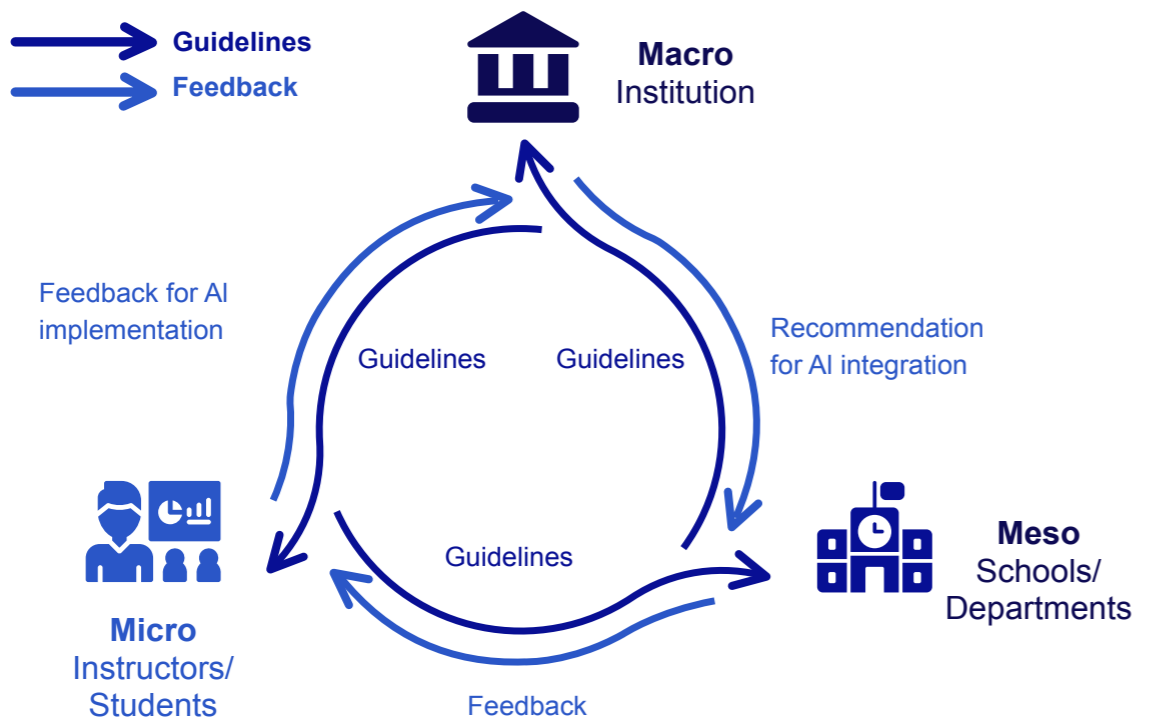
and reliable AI tools, as well as publishing guidelines on AI output accuracy and potential biases. These policies should aim to facilitate rather than impede innovation in teaching and learning.



HEIs should also cultivate inclusive AI governance approaches that are informed by the opinions of both faculty and students.

Survey results indicate that 71% of students desire involvement in AI-related decision-making processes, yet only 34% report that their institutions have solicited their input. This disparity between demand and provision may leave students feeling marginalised, while institutional policies fail to effectively address their concerns.

To avoid AI governance being a solely top-down process, feedback and recommendations from all levels of HEIs should be taken into account when crafting AI guidelines and policies. Input and



Source: *Elevating AI Communication, DEC Executive Briefing #011*

observations from faculty and students on the ground will greatly inform and improve the policymaking process, and will help to enable HEIs to produce policies that address and mitigate key concerns and risks around AI applications.

This communication framework is part of the DEC’s literacy and governance resource collection, which has been increasingly adopted by HEIs. Related resources include DEC’s policy mapping documents regarding institutional AI policies across the world.

The Future of AI in Teaching and Evaluation

The vast majority of faculty members recognise the potential of AI, as well as the necessity of incorporating it into teaching practices.

AI will bring numerous changes to teaching and learning, particularly in evaluation methods. According to the survey, over half of faculty believe that assignments and student evaluation methods need to

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be redesigned to adapt to changes brought about by AI, by making assignments more AI-resistant. This requires both faculty and students to collaboratively explore new teaching and evaluation paradigms in the AI era.

Despite students’ expectations for faster and deeper AI integration, 80% believe that the current state falls short of expectations. HEIs should focus on the AI application scenarios that students perceive as the most valuable and promote AI integration in a targeted manner, while instructing teachers to optimise their assessment methods to safeguard both academic integrity and the value of academic qualifications.

European Union: University-Industry Cooperation Empowering the Growth of Business and Research Talent

Screenshot of a video on
MCC's LinkedIn page



Cultivating local talents plays a vital role in driving economic and social development through innovation and leadership, as well as inheriting and promoting local culture. Janos Setenyi, the dean of the Institute of Education at the college, believes that the quality of the local elite group is a decisive competitive advantage for a country.

As one of the top universities in Hungary, the Mathias Corvinus Collegium (MCC) strictly enrolls the most outstanding students from all levels of schools and is dedicated to cultivating elite talents for the country. By providing students with general education and professional education that is deeply integrated with industries, MCC cultivates "T-shaped talents" who not only possess core knowledge and skills in a certain professional field, but also have extensive cross-disciplinary cognition and general skills. MCC focuses on cultivating talents who demonstrate outstanding performance

in academic disciplines, are capable of actively mobilising community participation and management, and creating value for the community, enabling the capable younger generation to take root in their local areas. MCC advocates the cultivation of talents who can perform outstandingly in their disciplines, actively mobilise community participation and management, and create value for the community, enabling capable young people to take root in their homeland.

On April 10, 2025, at the Seminar on University-Industry Integration in Research Universities held by Southern University of Science and Technology, Professor Halász shared the UIC in the EU based on his years of research on EU policies, and discussed the interaction between teachers and students within the UIC framework and the new requirements of universities for the core competencies of teachers and students in the future.

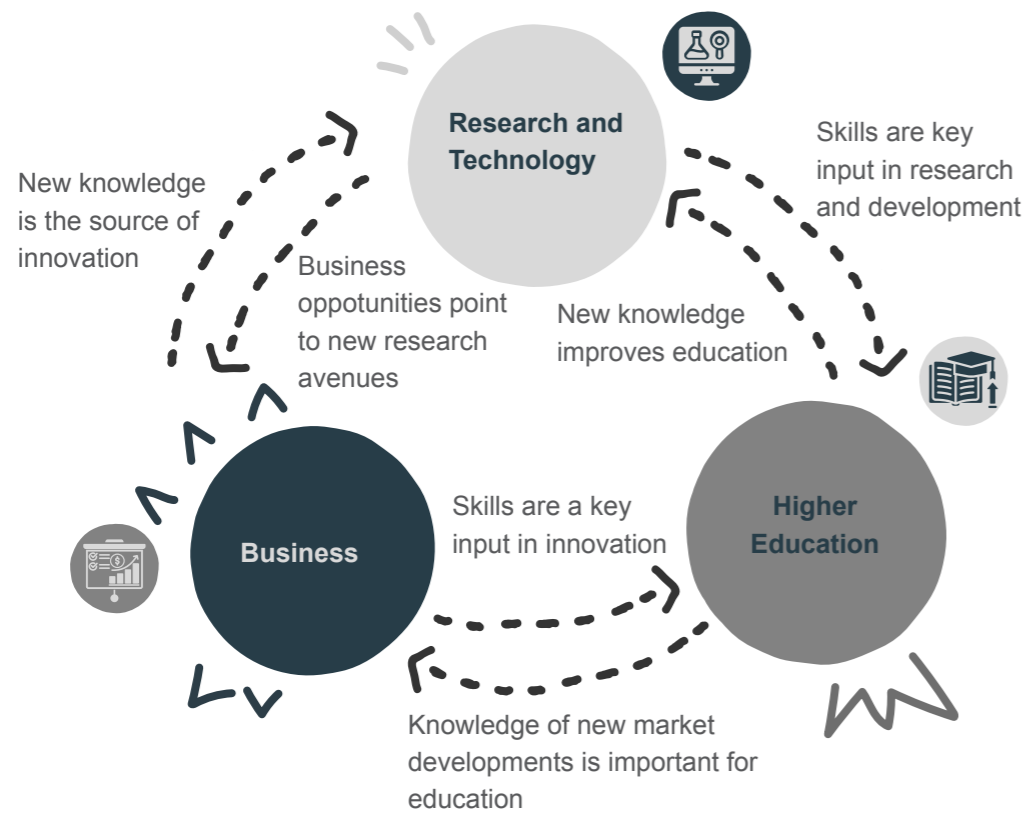
Knowledge Triangle-driven: University-Industry Cooperation Forges Future Innovative Talents

The EU puts more emphasis on "University-Industry Cooperation" (UIC) than "University-Industry Integration" (UII), building an interactive relationship for higher education, research and business through a Knowledge Triangle, while ensuring academic independence. Through cutting-edge knowledge sharing and technology interaction, the EU cultivates talents with

both business innovation and research potential.

How can EU Promote UIC through Educational Innovation?

The EU's pedagogical reforms are oriented towards fostering creativity, innovation and entrepreneurship. By providing space and financial support, the EU actively promotes collaboration between academia and industry to integrate innovative and entrepreneurial ideas into teachers'



source: P. P. Groumos and D. Meissner, "Knowledge Triangle: The Right Concept to Align Universities Missions?," in Science, technology and innovation studies, Springer, 2021, pp. 19–32. doi: https://doi.org/10.1007/978-3-030-81346-8_2.

Areas of UIC in the EU (a 2017 survey, N=17000)

UIC AREAS

UIC ACTIVITIES

1. Curriculum co-design (e.g. employers involved in curricula design with HEIs)
2. Curriculum co-delivery (e.g. guest lectures)
3. Mobility of students (e.g. student internships/placements)
4. Dual education programmes (e.g. part academic, part practical)
5. Lifelong learning for people from business (e.g. executive education, industry training and professional courses)

Education

6. Joint R&D (incl. jointly funded research)
7. Consulting to business (e.g. contract research)
8. Mobility of staff (i.e. temporary mobility of academics to business and of business people to HEIs)

Research

9. Commercialisation of R&D results (e.g. licencing/patenting)
10. Academic entrepreneurship (e.g. spin offs)
11. Student entrepreneurship (e.g. start-ups)

Valorisation

12. Governance (e.g. participation of academics on business boards and business people participation in HEI board)
13. Shared resources (e.g. infrastructure, personnel, equipment)
14. Industry support (e.g. endowments, sponsorship and scholarships)

Management

source: T. Davey, A. Meerman, V. Galán-Muros, Balzhan Orazbayeva, and T. Baaken, "The state of university-business cooperation in Europe - Final report," Publications Office of the European Union, Jan. 2018. doi: <https://doi.org/10.2766/676478>. G. Halász, "University-industry cooperation policies and practices in the European Union," presented at the Seminar on University-Industry Integration in Research Universities Southern, University of Science and Technology, Apr. 10, 2025.

teaching content and methods, ensuring that education is up-to-date. At present, the EU's UIC has covered many fields, such as education, research, valorisation and management, and has formed a significant impact through a large number of bottom-up initiatives, multilateral cooperation, financial support and knowledge sharing.

Teacher-student Research Collaboration: Doctoral Students as "Early Career Researchers"

When talking about the student-teacher relationship, Professor Halász stresses that his relationship with his students is a collaborative one: it is recommended that we don't call our PhD students 'students', but 'early-career researchers'. I prefer calling Min, not my student but my research colleague, because we do research together.

The "Aalto Model": From Knowledge Imparting to Innovation Collaboration

Professor Halász took Aalto University in Finland as an example to introduce its mature entrepreneurship education system and vibrant entrepreneurial ecosystem. He shared the new ability requirements of universities for teachers and students in the future.

Aalto University focuses on cultivating students' abilities in interdisciplinary learning and problem-based learning: its Aalto Design Factory (ADF) creates an entrepreneurial environment for students, where students from engineering, industrial design, business and other professional backgrounds jointly participate in product development projects to solve the actual business challenges of partnering enterprises [1]; the Aalto Center for Entrepreneurship (ACE) helps research teams achieve the transformation and commercialisation of research results by supporting start-ups and facilitating industry patent licensing agreements [2].

In terms of teaching modes, Aalto University has formed a diversified teaching team composed of experts from both academia and industry. The role of teachers has shifted from the traditional "knowledge authority" to "guides", fully playing a guiding and

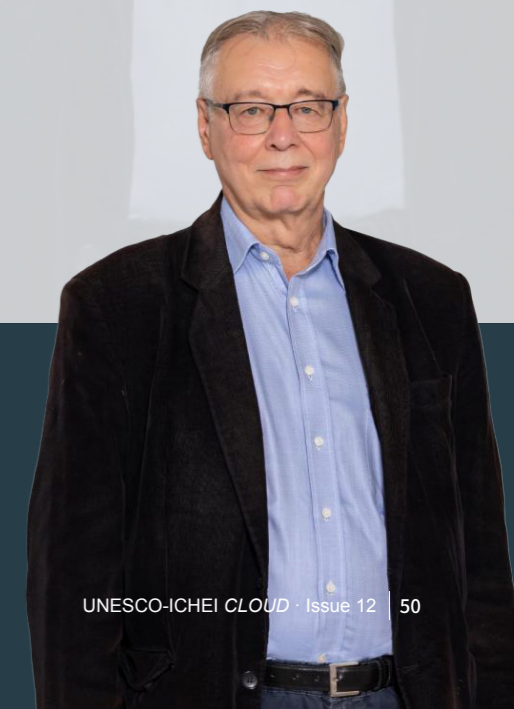
inspiring role in practice. Taking the courses of Aalto Design Factory as an example, teachers adopt an open teaching method to guide students to deal with unstructured challenges. Students organise and lead projects with an entrepreneurial mindset and achieve their goals through teamwork. In addition, the school regularly holds events such as Entrepreneurship Education Week, guiding teachers to integrate cross-disciplinary and multi-disciplinary innovation education concepts into teaching [3].

Currently, Professor Halász and his PhD student Min are jointly applying for a two-year research project on "The Teacher-Student Relationship in Higher Education Models of UIC in the Era of Artificial Intelligence", aiming to clarify how teachers and students can better interact in the new learning dynamic. Professor Halász said, "Most current research on UIC focuses on macro policies, whereas we want to focus on the 'human being' as the object of research and pay attention to the feelings and development of individuals under these policies."

This article is based on Professor Halász's sharing in the seminar and the open literature. ■

Gábor Halász

Gábor Halász is the Executive Dean of the Faculty of Engineering and the Built Environment at the University of Johannesburg, the largest engineering faculty in South Africa, with over 10,000 students. He holds a PhD in Artificial Intelligence from Brown University and has lectured at the university while also working for over 10 years in the public sector on IT services. His research focuses on the general-purpose applications of AI. Currently, he serves as the Chairperson of the Engineering Deans Forum in South Africa and is a member of the .za Board, which regulates domain names in the country.



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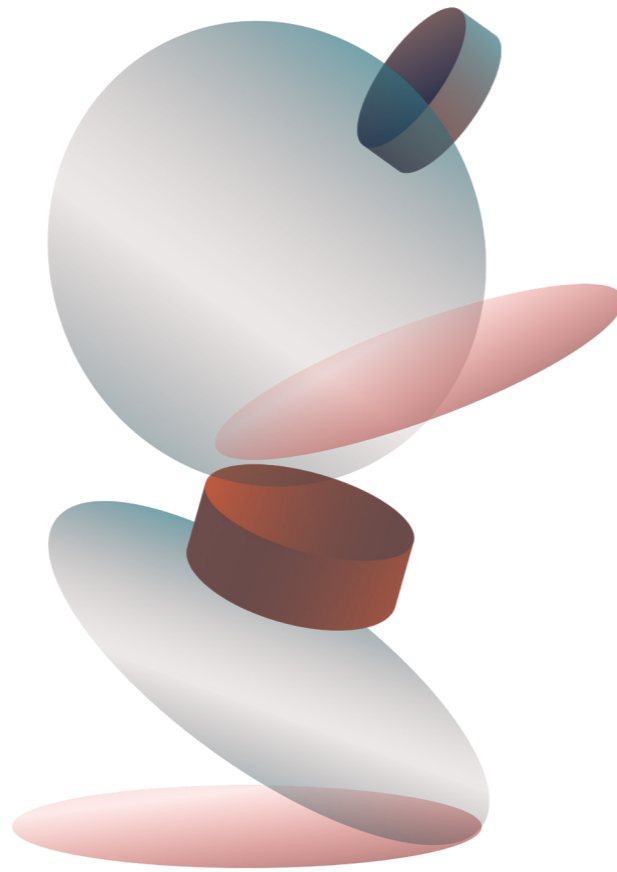
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Monash University: Moving Beyond the Efficiency Trap — Harnessing Human-AI Synergy to Develop Higher-Order Thinking

AI has surged into the field of education, like rising tide, significantly enhancing efficiency of evaluation, monitoring, and content generation. Yet this rapid advancement also prompts us to reflect: to what extent can AI truly optimise teaching and the cultivation of students?

As the trend towards the "automation" of education becomes more apparent, students are increasingly inclined to turn to AI for quick answers when faced with difficulties. AI has also given rise to a kind of "cognitive laziness", with students becoming overly reliant on its outputs and completing tasks without engaging in deeper thinking.

In the face of such rapid change, we must pause and ask ourselves: is the ultimate goal of education merely to improve efficiency? What, fundamentally, is the essence of nurturing people? And how should teachers position themselves in this evolving landscape?



A shot in the arm: The role of teachers will not disappear due to the development of artificial intelligence

At the "Transforming Higher Education in the Age of AI - International Institute Of Online Education (IIOE) Global Partners

Summit" held at the end of 2023, Professor Dragan Gašević clearly stated that the role of teachers will not disappear due to the development of artificial intelligence. On the contrary, in the age of AI, the role of teachers has become even more important. Rather than worrying about being replaced by AI, we need to deeply reflect: what irreplaceable value can human teachers provide to students?

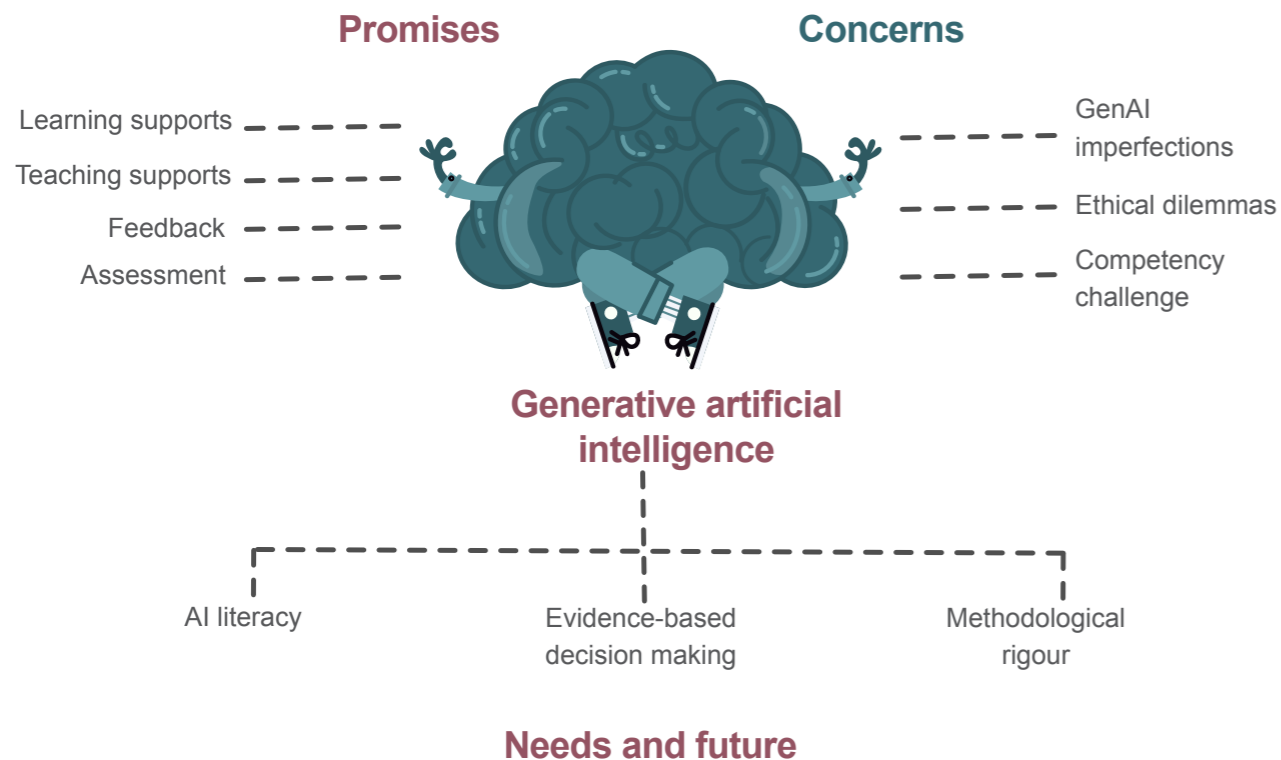


Teacher's role: Building a cognitive bridge between technology and students

In today's era when generative artificial intelligence is deeply embedded in educational practices, Professor Gašević's reminder is not only about the choice of teaching strategies, but also reveals the profound transformation that the role of teachers is undergoing: from the traditional "knowledge disseminator" to the "coordinator of the learning process", the core function of teachers is no longer simply to impart

knowledge, but to build a cognitive bridge between technology and students.

In teaching interactions, students do not expect teachers to give "simple and straightforward" answers like artificial intelligence. Instead, they expect to establish long-term and in-depth interpersonal relationships, so as to cooperate and solve problems together. This warm connection between people is the essential characteristic that differentiates human education from instrumental learning, and it is of irreplaceable significance for both individual growth and social development.



▼ The prospects, shortcomings and future development directions of GenAI in the field of education

(Source: Paper Analysis | Systematic Literature Review: Empirical Research on the Application of Generative Artificial Intelligence in Education)



▼ The Great A.I. Hallucination Illustration by Dalbert Vilarino

Technical concerns: Be vigilant against "cognitive laziness" and focus on technical collaboration

What is alarming is that excessive reliance on AI feedback may induce "cognitive laziness", which weakens learners' internalisation and engagement in the learning process. Professor Gašević verified through empirical research that although learners who use AI-assisted tools such as ChatGPT have shown significant improvement in writing performance, they have not demonstrated remarkable advantages in dimensions such

as knowledge transfer, deep understanding, and metacognitive development.

Moreover, research shows that the immediate feedback of AI quietly changes the interaction mode between teachers and students, automating educational relationships. When facing problems, students are more inclined to use AI as an assistant to answer questions rather than seek in-depth communication with teachers. Teachers need to consider how to consolidate their core position in emotional support, stimulation of learning motivation and guidance of higher-order thinking.

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The cultivation of advanced cognitive abilities, such as critical thinking, reflection, and solving complex problems, all need to be achieved through active participation in the process of knowledge construction, rather than relying on AI feedback to "achieve success quickly".

—The "Hybrid Human-AI regulation" model

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Human-machine collaboration to achieve the essence of education: cultivating higher-order cognitive abilities

The intervention of AI has brought about an improvement in the efficiency of education, but is improving efficiency the ultimate goal of education? The answer is obviously negative. Many argue that critical thinking, creativity, and emotional intelligence are the core competencies in the era of AI, leading to resilience and future-readiness for the workforce and lifelong development.

Therefore, it should be emphasised that the core value of technology to human beings is not limited to "completing faster", but "understanding deeper". The ideal positioning of generative AI is to serve as a "power multiplier" for human cognition rather than a "substitute". The "Hybrid Human-AI regulation" model proposed by Professor Gašević focuses on the coordinated development of AI technology and human cognition. At present, there is no sufficient evidence to show that AI technology is truly helping students achieve higher-level cognition. Although AI can assist in completing learning tasks, it cannot replace the self-regulation process of students in learning.

In this new era of "human-machine collaborative education", reconstructing a warm teacher-student relationship and strategically transforming the teacher's role will be crucial for future education. Teachers should not merely be "learning designers", but rather "mediators" between AI and students, as well as "allocators of cognitive responsibility". Teachers need to assess the applicable boundaries of AI tools and clarify the learning links that must be completed through students' independent thinking. Through carefully designed learning scaffolds and data tools, students' cognitive participation in real task situations is strengthened.

This article is based on the sharing of Professor Gašević at the IIOE Global Partners Summit and the collection and writing of publicly available materials. ■



Two-way Empowerment of System and Practice: How can Universities in Germany Reconstruct Educational Objectives and the Teacher-Student Relationship in the AI Era

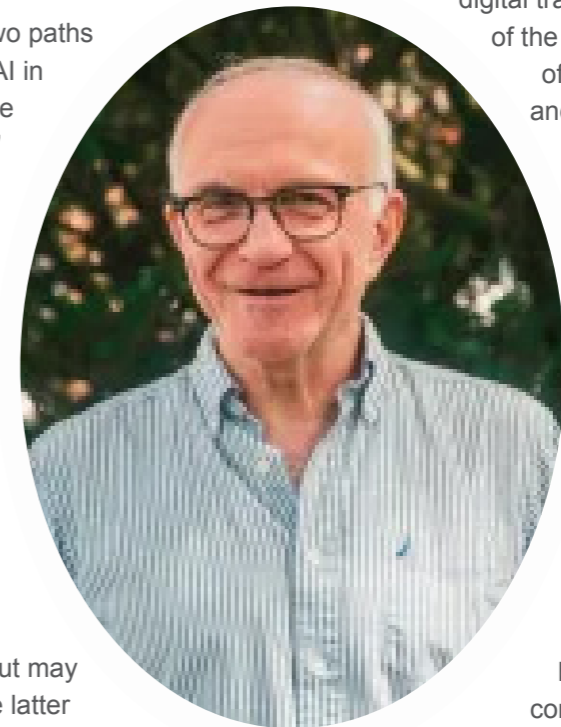
The emergence of generative artificial intelligence is reshaping the organisational logic of higher education. In this technology-driven transformation, many universities

pay more attention to potential risks than opportunities. At the Central Asia Policy Dialogue, Isak Frumin, the head of Observatory of Higher Education Innovations

at Constructor University in Germany, reminded that **higher education institutions should actively engage rather than fear risks in the application of technology and achieve "good governance" through "good use" of technology.**

AI Integration in Universities: "Top-down" or "bottom-up"?

Currently, there are two paths for the application of AI in universities: One is the "managerial diffusion" led by institutions, promoted by regulations and ethical governance; the other is the "organic diffusion" of spontaneous exploration by teachers and students, relying on individual creativity and self-organising practice. The former emphasises norms, but may inhibit innovation; The latter is flexible but lacks systematic support. Professor Frumin pointed out that constructing a "feedback mechanism" and enabling the mutual activation of the system and practice has become a key proposition in educational reform.



A case analysis: The digital reform of Education in Germany

The case from Germany provides a viable path for the "feedback mechanism". In order to tackle the predicaments of the decline in student enrollment and the rise in teaching costs, some private universities in Germany, such as IU Hochschule, have initiated the digital transformation. By means

of the two-way empowerment of the AI teaching system and teaching practice, this university has achieved a rapid expansion of its student population from several hundred to over one hundred thousand. Regarding institutional regulations, the university has implemented online education and introduced AI assistants, which effectively relieve the burden on teachers and control the teaching costs.

Given the practical results, teachers have voluntarily enhanced their personalised teaching approaches with the help of digital tools, and the interactive relationship between teachers and students has been further improved.



From "teacher-student" binary interaction to "teacher-student-machine" ternary interaction

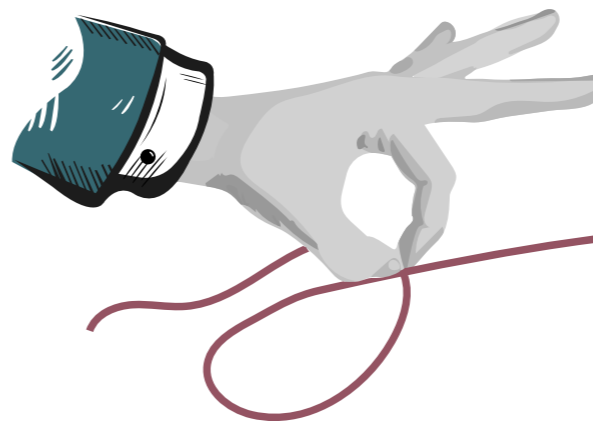
Technology integration is not only an innovation of means, but also implies adjusting educational relations. The knowledge-power relationship between teachers and students is being disrupted by technology, and collaboration, interactivity and autonomy are being placed in a more core position. Teachers are no longer "transmitters of knowledge", but more like "organisers of learning" and "masters

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The real challenge of digitalisation in education lies not only in the technology itself, but also in how to respect the differences and complexity of educational subjects and reshape the cognitive and trust structure among them.

—Professor Isak Frumin

”



of technology", assisting students in establishing judgments and meanings in complex information.

How to return to the core of education in the era of GenAI?

Professor Frumin reminds that the use of AI shows significant differences among different groups of people, influenced by age, culture and disciplinary background. The real challenge of digitalisation in education lies not only in the technology itself, but also in how to respect the differences and complexity of educational subjects and reshape the cognitive and trust structure among them.

Technology does not come with values by itself, while education must give it direction. In the process of AI reshaping the educational structure, the key does not lie in "what tools are used", but in how teachers and students reconstruct their relationship and redefine the goal of "nurturing people" through technological collaboration.



This article is based on the sharing of Professor Isak Frumin at the Policy Dialogue and the collection and writing of publicly available materials.

Isak Frumin is the Head of the Observatory of Innovations in Higher Education at Constructor University, Professor in the Department of Higher Education Research at the University for Continuing Education Krems, and the Founder and former Director of the Institute of Education at HSE University (National Research University Higher School of Economics) in Moscow. ■

University of Macau: Redesigning Teaching and Learning in the Era of Generative Artificial Intelligence



Become Upright Individuals before Achieving Academic Success

universities to expand its research scope and influence, earning it the 180th position in the Times Higher Education (THE) World University Rankings.

For decades, Macau has projected its image as a "gambling city" to the outside world, earning the moniker "Monte Carlo of the East." However, as a university established in 1981, the University of Macau is leveraging the city's unique East-West cultural fusion to implement a human-centered educational approach that encourages students to "become upright individuals before achieving academic success." This philosophy cultivates graduates with a sense of national identity, international perspective, global competitiveness, and world responsibility.

Under this educational vision, the University of Macau has achieved first-place ranking among Portuguese-speaking alliance institutions through its integrated model of professional, general, research, and community education. The university has also established over 20 joint laboratories with corporations, institutions, and other

Assessment isn't merely about grading—it's a powerful tool to activate students' thinking and judgment abilities. Teachers must evolve beyond result evaluators to become architects of learning structures and processes.

— Consensus among guests at the CTLE Interactive Forum

Macau not only features a strong blend of Eastern and Western cultures but also serves as a free port with over four centuries of rich history. This coastal gem remains the last surviving outpost on China's periphery that showcases Southern European landscapes and Latin cultural influences. Over time, Macau has naturally evolved into a unique bridge connecting China with Europe and the Latin world.

—WANG Wei-jen, The competing skyline: reading Macau's urban landscape[1]

”



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CTLE held an informal dialogue to discuss the formulation of evaluation strategies based on the latest advancements in generative artificial intelligence.

Educators Proactively Reshape Evaluation Strategies in the GenAI Era

Amid the technological torrent of generative artificial intelligence (GenAI), the University of Macau is steering a profound educational transformation with academic steadiness. Here, emerging technologies are not blindly celebrated trends, but rationally vetted teaching partners.

Since 2023, the University's Centre for Teaching and Learning Enhancement (CTLE) has cultivated an academic platform for intellectual exchange through faculty development activities centered on GenAI. While providing instructional support for teachers, these initiatives have systematically advanced exploration into "how to effectively integrate AI" in teaching. Regarding evaluation strategies, CTLE has

clearly defined policy boundaries that "allow students to use AI as a learning aid, but ensure assignments are completed by the students themselves," [2], marking a pivotal shift in the teacher's role from passively adapting to technological change toward actively designing pedagogical strategies. [3]

As AI continues to permeate educational settings, faculty reflection on evaluation methods has grown profound. In early 2025, CTLE hosted an interactive forum addressing "how to reshape evaluation strategies in the GenAI era." Educators collectively voiced concerns about academic integrity, criteria for evaluating AI-generated content, and the effectiveness of task design and collaborative learning activities. Forum participants reached a consensus: Evaluation is not only about grading—it's a powerful tool to activate students' thinking and judgment abilities. Teachers should evolve beyond result evaluators to become architects of learning structures and processes. [4]

“

AI will not replace teachers, but it is subtly redefining the functional boundaries of their profession.

”

Transformation of Teaching Methods and Teachers' Roles

In today's educational landscape, where generative AI is deeply integrated into teaching, beyond the assessment strategy changes mentioned earlier, teaching methods and faculty roles are evolving in tandem. As AI streamlines information delivery, educators must shift their focus toward inspiring student motivation, organizing cognitive tasks, and optimizing interactive processes. The goal of teaching is no longer merely knowledge transmission, but guiding students to develop stronger critical thinking and learning autonomy with AI support.

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This transformation in teaching approaches is like a gentle spring breeze, quietly driving the reconstruction of teacher-student relationships. The University of Macau's practices reveal that in technology-symbiotic learning environments, the relationship between teachers and students is transitioning from "knowledge transfer" to "cognitive collaboration." This requires educators to maintain interactive bonds with students in more nuanced ways, preserving the "human-centered" foundation of education amid technological advancement.

The University of Macau's deployment and localized practices aptly address the shared proposition across the educational sphere: the teacher's role not only persists but gains fresh interpretation amid contemporary currents. This demands educators integrate themselves into the teaching ecosystem with a new positioning—both recognizing technology's boundaries and grasping the dimensions of nurturing talent—thereby fulfilling their core regulatory role in the educational landscape of the AI era.

This article is based on the public literature of the University of Macau. ■

Taking AI as the "External Brain" : The Trinity Interaction Logic of "Teacher-Student-Machine"

Intelligent technology serves as an "external brain" for teachers, expanding their cognitive boundary and enabling them to process information, analyse data, design teaching, and even anticipate students' learning needs more efficiently.

Just as the left and right hemispheres of the brain work in tandem, intelligent technology is mainly responsible for logic and efficiency, while teachers can focus more on emotional guidance, creativity and values shaping in education. Only by combining the two can the true essence of education be achieved - imparting knowledge and shaping character.



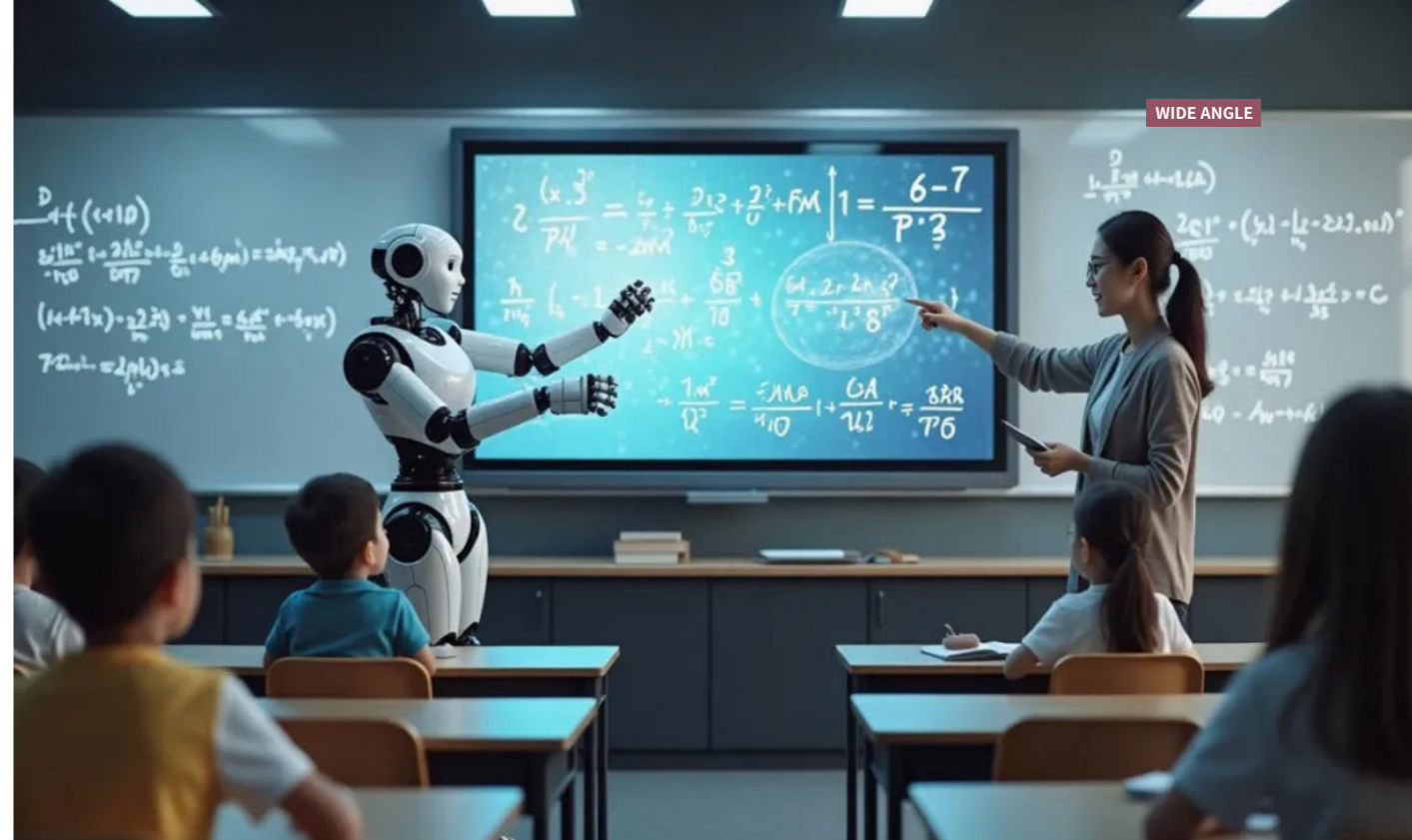
Tides of Warmth: Humanistic Pedagogy Alleviates Collective Anxiety

The rapid development of generative artificial intelligence (GenAI) is reshaping the educational ecosystem and teaching practices. Whether teachers will be

“
 "GenAI is not a replacement for teachers, but a new course for teachers to leapfrog the profession."
 ”

—Professor Hanbing YAN

Source: Teacher Professional Development Research Centre of the Chinese Society of Education



marginalised by technology has become a collective anxiety in the education sector. Meanwhile, students are facing the challenges of information overload and discerning AI-generated content. From the perspective of normal universities, Professor Hanbing YAN from East China Normal University and her team have focused on the warm interaction, such as active listening and emotional care, between teachers and students in the learning system. They believe the power of such interaction can help alleviate collective anxiety in the AI era.

Teachers and Technology: The Two Hemispheres of Education

The positioning of teachers as "knowledge transmitters" is undergoing a transformation,

shifting towards roles such as facilitators of personalised learning, designers of learning environments, integrators of learning resources, and decision-makers based on data analysis. Teachers should not only guide students to explore knowledge but also help them shape their values and judgment, and learn to coexist with, cooperate with AI, and discern its outputs.

Intelligent technology serves as an "external brain" for teachers, significantly boosting the efficiency of information processing, teaching design, and student data analysis. However, "nurturing people" remains the essence of education, not just "managing classes" or "improving efficiency". Intelligent technology excels at logic and efficiency, while teachers can focus more on emotional guidance, creativity cultivation, and values shaping in education. Just like the left and

right hemispheres of the brain, only by working together can truly warm and in-depth education be achieved.

Teachers, as subjects of emotional labour, need to have the ability of active listening, identifying learned helplessness, and helping students build psychological resilience. However, there's currently a lack of attention to students' emotions and values during technology applications, which urgently needs strengthening.

“

In the era of human-machine symbiosis, educational activities are no longer limited to the linear structure of "teacher-student", but have evolved into a dynamic collaboration among "teacher-AI-student".

”

A dynamic collaboration among "teacher-AI-student"

On this basis, Professor YAN further proposed that the effective application of digital and intelligent technologies should serve the "three sets of relationships" in education:



- Artificial intelligence empowers teachers.
- Teachers guide students in using artificial intelligence.
- Teachers empower artificial intelligence to guide students.

These three sets of relationships actually reflect a new logic of teacher-student interaction: in the era of human-machine symbiosis, educational activities are no longer limited to the linear structure of "teacher-student", but have evolved into a dynamic collaboration among "teacher-AI-student". Understanding this structure is an inspiration for reshaping teaching design and repositioning teachers' responsibilities. With

the constant evolution of technology, what truly merits our attention is how teachers can leverage AI to better fulfill the enduring mission of "nurturing people".

Professor YAN also cautioned that teachers need to be wary of the "technological illusion" of generative AI, i.e., the risk of factual fallacies or cognitive biases in the generated content, even though it is superficially reasonable. Teachers' professional judgment and teaching design remain indispensable in the educational landscape of the AI era.

This article is based on public interviews and literature taken from Professor Hanbing YAN.

Hanbing YAN is a well-known scholar in the field of educational technology, and is currently the dean and professor of the School of Open Learning and Education (School of Teacher Development) at East China Normal University. She is also the deputy head of the National Expert Working Group on Primary and Secondary School Teacher Training, the deputy director of the National Project Office for Enhancing the Information Technology Application Ability of Primary and Secondary School Teachers, the director of the National Research Center for the Development of Teacher Training Managers, and the executive deputy secretary-general of the Teacher Trainer Collaboration Body of the Chinese Society of Education.



UNESCO-ICHEI Attended Series of Events in Oman, Empowered Teachers' AI Capacity Building and Received Well Recognition

On 9-10 February 2025, Sohar University, in collaboration with the UNESCO Regional Office for the Gulf States and Yemen and the Oman National Commission for Education, Culture, and Science, organised the "Artificial Intelligence Conference: Navigating Digital Skills and Decent Work Conference" at its campus in Sohar, Oman. UNESCO-ICHEI delivered a keynote address on the "readiness of higher education educators in the AI era". On 30th April of the same year, UNESCO-ICHEI coorganised an online workshop titled "Enhancing Digital and AI Competencies for the Higher Education Workforce" with the Islamic World Educational, Scientific and Cultural Organisation (ICESCO) Chair for AI Ethics and the University of Technology and Applied Sciences, Oman, in order to further support digital and artificial intelligence capacity building of teachers in local, ICESCO-member and other higher education institutions. The work was widely recognised and featured in the *Oman Daily Observer*, the number 1 English Newspaper in Oman.

Project Updates

Successful IIOE Global Webinar Explores Higher Education Leadership in the Era of AI

On 12 February 2025, UNESCO-ICHEI successfully hosted an IIOE global webinar titled *Higher Education Leadership in the Era of AI: Practical and Data-driven Approach from the Digital Education Council (DEC)*.

Jointly organised by IIOE and DEC, the event drew on key data and insights from DEC's Global AI Educator Survey. The event aimed to equip young professionals in higher education with practical strategies to address emerging challenges, seize new opportunities, and develop into future leaders in the AI era.



In Conversation with ROSA Education: Digital Learning Realities

UNESCO-ICHEI has been invited to speak at the event — *In Conversation with ROSA Education* — on 10 April 2025. Hosted by UNESCO's Regional Office for Southern Africa (ROSA), the forum brought together education experts and representatives to explore the current state and experiences of digital learning in Southern Africa.

UNESCO-ICHEI highlighted the full integration of the domestic AI model DeepSeek into the IIOE platform, and presented a comprehensive approach to localising IIOE course resources to empower higher education institutions and educators across Southern Africa. Through this initiative, UNESCO-ICHEI aims to deepen collaboration with global partners and support the future-oriented digital transformation of higher education systems in developing countries.

UNESCO-ICHEI and UNESCO IITE Co-launched IIOE Russian version

On April 23 2025, UNESCO-ICHEI and the UNESCO Institute for Information Technologies in Education (UNESCO IITE) jointly launched the Russian version of the International Institute of Online Education (IIOE) learning platform and Micro-Certification courses in Russian. The event attracted over 1000 higher education educators and administrators from Russia, Belarus, Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Turkmenistan, Georgia, Azerbaijan, Armenia, Moldova, Bulgaria, and other countries.



Global Launch of DeepSeek on IIOE (DS-I): Empowering Digital Transformation in Education with Open-Source AI

The flagship project of UNESCO-ICHEI — the International Institute of Online Education (IIOE) Open Digital Learning Platform has successfully deployed the world-leading open-source AI large model DeepSeek, and the intelligent assistant "DS-I" is now fully operational. The AI-powered assistant "DS-I", will offer round-the-clock, multilingual learning experiences to IIOE's registered users across more than 120 institutions in 41 countries. DS-I will provide educators with more efficient AI support and promote open technological solutions to users worldwide, particularly benefiting developing countries.



IIOE Rolls Out Multiple New Courses

The IIOE platform unveiled four AI application courses in the first quarter, in collaboration with Southern University of Science and Technology, Shangyu Technology and other institutions: *Introduction to DeepSeek and Practical Applications in Teaching*, *AI + Medicine: Applications and Breakthroughs*, *Building Your Own AI Chatbot: From Basics to Implementation*, and *Basic Applications and Overview of Generative AI*. These courses aim to expand resources and promote the application of AI technologies in higher education.

In addition, IIOE released the course *Integration and Implementation of ePortfolio in Competency-Based Educational Programs*, developed by the National Centre, which explores the implementation, promotion, evaluation, and sustainability of ePortfolios.

UNESCO-ICHEI Partners with IUCEA to Launch AI Training

On March 7, 2025, the Inter-University Council for East Africa (IUCEA) and the International Centre for Higher Education Innovation under the auspices of UNESCO (UNESCO-ICHEI) jointly hosted an online "Workshop to Launch the Training of Trainers for Academic Staff on the Use of Artificial Intelligence (AI) for Teaching, Learning, and Research." This initiative uses the "Training of Trainers" (ToT) model and aims to empower local higher education professionals in East Africa, enabling them to become leaders in the digital transformation of higher education; this initiative also seeks to continuously enhance the digital competencies of East African higher education professionals, while fostering educational innovation and sustainable development. This training served teaching personnel from 6 institutions in the area. In the near future, through organisational collaboration, both organisations will further enhance the digital and AI competency building of higher education institutions and workforce to facilitate the digital development of higher education in the area.



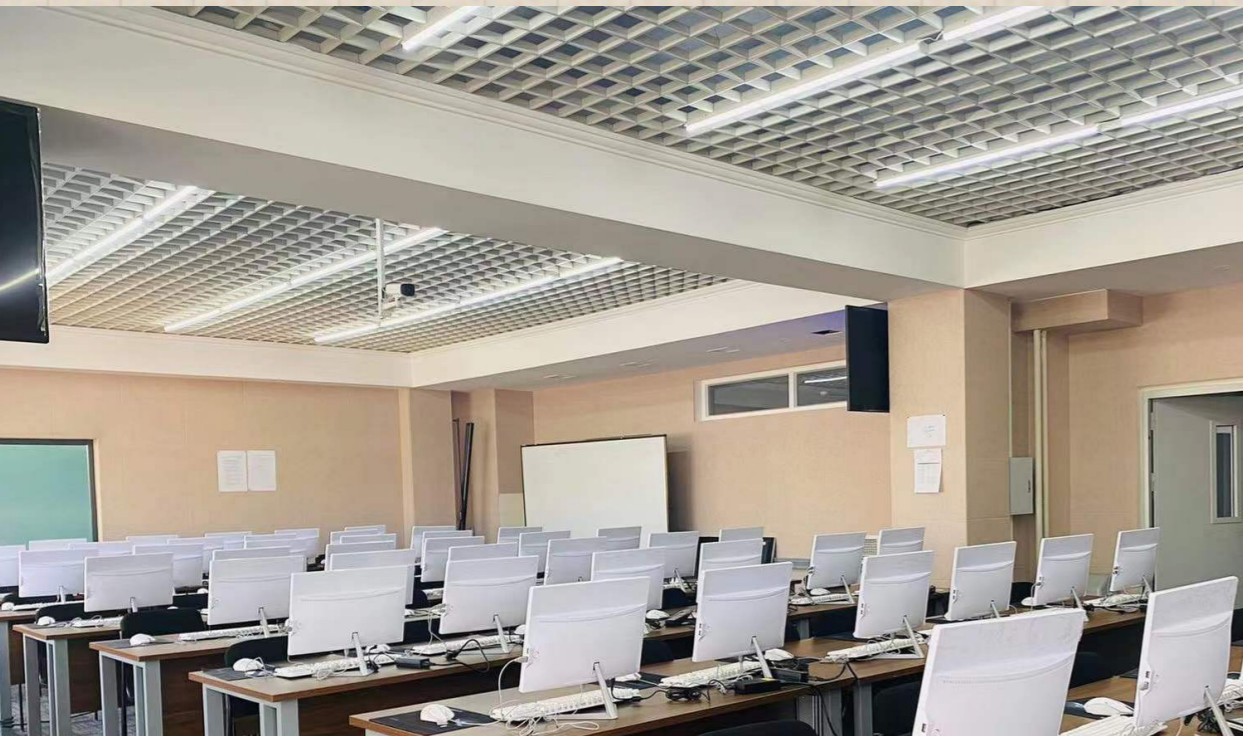
UNESCO-ICHEI and BGI College Have Reached Strategic Cooperation

On 26th March 2025, UNESCO-ICHEI signed a strategic cooperation agreement with BGI College. The two sides will engage in in-depth cooperation in areas such as the co-construction of course resources and the joint development of micro-certification and micro-courses to promote the integrated development of life sciences and education innovation.

Among them, the two sides plan to jointly build courses mainly focusing on the field of "AI+Medicine and Health", specifically including "AI+" multi-omics, life science, synthetic biology, biological data storage, bioinformatics, reproductive health, precision treatment of tumours, infectious disease prevention and control, and so on.

Micro-Certification Enhances AI Literacy for Mongolian Teachers

Amid the global shift towards digital education, the International Institute of Online Education Micro-Certification Project for Enhancing Digital and AI Competencies of University Teachers (IIOE Micro-Certification Project), launched by the International Centre for Higher Education Innovation under the auspices of UNESCO (UNESCO-ICHEI), is playing a vital role in supporting the digital transformation of universities in developing countries. As one of the first pilot countries, Mongolia has actively engaged in the project and seen encouraging outcomes. Leveraging the IIOE learning platform, the Mongolian University of Science and Technology (MUST) — host institution of the IIOE National Centre in Mongolia— has delivered AI literacy training to over 1,800 pre-service and in-service teachers from more than 10 universities across the country in a short period of time, through a blended online-offline and cascade training approach.



In-Depth Report

Breaking Through the Digital Divide: Mongolia's Urgent Quest for AI Education Solutions

Mongolian universities have long faced structural challenges such as limited teacher training and uneven distribution of educational resources. In the field of artificial intelligence, the gap between the rapid pace of technological advancement and the slower progress in teacher upskilling is particularly stark—especially in remote institutions, where the need is most pressing.

● Envisioning the Future of Digital Education

Mongolia has steadily advanced its digital education transformation, evolving from the Distance Education National Program 2002–2010 to the current Digital Nation Guidelines. These efforts have progressively strengthened the country's digital infrastructure and educational resources.

Through a series of policies such as Vision-2050 and a series of comprehensive education law reforms, Mongolia has developed a comprehensive policy system addressing digital literacy, online learning structures, and the integration of digital technologies in higher education.

At the 2022 Transforming Education Summit, Mongolia was recognised by the United Nations as a "Champion Country" for its achievements in digital learning, earning international recognition.

● Digital Transformation: Practical Challenges

While the policy blueprint is in place, Mongolia—like many developing countries—continues to face critical bottlenecks in the implementation process:

● Geographical Challenges and Digital Opportunities

Education in Mongolia has always wrestled with the vastness of its territory. As one of the world's most sparsely populated nations—with fewer than two people per square kilometre—traditional in-person training is both costly and inefficient. Digital learning, therefore, presents a highly cost-effective alternative. Against this backdrop, digital transformation has emerged as a critical strategy for ensuring inclusive and equitable quality education.

The Mongolian government is systematically promoting the integration of digital technologies into its education system, aiming to build an innovative learning ecosystem. Key pillars of this transformation include curriculum reform, teacher training, and increased student engagement.

Weak Foundation in Digital Literacy: According to a report of International Telecommunication Union, only 14.3% of Mongolia's population possesses basic Information and Communications Technology (ICT) skills, with just 11.3% demonstrating intermediate digital proficiency—figures that fall significantly behind those of developed East Asian countries.

Gaps in Teacher Development Systems: Teachers in remote areas face limited access to structured professional development. In higher education, ICT competencies are not yet integrated into mainstream evaluation frameworks, and training opportunities remain scarce. Meanwhile, the rapid advancement of AI education has outpaced the rate at which teachers can upgrade their skills.

Lagging Infrastructure and Lacking in Resources: Sustainable ICT infrastructure remains a challenge, with insufficient digital content and a shortage of Open Educational Resources (OER). MOOCs are still in their infancy. A stark urban-rural digital divide persists—while 31.5% of urban residents have internet access, the figure drops to just 6.06% in rural areas, severely hindering equitable distribution of educational resources.

In terms of overall progress, Mongolia's digital transformation remains at a "consolidation and refinement" stage, still some distance from full maturity. These challenges together represent key obstacles that must be overcome for the country to advance educational modernisation.

An Innovative Capacity-Building Model: Training of Trainers

The International Institute of Online Education (IIOE) has offered new pathways for Mongolian universities to advance their digital transformation. In 2022, the Mongolian University of Science and Technology (MUST) partnered with UNESCO-ICHEI to launch the "IIOE Pilot Project in Mongolia: Blended Learning Capacity Building for STEM Teachers" (IIOE Mongolia Pilot Project). Through teacher training and innovative practices in blended learning, the project developed models in STEM and other key disciplines, enhancing the digital teaching competencies of higher education faculty across Mongolia.

Developed collaboratively by UNESCO-ICHEI and the IIOE National Centre in Mongolia by the end of 2024, the Micro-Certification Project focuses on building a localised training system. It not only enhances the AI application capabilities of university faculty but also fosters an AI education culture within the Mongolian higher education system through the widespread dissemination of open educational resources. From reforming classroom teaching to deepening inter-



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C5

FUNDAMENTALS OF GENERATIVE AI IN HIGHER EDUCATION

Target Audience
• Teachers & Educators • Education Professionals • Instructional Designers

Course Overview

This course covers the basics of artificial intelligence (AI) with a focus on Generative AI. Participants will explore its advantages, types, workflows, and applications, with practical examples for integrating AI into teaching. By the end, learners will understand how to use Generative AI in education, enhancing engagement and personalization, while being aware of its potential risks.

Course Keywords

- Alibaba Cloud Platform
- Qwen LLM model
- Hands-on Cases

Course Outline

- Introduction to AI
- How to Apply AI
- A Glance at Generative AI
- A Snapshot of Large Language Models (LLMs)
- How to Use Generative AI in Education
- Not All That Glitters is Gold
- Overview of Alibaba Cloud Model Studio Demo

Course Duration

< 2 HOURS

Recommended Training Duration

4 - 6 HOURS

Course Components

12 VIDEOS | 6 QUIZZES | 1 FINAL EXAM

Course Link

C5

TEACHING WITH AI: PRACTICAL TIPS AND PROMPTS

Target Audience
• Teachers & Educators • Education Professionals • Instructional Designers

Course Overview

In this course, you'll explore the transformative impact of Generative AI and Large Language Models (LLMs) on education, learning and knowledge work. Whether you're an educator seeking to enhance your classroom with LLMs or just curious about the evolving role of LLMs in education, this 7-section course promises to equip you with the knowledge and prompt skills needed. This course provides various usable prompt templates for educators as well as students.

Course Keywords

- AI Understanding
- LLM Integration
- Prompting Skills
- Practical Framework
- Task-Oriented Approach

Course Outline

- How Does Generative AI work?
- How to Use LLMs in Education?
- A Guide for LLMs Prompting
- Prompts for Educators
- Generative AI and Education

Course Duration

< 3 HOURS

Recommended Training Duration

4 - 6 HOURS

Course Components

7 VIDEOS | 1 QUIZ | 1 ASSIGNMENT

Course Link

university cooperation, and from improving educational quality to expanding digital education, this project is injecting new vitality into Mongolian higher education.

The IIOE Micro-Certification Project in Mongolia has adopted a phased capacity-building model, centred on a competency-based curriculum and highly localised implementation. The project first selects core faculty members to complete AI education training in English, then trains them to become instructors. Course content is subsequently fully translated into Mongolian and adapted into local teaching materials, enabling large-scale dissemination.

To date, the project has initially engaged 300 faculty members at MUST, subsequently expanding to include 500 educators from six

state-owned universities and a further 1,200 from other higher education institutions across the country. This tiered "training of trainers" model ensures both the quality and scalability of capacity building efforts, thereby facilitating the systematic integration and dissemination of AI education within Mongolia's higher education sector.

The Localised Recognition Mechanism of IIOE Micro-Certification

As part of the IIOE Micro-Certification Project, the certification mechanism has been closely integrated into the faculty training system of the Open Education



Institute at MUST (MUST-OEI), covering both pre-service and in-service teacher development. A joint certification model between UNESCO-ICHEI and MUST has been adopted, positioning the micro-certifications as a valuable complement to the national teacher training framework.

Significant progress is also being made in academic recognition. Specifically, the ICT Competency Framework for Teachers is now accepted as an elective course towards teacher qualification, carrying 2–3 credits. Furthermore, micro-certification credit recognition has been extended to master's programmes in Education Management and Education Study. In the Education Management programme, the courses Open Education and Blended Learning

Approach are recognised as electives, each awarding 3–6 credits. In the Education Study programme, Educational Technology and Blended Learning Approach are similarly accredited.

Initial Success of the IIOE Mongolia Pilot Project After Three Years

This "digital empowerment" initiative stems from the deep and long-term collaboration between MUST and UNESCO-ICHEI. In December 2019, UNESCO-ICHEI, together with global partners including MUST, jointly launched IIOE. In January 2022, MUST

Name of Education Program		Subject	Credits
Education Management	Master degree formal program	1. Open education 2. Blended learning Approach	3-6 credits
Education Study	Master degree formal program	1. Education Technology 2. Blended learning Approach	3-6 credits
Teaching License training	Informal program	1. ICT competency framework for teachers	2-3 credits

Localised Certification Mechanism



IIOE Pilot Project in Mongolia

Blended Learning Capacity Building for STEM Teachers

officially became the IIOE National Centre in Mongolia, and Mongolia was designated as one of the IIOE pilot countries.

During the COVID-19 pandemic, Mongolian higher education institutions recognised the urgent need to develop blended teaching capabilities. A joint survey by MUST-OEI and UNESCO-ICHEI found that university lecturers faced significant challenges in implementing blended learning, including a lack of benchmarks and guidelines, insufficient training, and limited institutional support. In response to these needs, the IIOE Mongolia Pilot Project was launched.

This project is one of the first demonstration initiatives for blended teaching capacity building in Mongolian higher education. It showcases a classic blended learning model, encompassing overall course design, in-person assessment, and online evaluation, enabling lecturers to gain substantial practical experience. The project has developed a blended teaching guide, open textbooks, and course evaluation tools,

providing a systematic framework for online education.

Through a tiered training system, 65 master trainers have been developed and a total of 450 university lecturers have been trained.

In terms of collaboration, the project has successfully connected Mongolia's leading universities, faculty development institutions, and education authorities, significantly raising awareness of blended teaching across the higher education sector.

Coming Soon: 2025 High-Level Policy Dialogue in East Asia

The IIOE Micro-Certification Project, like a spring breeze across the steppe, continues to support the digital transformation of higher education in Mongolia. On 30th June, 2025, the 2025 High-Level Policy Dialogue in East Asia, themed "Fostering an

AI-enabled Higher Education Ecosystem", will be held in Ulaanbaatar, Mongolia. The event will be co-hosted by the UNESCO Regional Office for East Asia (UNESCO Beijing), the Ministry of Education (Mongolia), Ministry of Digital Development, Innovation and Communications of Mongolia, the Mongolian National Commission for UNESCO (MNCU), IIOE National Centre in Mongolia (MUST), and UNESCO-ICHEI. The dialogue will engage stakeholders from East Asia and surrounding regions involved in higher education. Mongolia's practical achievements and future vision under the Micro-Credentials Project will become a key focus of the conference, offering valuable insights for the digital transformation of education across the region. Participating universities will also share innovative experiences in developing AI education resources tailored to local needs, leveraging the IIOE Open Ecosystem Alliance.

This dialogue will not only serve as a platform for showcasing achievements, but also as a meeting of minds, signalling a new phase of deeper and broader collaboration in the digital transformation of higher education across East Asia.

The successful localisation of the IIOE Micro-Certification in Mongolia not only highlights the leading role of the IIOE National Centre in Mongolia in driving the country's higher education digital transformation, but also provides replicable and reference-worthy experiences for other IIOE National Centres seeking to localise similar initiatives. Moreover, the project vividly reflects the vision of building a lifelong learning hub accessible to all, contributing valuable insights to the global advancement of digital education.

2025 High-Level Policy Dialogue in East Asia:
Fostering an AI-enabled Higher Education Ecosystem

30 June 2025 | Ulaanbaatar, Mongolia

Supported by

UNESCO MINISTRY OF EDUCATION MINISTRY OF DIGITAL DEVELOPMENT, INNOVATION AND COMMUNICATIONS UNESCO

Knowledge Sharing

Analysis of Current Trends and Activities Related to the Integration of Artificial Intelligence into Higher Education in Central Asia and Beyond

The study on the integration of artificial intelligence into higher education in Central Asia and Beyond draws on the outcomes of the high-level Central Asia Policy Dialogue held in Uzbekistan in June 2024, as well as research conducted by Tashkent University of Information Technologies. It provides an overview of the current status of AI integration at both national and institutional levels across CIS countries and offers recommendations based on the discussions at the conference.



Report on Digital Transformation in Higher Education in Southeast Asia

In Southeast Asia, where civilisations converge and cultures are diverse, the digital transformation of higher education is being accelerated through a variety of initiatives. Despite many important achievements, problems such as weak digital infrastructure, increasing digital divide, insufficient policy coordination and lack of implementation still exist. UNESCO Bangkok and UNESCO-ICHEI have jointly conducted a study to examine how digital technologies are reshaping the landscape of higher education in Southeast Asia, with a focus on the challenges, opportunities, and strategies to navigate the digital transformation of higher education.

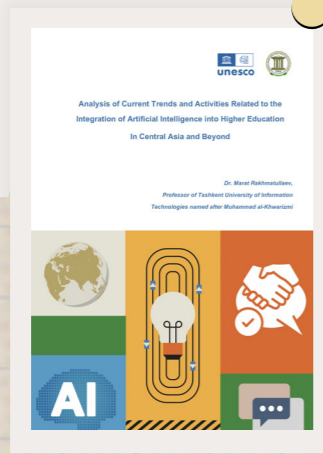
Report on Digital Transformation in Higher Education in South Asia

In recent years, higher education in South Asia has undergone profound changes with the rapid development of digital technologies and increasing global interconnectivity. The application of information and communication technologies (ICT) has led to a profound rethinking of the traditional education model, giving rise to a new paradigm of education that focuses on flexibility, accessibility and personalised learning, and posing many challenges. *The Digital Transformation of Higher Education in South Asia Report* was produced timely to review the trends and situations. The report, co-authored by experts and education practitioners from South Asia, focuses on Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, and consolidates and analyses the diverse strategies and innovations that these countries are adopting to address the challenges and opportunities of digital transformation.



Understanding Trends, Activities, and Recommendations Regarding AI Integration in Higher Education in Southeast Asia

This report reviews the outcomes of the High Level Policy Dialogue on GenAI integration in higher education in Southeast Asia. By reviewing the experience and initiatives from international organisations and SEA countries, examining national policies, institutional innovations, and implementation challenges, the report summarises key takeaways from the policy dialogue and identifying regional trends, providing recommendations for policymakers, educators, and stakeholders to advance AI integration in higher education in Southeast Asian countries.



Digital Transformation of African Higher Education in an AI Era: Snapshots on Progress—Building on the 2024 High-Level Policy Dialogue in Dakar, Senegal

Taking the 2024 African High-Level Policy Dialogue in Dakar, Senegal as a point of departure, this report systematically presents typical practices of digital transformation of African higher education in the era of artificial intelligence. Using a combination of data from the presentations at the Policy Dialogue and desk research, it focuses on 15 representative countries on the African continent, provides an in-depth analysis of the current state of development of the digital transformation of higher education in the convergence of AI, compiles the development trends and existing gaps, and puts forward preliminary policy recommendations. The report also includes a number of case studies, vividly presenting a multi-dimensional picture of the digital transformation of higher education in Africa.



Impact, Inequality, and Imagination: Envisioning a more Ambitious Education in the era of AI

At the closing plenary session of UNESCO's International Day of Education 2025, themed "Artificial Intelligence and Education: Protecting Human Agency in a World of Automation", Professor Jeremy Knox delivered a keynote speech on "Towards human-centred AI in education". In his accompanying commentary article, he discussed how the education sector might interrogate the assumptions underpinning current narratives on AI to better serve educational goals. The article highlights three themes — impact, inequality, and imagination — each pointing to the limitations of existing AI-related research, and calls for a more creative reimagining of education in the era of AI.



Whose Education? The Future of Learning, Labour, and Living in the Age of AI

Current debates on artificial intelligence and education often emphasise technological impacts, while overlooking the fundamental question: for whom is education intended? Although AI has the potential to transform learning, labour, and everyday life, it risks deepening existing inequalities — widening the gaps in access to educational resources and employment opportunities across different groups. The article is part of a series leading up to the launch of a publication on the theme of “renewing the social contract for education.” The theme of the series is based on the call from the report *Reimagining our futures together: A new social contract for education*. The article calls for a re-examination of the aims of education, advocating for the creative use of AI to promote equity and build a more inclusive education system that better serves the public and advances social justice.



Future Universities in a Generative AI World



February 2025
 APRU
 Association of Pacific Rim Universities (APRI)

Future Universities in a Generative AI World

Amid the global surge of generative AI, higher education is undergoing profound transformation. This report highlights a study led by the Association of Pacific Rim Universities (APRU) with support from Microsoft, analysing the current use of generative AI in universities and proposing four future models for university development, including collaborative research labs and digital university alliances. Additionally, it introduces the CRAFT action framework to support institutions in addressing emerging challenges. These insights offer pathways for universities to navigate and thrive in the era of generative AI.

