



北京師範大學
BEIJING NORMAL UNIVERSITY



Global Smart Education Conference 2022

Launching of Global Smart Education Network (GSENet)

Intelligent Technology and Digital Transformation in Education

18 - 20 August 2022

Intelligent Technology

Digital Transformation in Education

Synthesis Report



北京師範大學
一百二十周年校慶
120th Anniversary of Beijing Normal University
1902 - 2022

Beijing Normal University

Beijing Normal University (BNU) grew out of the Education Department of Imperial University of Peking established in 1902, which initiated teacher training in China's higher education. After the development for over a century, BNU has become a comprehensive and research-intensive university with its main characteristics of basic disciplines in sciences and humanities, teacher education and educational science.



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Be in awe of education, for it shapes the soul of human,
Be cautious to technologies, for its adoption has to be effective,
Be entangled with Smart, for the uncertainty tends to be increasing,
Be serious to academies, for the true research needs evidence.

--- HUANG Ronghuai March 20th, 2017

Four gray circles of varying sizes are positioned in the bottom-left and bottom-right corners of the page, serving as a decorative element.

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Organizer



Co-organizer



Hosts



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Executive Summary

To promote the digital transformation and intelligent upgrade in education and strengthen international communication, BNU convened the Global Smart Education Conference 2022 (GSE2022) in conjunction with international organizations, universities and research institutions on 18th-20th August 2022. The theme of this conference is “Intelligent Technology and Digital Transformation in Education”. GSE2022 is organized by Beijing Normal University, co-organized by UNESCO Institute for Information Technologies in Education, and jointly hosted by Smart Learning Institute of Beijing Normal University, China Institute of Education and Social Development, Collaborative Innovation Centre of Assessment for Basic Education Quality, National Engineering Research Center of Cyberlearning and Intelligent Technology, Educational Informatization Strategy Research Base of the Ministry of Education (Beijing), etc.

GSE2022 featured by 12 thematic forums. They are Opening Ceremony & Forum on Digital Transformation for Smart Education, Forum on Teacher Education in Metaverse World, Forum on Promoting Digital Literacy in Smart Learning Environment, Forum on the New Ecology of Regional Smart Education, Teacher Forum on Technology Empowered Teaching Innovation, Student Forum on Learning Crisis and Futures of Education, The 6th International Conference on Smart Learning Environments, Forum on Smart Village and Transformation of Rural Education, Forum on AI-driven Open Education, Forum on Digital Governance of Education, Forum on Reform of School Education in the Intelligent Era, Forum on Leveraging Intelligent Technology for Education Innovation & Closing Ceremony.

Forum participants included government ministers, representatives of international organizations, and academic institutions. Experts and scholars from the fields of education and technology were also invited to discuss new theories, emerging technologies, latest achievements and trends in smart education, share relevant cases, build platforms for communication and establish alliances for cooperation. Altogether more than 200 domestic and overseas speakers attended our conference, including 15 student speakers. GSE2022 provided five participant modes, namely, live streaming, main venue, local venues, ZOOM meeting, and metaverse exhibition. The livestreaming of the GSE2022 was watched by more than 8,000,000 viewers.

GSE2022 released the outcome of a joint project of *Rethinking and Redesigning National Smart Education Strategy, a Report on the Construction Progress of Demonstration Zone of Smart Education and best practices of smart education, and an International Report of Supportive Environment on Artificial Intelligence Courses in K-12*. The Initiative for Global Smart Education Network (GSENet) and the Academic Network for Education of China-CEEC Higher Education Institutions Consortium (CCHEIC) were also launched on the conference.

Our conference seized the opportunities brought by the current era, focusing on “five concerns”:

- the fields of technology and education are both actively influencing each other, and showing a development trend of systematic integration;

- in the face of uncertain crises, the Futures of Education needs a new social contract for transformation, and young students shall take concrete actions to promote the global development initiative;
- we shall not only make full use of intelligent technology to empower teacher professional development but also examine the challenges of teacher education and teacher development brought by the intelligent era in an objective and rational manner;
- building the new ecology of smart education includes but is not limited to the planning of digital strategy and system, the construction of new infrastructure, technology-supported pedagogic transformation, and technology-empowered innovative evaluation; and
- rural revitalization is facing a major issue in all countries. We shall pay equal importance to construct the smart village and the smart city to transform rural education effectively.

Finally, we are pleased to announce that the Global Smart Education Conference 2023 will be held on August 18th - 20th, 2023. We are already looking forward to next year together, and having the opportunity to connect with our friends again.



Group photo of speakers at Opening Ceremony at BNU

Introduction

From 2016 to 2019, Beijing Normal University, jointly with other institutions have held four consecutive US-China Smart Education Conference (UCSEC) to explore the development trend of future educational technologies and released relevant research reports that have exerted great influences.

In order to further understand the latest achievements and development trends in smart education, grasp the influences of AI on the futures of education, discuss the factors, features, plans and potential problems in IT-driven educational development, Beijing Normal University, with the approval from the Ministry of Education, collaborated with international organizations and other Higher Education Institutions to hold the Global Smart Education Conference 2020 on August 20-22, 2020 with the theme of *AI and Futures of Education*.

With a focus on identifying the promise of futures of education, the Global Smart Education Conference 2021 was held on August 18-20, 2021 with the theme of *Smart Learning and Futures of Education*. The plural form of “Futures” emphasized multiple dimensions to the future and appealed to reimagine how education and knowledge shall shape the future of humanity in a context of complexity and uncertainty.

Held on 18-20 August 2022, this Global Smart Education Conference 2022, which is the focus of this report, involved more than 200 speakers from 48 countries, including ministers, vice-minister and experts from international organizations, academic institutions, and private sectors. The conference included 12 thematic forums and took a hybrid mode with online and onsite sessions. International research outcomes

and related sets of cases were released during the event. Technologies including VR/AR were applied to build a metaverse venue to improve audiences’ experience of communication and interaction and also to display our innovative solutions for digital education. The conference also live-streamed and watched by 8 million views. This series of forums has aimed to become a sustainable platform to promote knowledge sharing and the achievement of international agreements in the field of smart education.

Intelligent Technology Empowerment for Smart Education

With the evolution of global digitization, the exploration and practice of technology-transformed education is also expanding from single technology empowerment to multi-dimensions of social transformation, technology empowerment, and educational reform. Technology empowerment is the core value of integrating intelligent technology into education, and student growth, teacher development and environmental upgrading are the core areas of technology-empowered education.

The strategic significance of digital transformation in education is in the same vein with digital China and the digital economy. It means that education shall actively

- adapt to the trend of a new round of technological revolution;
- promote the digital transformation of all elements, all services, all fields and all processes;
- rethink the standards of talent training from the perspective of a smart society;

- optimize and upgrade the digital learning environment;
- change the teaching and evaluation model;
- promote system and mechanism innovation;
- establish an inclusive, fair, green, high-quality and sustainable smart education system that adapts to the intelligent era; and
- improve lifelong learning system that people can learn at any time and anywhere. Finally, it is also necessary to pay attention to regional differences and urban-rural differences, fully consider the digital divide in the application of intelligent technology, establish an inclusive and fair culture, and consider the development of each individual student.

Capacity Building and Teacher Professional Development under Digital Transformation

The fundamental task of education digital transformation strategy is to optimize, innovate and reconstruct the values of organizations and institutions. From the perspective of education system reform, it is the digital transformation of all elements, processes, businesses and fields of education, and the building of a smart education development ecology. The core path is digital capacity building, which aims to improve the digital literacy and skills of students, teachers, administrators and parents. The key drivers of education digital transformation strategy are data and resources. The main aspect of education reform is the classroom; classroom teaching is the core of digital transformation; and teaching content is the foundation of digital applications and services. At present, the application technology and products such as the multimodal data analysis are still immature, and based on the traditional elements, there are still bottlenecks and obstacles in the digitalization of teaching. However, with the help of traditional

paper textbooks and exercise books, digital teaching materials, and intelligent teaching tools and equipment, there will be feasible path for solving the current problem, including exploring new teaching modes, improving classroom teaching efficiency, reducing the burden on teachers and students, and cultivating students' new abilities.

Smart Learning Environment for Digital Transformation

An intelligent learning environment is the basis for realizing the transformation of learning and teaching methods and supporting the development of smart education. At present, both traditional classrooms and multimedia classrooms are single teaching locations or teaching scenes, so the teaching process in different environments is fragmented, the teaching interaction is insufficient, and the learning status is difficult to track. For the digital transformation of the school environment, there are several important focuses, including

- promoting the application of new-generation information technologies;
- optimizing and upgrading basic facilities, hardware equipment, network conditions, intelligent tools, and learning platforms;
- continuing to build smart campuses, smart classrooms, and smart living places;
- creating smart learning space with three kinds of deep integration, namely, time, space and teaching, offline and online, virtuality and reality;
- promoting context-based, experiential, and immersive teaching;
- breaking through the data and information barriers between schools, families and society; and

- using learning analysis, educational data mining and other means to improve the matching of teaching service supply and learning needs.

Educational evaluation is related to the direction of education development and affects the way of teaching and learning to a large extent. Deepening the reform of education evaluation in the new era requires the innovation of evaluation tools as well as the utilization of modern information technologies such as artificial intelligence and big data, which aims to explore new ways for carrying out vertical evaluation of students' whole learning process and horizontal evaluation of all elements of moral, intellectual, physical, aesthetic, and labour.

The trend of the digital reform of education evaluation is to apply big data perception, interconnection, storage, computing and analysis technologies, build cross-regional and cross-scene intelligent assessment system platform and tools, optimize and combine data-based evaluation methods, promote the close integration of the evaluation process with the learning process, complete the evaluation during the learning process, and support the organic combination of large-scale education and personalized training.

Public Service System and Digital Governance of Education

Insufficient capacity for supporting services is the main bottleneck of education informatization in rural areas. Only by improving the national and regional education public service capacity can we effectively promote the digital transformation of education. At the national level, the focuses are on

- strengthening the national smart education public service platform, large resource system and educational brain construction;

- formulating a system for the confirmation, opening, connection and protection of educational big data; and
- promoting data integration between platforms at all levels.

At the regional level, the focuses are on

- integrating and optimizing digital educational organizations;
- making full use of the national smart education public service platform to continuously expand the coverage and application of targeted objects;
- optimizing the supply channels of digital educational resources inside and outside the school;
- meeting diversified educational needs;
- strengthening the governance of digital learning products and services for young people; and
- forming new strategies and capabilities for education digital governance.

Forum Structure

The Global Smart Education Conference 2022 was structured around the following 12 thematic forums:

• Digital Transformation for Smart Education

This forum highlighted the issues on the connotation, international experience and challenges, and implementation path of digital transformation in education. The results of Rethinking and Redesigning National Smart Education Strategy were released, and the Initiative for Global Smart Education Network (GSENet) was launched.

• **Teacher Education in Metaverse World**

This forum conducted in-depth discussions on topics including “the metaverse and its educational potential”, “the application scenarios of the metaverse in education”, “metaverse-empowered teacher education”, and “the AI-driven teacher development”. The discussion provided new directions toward designing innovative metaverse scenarios and technology-empowered teacher professional development. It also suggested new ideas for seeking the development path of high-quality education, reshaping the relationship between main educational stakeholders, and solving educational fairness and other issues.

• **Digital Literacy in Smart Learning Environment**

This forum highlighted the issues on the metaverse and its educational potential, application scenarios of the metaverse in education, the metaverse-empowered teacher education, and AI-driven teacher development. *The Academic Network for Education of China-CEECEC Higher Education Institutions Consortium* was released.

• **The 6th International Conference on Smart Learning Environments**

The International Conference on Smart Learning Environments 2022 will be jointly held on August 18-20, 2022 at the Hangzhou Normal University, The International University of La Rioja, and Near East University. The theme is “Intelligent Technology Enhanced Smart Learning”. It aims to bring together researchers, practitioners, and policy makers to discuss issues related to the optimization of learning environments to enhance learning. The focus is on the interplay of pedagogy, technology and their fusion towards the advancement of smart learning environments.

• **New Ecology of Regional Smart Education**

This forum highlighted the issues on the digital transformation in education and the development of regional smart education, the construction of smart campuses and new ecology of education, the construction of regional smart education empowered by intelligent technologies, and the innovative management and application of smart education.

• **Student Forum on Learning Crisis and Futures of Education**

This forum highlighted the issues on solving the learning crisis through transforming learning environments and developing learning methods, developing competencies for sustainable development among rural students, and integrating resources to achieve inclusive education.

• **Teacher Forum on Technology Empowered Teaching Innovation**

This forum highlighted the issues on technology-empowered teachers' professional development, application, and exploration of technology in teaching, technology-supported smart teaching and research, empirical research on teaching intervention, etc.

• **Smart Village and Transformation of Rural Education**

This forum highlighted the issues on the opportunities and challenges brought by the digital transformation in education to rural education and rural transformation; the development status, successful cases and experiences of smart village and rural (education) transformation in various countries and regions; and how to plan, implement, and assess the sustainability of smart village and rural development.

- **AI-driven Open Education**

This forum highlighted the issues on how can open education and artificial intelligence promote more inclusive and equitable education, how to improve the teaching effect in open education through artificial intelligence, the advantages and limitations of AI in open education, and whether the integration of AI strengthen or reduce bias in open education.

- **Digital Governance of Education**

This forum highlighted the issues on cutting-edge digital technology, rural education governance, the application and governance of “Internet + education”, and digital transformation in regional education, aiming to explore new data-based educational governance models.

- **Reform of School Education in the Intelligent Era**

This forum conducted in-depth discussions on salient topics, including how intelligent technology empowers the high-quality development of basic education, the future prospects of school education in the intelligent era, students' mental health assessment and inquiry-based learning in the intelligent era, and the path and practice of digital transformation in primary and secondary schools.

- **Leveraging Intelligent Technology for Education Innovation**

This forum highlighted issues on the connotation, application scenarios, scientific problems, and key technologies for leveraging intelligent technology for education innovation. The exploration and practice of how to leverage intelligent technology for education transformation is seen from four dimensions, namely, social transformation, technology empowerment, education reform and reform in an orderly manner.

Opening Speeches

Speakers at the opening ceremony spoke about the implementation of strategic action of digital transformation in education, and the promotion of sustainable development of smart education. They are **Mr LEI Chaozi**, the Director of the Department of Science, Technology and Informatization, on behalf of **H.E. Mr ZHONG Denghua**, the Vice Minister of the Ministry of Education of P.R.C; **Mr MA Jun**, the President of Beijing Normal University; **Professor ZHAO Qiping**, the Academician of the Chinese Academy of Engineering; **H.E. Mr Branko Ruzic**, the First Deputy Prime Minister and Minister of Education, Science and Technological Development in Serbia; **HRH Princess Adejoke Orelope-Adefulire**, the Senior Special Assistant to the President on SDGs in Nigeria; **H.E. Mr Azat Athalye**, the Deputy Minister of Education in Turkmenistan; **Professor ZHAN Tao**, Director of UNESCO IITE.

On behalf of **H.E. Mr ZHONG Denghua**, who is the Vice Minister of the Ministry of Education of P.R.C, **Mr LEI Chaozi**, the Director of the Department of Science, Technology and Informatization, addressed the conference. He emphasized the Chinese government has always given priority to education during economic and social development. The government also adheres to fair, inclusive, and high-quality development, reform and innovation. At present, the new form of education promoted by intelligent technology puts forward new and higher requirements for educational reform. The Chinese government has attached great importance to the impact of new technologies in education, actively promoted the digital transformation and intelligent upgrading in education, built a Smart Education Platform in China, and expanded the coverage of high-quality education resources. Moreover, it strengthened the application of educational big data and

MODERATOR

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Vice President, Beijing Normal University, China

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Mr MA Jun

President, Beijing Normal University, China

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Vice Minister of Education, Turkmenistan

Prof. ZHAN Tao

Director, UNESCO IITE

Prof. HUANG Ronghuai

Co-dean, Smart Learning Institute of BNU

actively created a digital education governance system with Chinese characteristics. Overall, it accelerated the improvement of the infrastructure for information technology in education, and built a high-quality education support system. He proposed to reshape the educational goal in the intelligent era, vigorously promote the digital transformation of education, and strengthen the opening and cooperation of smart education to achieve the sustainable development goals of education.

Colleges and universities play an important role in the reform and development of education. **Mr MA Jun**, the President of Beijing Normal University, pointed out several important issues:

- more attention is needed for the teachers training in rural areas, especially in remote and ethnic areas;
- there is a need to actively promote the transformation of teachers' roles and improve teachers' digital literacy;
- rely on AI, big data, virtual reality and other technologies, and provide supports for the pre-service and post-service integration reform of teacher education;
- local government and school leaders should design smart campus and a new generation of the learning environment; and
- encourage teachers to be proactive in the front line of teaching and be able to carry out research to provide solutions for the better integration of intelligent technology into education and teaching.

Professor ZHAO Qiping, the Academician of the Chinese Academy of Engineering, pointed out the current digital transformation of education and smart learning are becoming a new stage for the development of education informatization. In the process of the systematic reform of education, the digital ability of teachers, students and managers is the key focus. Users are the most important factor in education. Therefore,

technology should be applied by users to serve teaching and improve people's digital literacy and skills. The innovative development of education informatization is a systematic project. It is important to seize the opportunity of new infrastructure construction in education and provide digital learning content, platforms and tools for better teaching and learning to improve the level of digital education services and governance.

The First Deputy Prime Minister and Minister of Education, Science and Technological Development in Serbia, **H.E. Mr Branko Ruzic**, expressed the practical exploration of China's digital transformation of education had brought great inspiration to Serbia. Serbia is actively improving the construction of educational infrastructure, enhancing the digital ability of schools, teachers and students, promoting the digital transformation of education, and improving the flexibility and quality of education.

The Senior Special Assistant to the President on SDGs in Nigeria, **HRH Princess Adejoke Orelope-Adefulire**, stressed that high-quality education is the best investment, in which everyone can receive an education in a healthy and sustainable society. The Nigerian government is implementing the requirements of the United Nations SDG4 in increasing investment in education, eliminating the digital divide, and promoting the supply of sustainable educational resources. She also referred to the cooperation between Nigeria and the Chinese Digital Technology Company that had played a positive role in curriculum reform and the improvement of teachers' teaching levels.

The Deputy Minister of Education in Turkmenistan, **H.E. Mr Azat Athalye**, noted that the application of digital technology in education is a trend for future development. With the development of network technology, online learning methods and traditional education models will gradually be integrated.

Turkmenistan is committed to building a digital education system, improving the digital infrastructure, establishing an international cooperation network, and promoting the technological upgrading of the education system.

UNESCO is committed to helping and supporting the planning and practice of member states in the field of AI and education, building a global education cooperation network, ensuring inclusive and equitable quality education, and promoting lifelong learning opportunities for all. **Professor ZHAN Tao**, Director of UNESCO IITE, pointed out achieving this goal depends on the joint efforts of global partners. He believed China's forward-looking plans and innovative practice presents encouraging examples. UNESCO IITE and Beijing Normal University have carried out close cooperation. In particular, since the outbreak of COVID-19, the two sides' exploration of smart education has received strong support and positive response from experts and scholars around the world.

Rethinking and Redesigning National Smart Education Strategy

At the opening ceremony, on behalf of the project expert team, **Professor HUANG Ronghuai**, who is the Co-Dean of the Smart Learning Institute of Beijing Normal University, reported the research results of "Rethinking and Redesigning National Smart Education Strategy" and launched the "Initiative for GSENet".

The "Rethinking and Redesigning National Smart Education Strategy" was jointly launched by the UNESCO Institute for Information Technologies in Education (UNESCO IITE), Commonwealth of Learning (COL), International Society for Technology in Education (ISTE), National Research University Higher School of Economics (HSE) and Beijing Normal University (BNU). Various institutions worked together to sort out the experience of smart education in various

countries and explore the development strategy of smart education. It has formed a series of research achievements such as the National Smart Education Framework, the Global Smart Education Policy Analysis, the National Smart Education Evaluation index, the National Public Service System for Smart Education, and the Smart Campus Design for Future Education.

In order to better promote the development of global smart education and effectively promote the digital transformation of education, the project research team gives five suggestions for the future development of smart education:

- teachers, managers, and stakeholders should recognize the important role of smart education;
- governments should promote the development of smart education according to strategic levers;
- policymakers should review, analyze and formulate relevant national education policies from the aspects of information infrastructure, digital education resources and platforms with the goal of smart education;
- local government and school leaders should design smart campus and a new generation of the learning environment; and
- all stakeholders should promote and strengthen cooperation under the smart education strategy.

Initiative for Global Smart Education Network (GSENet)

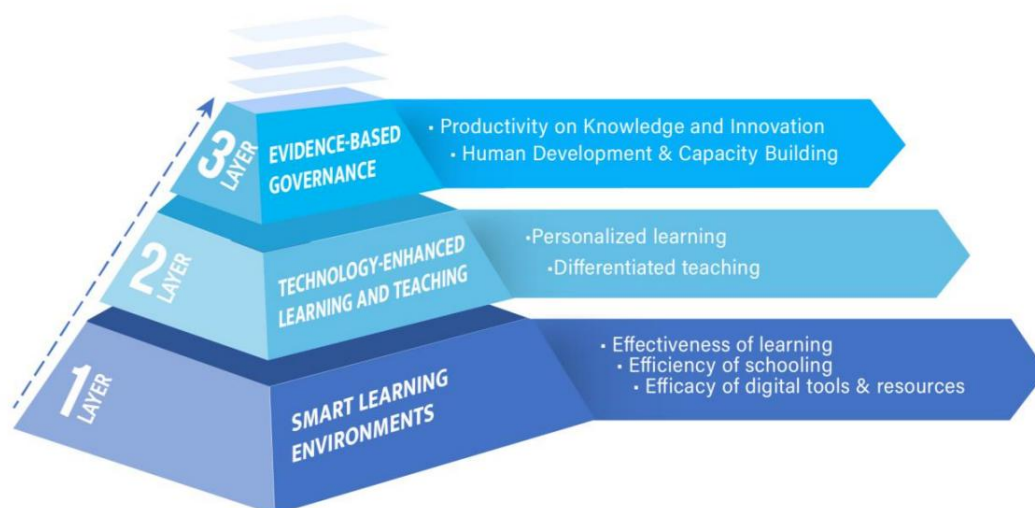
During the conference, the "Global Smarter Education Network" (GSENet) was officially launched aiming to establish an international smart education network of researchers, practitioners, technical experts and policy makers to support countries in rethinking and designing

education systems at the national, regional and school levels. The rapid development of big data and artificial intelligence has made an increasingly deep impact of technology on society. Adapting individuals and communities to the uncertain and complex future is an important issue in educational development. Moreover, smart technology contains huge potential for change, which needs to be transformed into an effective and practical way through smart education. **Professor HUANG Ronghuai** said: “The world needs to conduct joint research and exploration on smart education, form strategies and solutions to reshape and innovate education, and establish an equal, inclusive and high-quality smart education to meet the diverse and personalized needs of everyone in the future.”

The network is composed of Beijing Normal University, UNESCO Institute of Information Technology in Education (UNESCO IITE), Arab League Educational, Cultural and Scientific Organization (ALECSO), Commonwealth of Learning (COL), International Society for Technology in Education (ISTE), and the Southeast Asian Ministries of Education Organization (SEAMEO). The Smart Learning

Institute of Beijing Normal University serves as the secretariat of the network. The network will conduct consultations and discussions on the development of smart education in various countries, and promote the integration and innovation of the new generation of information technology and education.

In the future, the “Global Smart Education Network” will promote the deep integration of a new generation of information technology and education, and promote equal and inclusive high-quality education for all, lead the development of global smart education from the aspects of concepts, methods and systems, promote a balanced, equitable and high-quality development of education in various countries, respond to UNESCO’s “Future of Education” initiative to reach the SDG 4 targets.



Three layers of Smart Education

Initiative for Global Smart Education Network (GSENet)



GSENet Vision

Looking to 2030 and beyond, GSENet seeks to leverage emerging technologies to promote equal and inclusive high-quality smart education for all to achieve the targets of SDG 4, with the vision:
Networking with the best for a global smart education to ALL

GSENet Mission

- To connect educational technology organizations for disseminating generic policies and innovative strategies at national, regional, and school levels towards achieving SDG 4 targets;
- To promote state-of-art technologies, practical experiences, and best practices to serve researchers, teachers, and technicians in supporting the development of smart education.

GSENet Activities

- To hold official conferences and present outcomes from the GSENet for sharing innovative ideas and best practices to GSENet members and beyond;
- To create a set of toolkits for assessment and monitoring to support GSENet members with IT solutions in Smart Education by using academic and practical experiences from Ministries of Education;
- To produce annual report of GSENet community disseminating the status of Smart Education in each region from the network;
- To offer guidance, in association with UNESCO IITE E-Library, on OER, OEP and Smart Learning by providing tutorials to customize resources for the regions who are joining the GSENet;
- To conduct teacher and technician training programmes in cooperation with GSENet member organizations (ALECSO, SEAMEO, COL, ISTE, IASLE, and others) by using and establishing training centers in the GSENet regions.

GSENet Organizations

Founding Members

- Beijing Normal University (BNU)
- UNESCO Institute for Information Technologies in Education (UNESCO IITE)
- Commonwealth of Learning (COL)
- Arab League Educational, Cultural and Scientific Organization (ALECSO)
- International Society for Technology in Education (ISTE)
- Southeast Asian Ministers of Education Organization (SEAMEO)

The Secretariat

Smart Learning Institute of Beijing Normal University (SLIBNU)

Academic Board

- The Academic Board has representatives from each GSENet member and is responsible for the development, agreement, and oversight of the academic standards, regulations, and quality of research projects and programs for Smart Education.
- The member of the Academic Board includes the distinguished scholars and scientists, the academic coordinators of each member institution, and any experts recommended by the members of the Academic Board.

Digital Transformation for Smart Education

In recent years, the construction and application of education informatization in China have continued to advance. The Chinese government has released strategic and policy documents such as *China's Education Modernization 2035 plan*, *The New Generation Artificial Intelligence Development Plan*, *Education Informatization 2.0 Action Plan*. The Chinese Ministry of Education's annual work points include the proposal of implementing the strategic action of education digitalization as well as accelerating digital transformation and intelligent upgrading. The strategic significance of digital transformation in education is in the same vein with digital China and digital economy.

Digital Transformation for Smart Education requires us to rethink the talent training from the perspective of building a smart society, to optimize and upgrade the digital learning environment, to transform the teaching and evaluation model, to promote the innovation of systems and mechanisms, to establish an inclusive, fair, green, high-quality and sustainable intelligent educational system that adapts to the intelligent era, and to improve the lifelong learning system that enables all learners to learn at anytime, anywhere.

Mr LEI Chaozi, Director of the Department of Science, Technology and Information, Ministry of Education, delivered a speech on "Seize the Opportunity of Digital Transformation and Build a New Ecology of Smart Education". He pointed out the digital transformation of education is not only essential for building a digital China, but also a strategic choice to seize the climax development. It is also an internal demand for the high-quality development of education, and

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Academician of Chinese Academy of Sciences

Prof. ZHONG Binglin

Committee member of the State Education Commission of P.R.C

Prof. ZHENG Qinghua

Senior Expert of UNESCO IBE

Mr Renato Opertti

Vice Minister of Education, Turkmenistan

Prof. Rebecca Eynon

University of Oxford, UK

Prof. Rory McGreal

UNESCO/ICDE Chair in Open Educational Resources

Mr WANG Hongtao

President of UNISED, China

1 See <https://www.smartedu.cn/>

the only way for China's education to rise from a basic equilibrium to a high-level equilibrium, and from an educational country to an educational power. At the beginning of this year, the Ministry of Education of the People's Republic of China made an important deployment for the implementation of the national digital education strategy, focusing on building the platform of *Smart Education of China*. The construction and application have gradually risen, which will help accelerate the systematic reform of education and comprehensively realize the digital

transformation of education. He mentioned in order to jointly cope with global crises and challenges, we should further stimulate and release the vast energy of technology and education integration, strengthen international exchanges and cooperation, contribute to global education development and the realization of the 2030 education goals, and highlight the responsibility and undertaking of the education system in building a community with a shared future for mankind.

The Chinese Ministry of Education launches National Smart Education Platform²

The MOE held a ceremony to launch the National Smart Education Platform on March 28, 2022. Minister of Education Huai Jinpeng attended the ceremony and announced the official launch of the platform.

The minister said that the launch of the platform, as a milestone achievement of the education system in advancing digitization, would greatly help bridge the “digital divide”, and generate more momentum for the ongoing digital transformation of China’s education system. He urged local educational departments to promote the use of the platform and explore other IT solutions in order to help build modern educational infrastructure. As a next step, he said a public service system for educational digitalization would be built, prioritizing services for students and teachers amid a new round of COVID-19 outbreak. A result-oriented approach and a focus on effectiveness and efficiency would be vitally important, he said. In addition, institutional mechanisms had to be strengthened to bring together all stakeholders in building this service system. Cooperation and exchanges with the rest of the world would also be necessary, as China strives to be an international leader in smart education.

The platform comes with easy-to-use applications and tools tailored to the needs of school students and offers abundant digital resources.



2 See http://en.moe.gov.cn/news/press_releases/202204/t20220411_615580.html

Professor GONG Ke, Executive Dean of Chinese Institute of New Generation Artificial Intelligence Development Strategies (CINGAI), pointed out the digital transformation of education is the digital innovation of teaching tools and the digital reform of teaching content and teaching mode. The success of digital innovation of teaching tools hinges on the research and development of teaching facilities using digital technology. The success of the digital reform of teaching content and mode requires a sound digital technology curriculum system, as well as an open, inclusive, multidisciplinary, and problem-oriented learning environment. He proposed three measures:

- putting a premium on basic subject learning and integrating interdisciplinary and cross-field knowledge transformation
- combining technical and social attributes in the teaching process to promote learning through practice; and
- developing a team of qualified teachers with expertise and responsibility.

Professor ZHANG Jingzhong, the Academician of the Chinese Academy of Sciences, pointed out in his report titled “Intelligent Mathematics Education Technology for In-depth Disciplines” that the basic education software of disciplines is full of vitality, and the mathematical intelligent education software could alleviate the burden of teaching and make learning enjoyable. He believed there are five ways for intelligent mathematics education technology to facilitate the digital transformation of education:

- building a digital and intelligent teaching resource operating environment;
- staying open and integrated to upgrade educational resources and software and hardware products;
- co-creating and sharing resources and shifting from a supply-driven model to a demand-driven model;

- building an application environment for the integration of mathematics teaching and learning, i.e., an Internet Mathematics Laboratory;
- building a technological model with intelligent mathematics education technology to change the way of teaching and learning.

Digital transformation is essential for educational reform and progress. The integration of IT into education and teaching presents new challenges for the role of teachers, their relationship with students, and the learning process. **Professor ZHONG Binglin**, the committee member of the State Education Commission of P.R.C, indicated the support of the digital economy talent pipeline, fundamental theories, and critical technologies are desperately needed for the digital transformation. He further noted that it is necessary to assemble a high-quality and professional faculty through systematic project research and development, curriculum training, etc., and comprehensively improve teachers’ informatization and digital literacy. The rapidly developing digital economy has given rise to a critical governance proposition for the digital transformation of education. He stressed that it is necessary to actively respond to the new challenges for the digital transformation of education, including rethinking what education should be and how to deliver it, strengthening team building, and optimizing the governance system.

Professor ZHENG Qinghua, Vice President of Xi’an Jiaotong University, talked about the fourth industrial revolution and educational innovation, and emphasized the new generation of information technology, represented by AI, is rapidly catalyzing the fourth industrial revolution and setting off a new wave of the industrial revolution – technological revolution – which in turn reshapes the education revolution. He

analyzed the historical revelation of the development of higher education, discussed the new missions and challenges imposed by the new era, and put forward critical tasks and measures for future innovation based on the status quo. This included a profound understanding of education laws and direction; focusing on the fourth industrial revolution to innovate discipline and major setting; strengthening the training of talents in fundamental disciplines; emphasizing the deep integration of theory and engineering practice; vigorously utilizing AI and other technologies to empower educational innovation and development.

Mr Renato Opertti, the senior expert from IBE-UNESCO, made a presentation on “Curriculum Reform in the Post-pandemic Era.” He introduced the Chinese version of the “Guidance Framework for Blended Education, Learning, and Evaluation” issued by the IBE-UNESCO and Smart Learning Institute of Beijing Normal University. The framework identifies key strategies for implementing blended education, learning, and evaluation, as well as providing principles for reforming the curriculum and the teaching practice. It also extensively adopts technologies to facilitate blended learning of teaching, learning, and evaluation. He mentioned about flexible teaching, promoting the development of human potential and the distribution of equal educational opportunities, which eventually leads to contributing to the realization of Sustainable Development Goals.

Professor Rebecca Eynon from the University of Oxford shared her views on the challenges and possibilities of using smart technologies for education. She suggested we move away from a very strong focus on educators and what educators believe the future of education should look like but more to thinking about the growing role of computer scientists, physicists, and engineers in this space, who have much of the technical capabilities. Looking into the future,

she listed five key elements for shaping the future direction with respect to thinking about smart technologies: understanding the changing ecology of education, building systems that facilitate agency and applying the logic of augmenting expertise, ethics, fairness, accountability, and transparency.

Professor Rory McGreal, UNESCO/ICDE Chair in Open Educational Resources, delivered a report and shared his practical experience focusing on micro-credentials, open educational resources, and digital transformation. He noted that the difference between micro-credentials and regular credentials is that the latter has short duration, narrow in scope, and for educational or training activities. Behind micro-credentials is the possibility for learners to develop their own personal pathways to formal credentials such as certificates or degrees. He believed one of the reasons for high demand of micro-credentials is the need to provide short-timeframe opportunities for upskilling and reskilling.

The prevalence of new business and service models and enterprises plays an essential role in the tech-driven digital transformation of education. It also provides ubiquitous cloud and intelligence support and solutions for educational activities. **Mr WANG Hongtao**, the President of UNISED, believed technological innovation is crucial to developing the digital economy. In addition to the introduction of talents, technology enterprises need to implement personalized learning and large-scale individualized teaching through the bi-directional empowerment of education and technology to bridge the digital gap and foster the development of innovative talent of the highest caliber.

Digital Transformation for Smart Education

Key takeaways

- Equipping schools with appropriate ICT infrastructure and promotion of the flexible physical spaces during the use of technology are the basic prerequisites for the implementation of innovative approaches to teaching and learning.
- Until we tackle this digital education divide, together with the (rural-urban) divide, generation divide and gender divide, the opportunities offered by the digital transformation of education will remain out of reach for billions.
- The future of education lies not in the partial changes or marginal innovation of the existing education system. Rather, it will be a brand new educational ecosystem that is developed to promote learning, literacy and abilities.
- The digital transformation of education is a process of promoting the deep integration of digital technology and education. That is using digital technology to renew educational concepts, transform education models, and promote intelligent upgrading.
- In the development of education informatization, although factors such as environment, resources, and data are important, the most significant one is "people". Technologies shall be used by people and served the teaching and learning process for teachers and students.

Teacher Education in Metaverse World

Education is one of the main fields of designing innovative metaverse world, providing an immersive and interactive teaching and learning experiences for teachers, students, and other educational stakeholders. It also meets the teaching and learning needs of teachers and students in both the physical world and the virtual world. Carrying out the metaverse research in the field of education will help to further clarify its connotation and future trend, and provide new ideas for seeking a high-quality educational development path, reshaping the relationship between education subjects, and solving problems such as educational equity. As the users of the metaverse, teachers shall explore how metaverse could be applied in teaching, evaluation and management, which would help them better adapt to the development trend of technology-empowered educational innovation and change.

Professor ZHU Xudong, Dean of the Faculty of Education of Beijing Normal University, believed the new technology is expected to significantly impact teaching scenarios, teaching resources, teaching organization and evaluation through the deep integration of virtuality and reality, online and in-person teaching. Such technology not only brings new opportunities for teacher development but also makes new requirements for teaching ability. Courses on teacher education and instructional methods need to be upgraded and innovated to respond to the opportunities and challenges brought by the changes of the times and technological development.

Professor Getachew Engida, Former Africa Assistant Officer of UNESCO, highlighted that the era of sustainable development calls for innovation, which comes from new systematic

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University of Craiova, Romania

Prof. Cynthia Calongne

Parker University, USA

Prof. Stylianos Mystakidis

University of Patras, Greece

Dr. Lik-hang LeeAssistant Professor, Korea Advanced
Institute of Science and Technology, Korea**Dr. Gaana Jayagopalan**Associate Professor, Alliance University,
India

thinking, new operating methods and technologies. There is a long way to go to achieve the goals set by the 2030 Agenda for Sustainable Development. The international community will make joint efforts to explore the potential of technology and innovation.

The Potential of the Metaverse in Education and Teacher Professional Development

Professor CHEN Zhong from the School of Computer Science of Peking University delivered a keynote speech on "The path of innovative development of the integration of metaverse and Web 3.0". He pointed out the metaverse

provides new development opportunities for future education. He systematically discussed the role of blockchain played in the metaverse in education and shared the innovative application scenarios of the metaverse and Web3.0.

Mr Awol Endris Adem, Education Programme Specialist at UNESCO Regional Office for Eastern Africa, highlighted the issues on teachers, the digital divide and the metaverse. He proposed that teachers shall be equipped with better digital skills to teach in the metaverse world; otherwise, the use of new equipment and technologies will bring much cognitive load to teachers. Metaverse can also enrich teaching content and provide support and assistance for teacher training.

Professor LIU Geping, the Vice Chairman of China Higher Education Information Academy (CHEIA), focused on "Metaverse-supported Teacher Development Scenarios" and gave further elaborations, including the scenarios of simulating teaching trials, improving teaching adaptability, rehearsing classroom management, promoting teaching interactions, enhancing the ability of empathy, and supporting teaching reflection.

Ms Annie Ning, Director of Asia Affairs of International Society for Technology in Education (ISTE), cared about how to improve students' learning motivation. Taking the subjects of Chinese, mathematics, and English as examples, she emphasized the influences of scenes, tasks, games, and other factors on students' learning motivation through a detailed explanation of several teaching cases, which inspires the innovative design of pedagogic activities.

Dr. Temechegn Engida, Programme Officer at International Institute for Capacity Building in Africa (IICBA), shared his thoughts on "Capacity Building of Teachers and Teacher Educators in e-Learning Content Development and e-

Assessment in Africa” based on his working experiences at IICBA. In Africa, the traditional approach to e-learning costs a lot for teachers, and teachers are only seen as consumers of digital content. He encouraged teachers to set up teams, use affordable technologies to design curricula and work together on the analysis, design, development, implementation, and evaluation of e-learning content.

Mr CHEN Hong, Senior Vice President of NetDragon, shared his thoughts and practices on the great technological convergence of metaverse in education. He presented a video on the metaverse to let audiences experience how the metaverse is applied in real-world teaching and pointed out the advantages of the metaverse, such as promoting personalized learning, stimulating learning interests, enhancing learning effects, and optimizing experiment or training modes. He also introduced how the teaching content is produced for the metaverse world from a technical level.

Professor Colin De La Higuera from the University of Nantes in France focused on Artificial Intelligence and Open Education. He introduced some ongoing projects, including Open Education Global 2022, FLORILEGE, and Multiling-OEG, based on which he reflected on the project practice about "industrial takeovers education" and "the supervision of open education resource".

E-Library for Teachers: Helping Global Teacher Capacity Building

Since its release in 2021, the project “E-Library for Teachers” has provided teachers around the world with services in several languages, such as open educational resources and educational training, opportunities for communication and interaction, and resource co-construction and co-sharing. It covers five regions, including Eastern Europe, Asia, Africa, the Middle East and the Commonwealth of Independent States, and benefits nearly 100,000 educators.

E-Library for teachers³

To boost teacher ICT competency development, provide educators with advanced digital resources and AI-based educational solutions, strengthen teaching networks, and overall contribute to capacity building in target regions, UNESCO IITE and a global leading creator of Internet communities NetDragon have joined efforts to create the online platform. This platform represents a hub that serves as a resource and training as well as, communication and networking center for teachers around the globe with open education resources in English and Russian languages (Arabic is coming soon). For over a year partners and members of the project team have been working together to bring this platform to life. In order to amplify the impact of the platform and provide teachers with quality resources, IITE reached out to international organizations holding expertise in the upliftment and empowerment of educators worldwide.

On June 8, 2022, UNESCO IITE and NetDragon officially launched the “E-Library for teachers” to the high officials and partners such as the representatives of the Ministries of Education from the target countries: the Republic of Serbia, the Republic of Tunisia, the Republic of Ghana, the Arab Republic of Egypt, the Russian Federation, the Kingdom of Thailand and partners from BNU, the COL, ISTE, Autodesk, ALECSO and Go-Lab.

³ See <https://iite.unesco.org/highlights/official-launch-of-the-platform-e-library-for-teachers/>

Application and Innovation of Educational Metaverse Scenarios

In this part, experts and scholars from the Netherlands, Romania, Greece, India and other countries conducted in-depth discussions on the application of metaverse in various teaching scenarios.

Professor Ton de Jong from the University of Twente in Netherlands introduced Go-Lab - an Ecosystem for Inquiry-Based Instruction. He first pointed out the existing problems in STEM education and believed Go-Lab could create effective teaching scenarios for teachers. As an online learning platform, Go-Lab can not only be embedded with multimedia teaching resources and software but also support students to co-share resources and solve practical problems faced by teachers in STEM education.

Professor Elvira Popescu from the University of Craiova in Romania paid close attention to peer assessment platform for smart education. She argued that although peer assessment is essential for students and teachers, it raises issues of authenticity, validity and fairness. She introduced the “LearnEval” peer-evaluation platform and the results of case studies. She believed the future development trend of peer evaluation platforms is to strengthen the intelligence of the platform and realize real-time peer evaluation and feedback.

Professor Cynthia Calongne from Parker University in USA highlighted the advantages of the metaverse in education. The application of metaverse can not only help teachers create virtual learning environments but also help students enhance peer perception and the ability of collaborative communication. The future development of the metaverse shall strengthen its relevance to the real world and technological innovations in order to provide students with more efficient tools.

Researcher Stylianos Mystakidis from the University of Patras in Greece gave a presentation on “Motivation-enhanced Smart Learning in the Metaverse”. He believed the metaverse is a bridge to promote the transformation of education and instructional mode. In this context, gamification design, toys and interesting design can better enhance students' learning motivation and promote intelligent learning.

Dr. Lik-hang Lee from the Korea Advanced Institute of Science and Technology reported on “When Education meets the Metaverse: an overview and challenges”. He analyzed the three stages of metaverse development and how to build the metaverse world; then, he introduced some classic cases like Roblox, Minecraft, Facebook workshops, etc. He finally shared his views on the challenges facing the metaverse in education, such as issues on a hardware device, students' social presence, and student interaction and feedback.

Dr. Gaana Jayagopalan from the Alliance University in India delivered a speech on “teaching through urban sensorium: urban spatiality as a smart learning environment”. She proposed we should change the conception that teaching only happens in traditional classrooms and extend learning space to urban buildings as the urban spatiality may provide possibilities for intelligent teaching.

Teacher Education in Metaverse World

Key takeaways

- The discipline of teacher education is an academic field. Teacher education should carry out academic research on the priorities, difficulties, hot spots and frontier issues in the field of teacher education, and form a subject knowledge system to serve the theory and practice of teacher education.
- The lack of training and proper qualification of teachers will very likely result in poor learning by students as the countries do not have the resources to equip schools with required teaching and learning materials – enough classrooms, textbooks, lab equipment, supplementary materials, etc.
- The metaverse can provide each user with a variety of modeling tools, which allow them to create their own content of interest. This is helpful for training pre-service teachers, who can use such technology to create a learning/teaching environment that best suits them.
- The primary focus of e-assessment is not developing new assessment tools but improving learning by using new assessment technologies.
- With the development of AI, in the future, every student will be able to have their own virtual education partner in the metaverse world, and can also have personalized education anytime and anywhere.

Digital Literacy in Smart Learning Environment

With the smart technologies such as artificial intelligence (AI), the Internet of Things (IoT), and big data continuing to mature, these technologies have penetrated into all areas of human activity, changing the way they produce, live, and learn. The widespread deployment of smart technologies is considered a core competitive advantage of sustainable development. At the center of this ecosystem of smart technologies is the users, aiming to improve digital literacy and promote smart learning. As a result, all levels of educational institutions around the world are challenged by the incremental or disruptive digital transformation and intelligent upgrading.

At the same time, in the wake of the COVID-19, distance learning has become a new reality in school education around the world, and blended teaching has been widely adopted in K-12, higher education, vocational education and lifelong learning. To this end, it is necessary to analyze the application scenarios of sustainable smart education and conduct dialogues around differentiated education and personalized learning with intelligent technology, including the issues on digital literacy and skills, technology-empowered smart learning, teaching innovation and smart learning environments, which provided new ideas and directions for countries to further improve citizens' digital literacy and promote smart learning practices.

Mr WANG Yongli, Deputy President and Secretary General of the China Education Association for International Exchange, expressed his expectations for the interconnection of higher education between

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Academic Network for Education of CCHEIC

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regions. He noted that under the framework of the China-Central and Eastern European Universities Federation, China Education Association for International Exchange would fully support the international exchanges and cooperation between Chinese higher education institutions and those in Central and Eastern Europe, aiming to promote the high-quality development of global higher education.

Professor Vladan Đokić, Rector of the University of Belgrade, said that the University of Belgrade and Beijing Normal University have extensive cooperation foundations and close ties in the field of smart education. He expected the two sides would carry out more in-depth cooperation in the field of educational technology.

Academic Network for Education of CCHEIC

Professor YU Kai, Vice Dean of the Faculty of Education of Beijing Normal University, launched the "Academic Network for Education of CCHEIC", and introduced the concept and action plan of the community construction.

Professor Danimir Mandić from the University of Belgrade and **professor Demetrios Sampson** from the University of Piraeus hoped to strengthen the exchanges between universities, research institutions in Central and Eastern European countries and Chinese universities in the field of education, which aimed to promote the sharing of high-quality educational resources, deepen the pragmatic cooperation between countries in the aspects of educational theory research and educational practice innovation, and finally contribute to building a community with a shared future for mankind. metaverse in education, such as issues on a hardware device, students' social presence, and student interaction and feedback.

The Academic Network for Education of China-CEEC Higher Education Institutions Consortium(CCHEIC)

China-CEEC Higher Education Institutions Consortium was established in 2014. On the basis of adhering to the “mutual respect, equality and mutual benefit, and win-win cooperation” principle, the Consortium plays an important role in enhancing educational exchanges and cooperation between China and central and Eastern European countries. China Education Association for International Exchange (hereinafter referred to as “Association”), as the Chinese Secretariat, continues to expand the influence of the Consortium, gives full play to the initiative and enthusiasm of its member universities, and plans to implement the classified management of the academic network. As the co-founder, Beijing Normal University applies to initiate the Academic Network for Education of China-CEEC Higher Education Institutions Consortium. Beijing Normal University is responsible for absorbing Chinese and foreign universities in the educational field; planning cooperative projects to jointly build and promote the development of educational disciplines; and manage the activities of member universities in the academic network.

● Goal

Relying on the platform of Consortium, the academic network aims to strengthen academic exchanges and cooperation in the field of educational disciplines between China and CEE countries; to carry out cooperation in brand projects, and build a network for academic cooperation and exchanges among member universities; to promote the sharing of high-quality educational resources, and to support international joint research; raise the internationalization level of educational research and practice; cultivate innovative talents with global competence, and make greater contribution to building a community with a shared future for mankind.

● Mission

Under the guidance of the Bucharest Guidelines for Cooperation between China and Central and Eastern European Countries, the academic network focusing on the work of Opening-up of Education in the new era and following actual needs of educational discipline development in China and CEE countries. Abide by the principles of mutual learning, co-building and sharing, cooperation and development, through “building platforms, sharing resources, building brands, and joint output” series activities, the academic network will strengthen exchanges and cooperation in education disciplines between China and CEE countries, and jointly cultivate innovative talents with strong abilities to meet global challenges.³

● Obligations

- The Association is responsible for managing and supervising of all community work, including to determine the sub-group plan of the Consortium and issue the working methods; monitor and review the work of the academic network; to provide necessary assistance as required by the academic network universities; and participate in the annual meeting, etc.
- Beijing Normal University is responsible for coordination of the members and carrying out activities within the academic network, including organizing the management and working team; drafting the application methods; planning and designing cooperation projects and annual development plans; developing universities in China and CEE countries as Consortium member universities; organizing academic activities and monitoring the progress of cooperation projects; and working on the annual summary of academic network activities.

● Work Plan

- Establishing academic network team and build a cooperative network, including establishing academic network team and creating cooperation and exchange brand projects. First, relying on the Consortium and other platforms to issue member recruitment announcement, inviting Chinese and foreign institutions to join the Academic Network for Education; second, through the existing network of domestic universities to develop partner universities with educational discipline in CEE countries to join the community. By holding seminars, symposiums, and forum activities, more universities will be invited to join the community and gradually a network of cooperation platform will be built. For the latter, the academic conference of the Academic Network for Education of China-CEEC Higher Education Institutions Consortium will be hold annually, providing a platform to discuss related educational discipline issues in China and CEE countries. Create joint research projects for teachers from community member universities; plan student design competition, cross-cultural exchanges and student forums for student, and gradually establish a multilateral interaction mechanism through the development of cooperation and exchange projects.
- Sharing educational resources and cooperating to cultivate talents, including implementation of high-quality education resource sharing projects, cooperative development of postgraduate courses, organizing student exchange programs, and conducting campus cultural activities of mutual learning and appreciation to enhance the global competence of students.
- Strengthening joint scientific researches and joint publications in the Academic Network for Education. Consolidating the existing virtual joint laboratory for future education in China-CEE countries, attract researchers from member universities to participate in international cooperation research through joint international researches and joint publications, and establish the China-CEE community for intelligent education. The corresponding joint researches will be carried out by relying on the advantageous sub-disciplines of pedagogy of Beijing Normal University. Initially, it is planned that the Institute of International and Comparative Education will take the lead in conducting China-CEE education country studies and comparative education studies; the Institute of Education History and Culture will take the lead in conducting research on the history of education in China-CEE countries; other sub-disciplines of pedagogy of Faculty of Education, such as teacher education, vocational education, special education and other fields, can apply joint research projects. Through joint research projects, researchers from various disciplines of higher education in China and CEE are connected to study common concerns from different perspectives and promote the development of educational disciplines.
- Carrying out workshops for principals and teachers of primary and secondary schools in China-CEE countries. Investigating the professional development needs of primary and secondary school principals and teachers in CEE countries to design professional development training programs for different groups of educational personnel. Setting up a team of education experts from China-CEE countries to conduct principal and teacher training in the form of cooperative training programs.
- Providing theoretical support and professional guidance for the China-CEE Education Community. Gathering the wisdom of talents from all sides to build a talent think tank of “The Academic Network for Education of China-CEEC Higher Education Institutions Consortium” to provide policy consultation and intellectual support for China and CEE countries in the field of educational disciplines strategic planning, educational development at all levels, people-to-people and cultural exchanges and other aspects.

Academic exchanges on smart education between China and (CEEC)

At this forum, 12 experts from 9 countries shared their understanding of the characteristics of smart education, as well as the latest situation and practice of smart education development in China and Central and Eastern European countries.

Ms ZHUANG Rongxia, Associate Professor from Beijing Normal University, focused on international comparative research on the development of smarter education. Based on the cooperative research results from China, Serbia, Greece, and other countries, she analyzed the overall characteristics and characteristics of smart education practices in various countries and pointed out that smart education can be promoted from 3 aspects: the construction of smart learning environments, the reform of teaching and learning, and educational policy and governance. She held that smart education is a long-term, systematic, and continuous work that requires the joint efforts of all countries.

Professor Sandra Kucina Softic from the University of Zagreb elaborated on the advantages and challenges of digital transformation in Education. She believed the digitization of education has made teaching resources available to more learners on a global scale; as a result, students have a wider range of learning opportunities, and the learning process is more personalized. She also stressed that the digital transformation of colleges and universities needs to redevelop the operating model and integrate "digitalization" into education in an all-round way, rather than just adding high-quality digital infrastructure.

Mr Borut Čampelj, who is from the Office of Development and Education of the Ministry of Education, Science and Sport in Slovenia, gave his view on the topic of "Towards Smart Education".

He believed smart education needs to consider the factors like smart curriculum, teaching environment, pedagogic methods, teachers, leadership team, etc. Smart education shall be developed with the aim to benefit various communities and promote ubiquitous, equitable and quality education.

Professor Gyöngyvér Molnár from the University of Szeged in Hungary gave a presentation on "Applying Intelligent Technology to Make Education Smarter". She proposed that intelligent education should be evidence-based, data-driven, and constantly adapt to students' individual needs. She emphasized that summative assessment cannot meet the individual needs of students, and it is necessary to develop complex, practice-integrated, high-quality assessment methods and tools to replace the traditional "one-size-fits-all" method.

Professor WANG Yunwu from Jiangsu Normal University said that many countries around the world had implemented digital education strategies, which accelerated the digital transformation in education. The two-way empowerment of technology and education will further accelerate the digital transformation in education, form an ecological chain of digital education, and promote the development of the digital economy and smart society.

Dr. Diana Andone from the Politehnica University of Timisoara in Romania highlighted "Digital Future Universities 2030". She introduced the framework for developing digital education strategies for universities. The framework includes 3 areas: "Vision, Leadership, Governance", "People, Community, Stakeholders", and "Tools, Spaces, Resources." She also suggested that the collaboration and openness of all stakeholders shall be empowered, the sense of community needs to be created, and the infrastructure shall be scaled up.

In addition, five speakers shared their views on the development of smart education in their own countries, including **professor Siyka Chavdarova-Kostova** from Sofia University "St. Kiment Ohridski" in Bulgaria, **Dr. Maja Homen** from the University of Zagreb in Croatia, **Dr. Engjellushe Zenelaj** from the Reald University of Vlora in Albania, **Ms Ana Sekulovska** from the University of Tourism and Manegement Skopje in North Macedonia, and **professor Charalampos Karagiannidis** from the University of Thessaly in Greece.

In Bulgaria, in recent years, there has been a clear tendency the integration of ICT to be prioritized at all levels of the education system in Bulgaria - from preschool to secondary and higher education. Manifestations of this trend can be found in various strategic and regulatory documents related to education policy. Bulgaria's digital transformation is not only a desired perspective, but also supported as a strategic vision until 2030. The development of artificial intelligence is an integral part of this vision. It is an undoubted priority at the strategic level not only in the activities of the Ministry of Education and Science. Efforts at the national level in the construction of digital infrastructure continues. In general, the development of smart education in Bulgaria has its foundations. There are visible prospects for development that would increase the quality and efficiency of secondary and higher education.

In the Republic of Croatia, since independence as well as since the beginning of the process of accession to the European Community, a lot has been done in the field of education. By accepting the Bologna Process as well as the development of new Digital Educational Technologies, the basic elements of the development of education at all levels have been set, from pre-school programs, higher education university programs to adult education.

In the Republic of North Macedonia, The national vision and plan includes the priorities of improving the system for collecting statistical data and EMIS (Educational Management Information System) and ensuring widespread use of ICT in education and training and digital literacy. For EMIS, it is not only a web-based tool for collecting, processing, checking and presenting data and information that are important in the educational process in primary and secondary education in North Macedonia, but also a comprehensive system that connects people, practices and technology in order to provide quality educational statistics in a short time, in an efficient and sustainable way at every administrative level. For ICT in education, the Republic of North Macedonia sets relevant policies. For example, one of the goals of *the Education Strategy for 2018-2025* and the Action Plan is to intensify the application of ICT in education by establishing an e-learning portal and system for managing learning and continuous training of new tools and staff in education, and building a system for recovery of computer equipment and providing conditions for efficient maintenance of computer equipment and computer networks.

In Albania, Albania currently has several efforts to integrate technology into the education system. These are sporadic efforts that mostly stem from collaborations with NGOs for pilot programs or for some educational institutions. Challenges of Albanian education system in the process of systematic integration of technology and education:

- during the last years, changes have been made in the textbooks where there is a combination with technology, but during the last 5 years, from a statistical point of view, there has been a decrease in investments for technological equipment in educational institutions;

- there are also no investments or development programs for teachers or for various technological applications for the teaching process;
- in Albania we still do not have real electronic libraries to create opportunities for pupils or students as well as teachers to research the learning process.

In Greece, Greece published *The Greek Digital Transformation Bible (2020-2025)*. It is a holistic digital strategy which describes the objectives and implementation measures of the digital transformation strategies. One of the objectives is the development of digital skills for all citizens.

In this regard, Greece transforms education through MOOCs. For enhancing teachers' and students' digital competency, HyperMOOC is established for teaching and learning in online and hybrid inclusive education format. The design principle of the HyperMOOC is the European framework for the Digital Competence of Educators (DigCompEdu), which synthesizes national and international efforts to capture educator-specific digital competencies, and proposes a six level progression model to help educators assess and develop their digital competences. For K-12 education, PROG-MOOC is established for computer science for high school students as a supplementary resource to the existing school curriculum.

Digital Literacy in Smart Learning Environment

Key takeaways

- Digital learning environment empowered by intelligent technologies (e.g. seamless connectivity, digital learning devices, etc.) can promote smart education. Formal and non-formal education opportunities are enabled and accelerated in such environment, and learning could occur anytime and anywhere.
- Technology enables the transformation of teaching and learning, such as developing student-centered pedagogy, applying the redesigned assessment and building learner community. Students could settle their learning objectives and activities in collaboration with teachers, and they decide how to show mastery with the help of the right advice. Teachers could provide personalized feedback, coaching, and assistant with adaptive assessment and learning analytics.
- For advancing smart education, it is essential to pay attention to rationales such as cooperation, inclusion, equity, quality, and green sustainability.
- There are six key features of smart education: curriculum and practices improving digital literacy; innovative teaching methods and strategies; assessments supported by AI and big data; personalized and on-demand services for teachers and students provided by the government and enterprises; solutions and policies on open educational resources; new model of educational governance empowered by AI and big data.

The 6th International Conference on Smart Learning Environments

The International Conference on Smart Learning Environments (ICSLE 2022)⁴ was jointly held on August 18-20, 2022 at the Hangzhou Normal University (China), The International University of La Rioja (Spain), and Near East University (Cyprus). The theme of the conference is “Intelligent Technology Enhanced Smart Learning”. It aims to bring together researchers, practitioners, and policy makers to discuss issues related to the optimization of learning environments to enhance learning. The focus is on the interplay of pedagogy, technology and their fusion towards the advancement of smart learning environments.

Various components of this interplay include but are not limited to:

- Track 1 Pedagogy: learning paradigms, assessment paradigms, social and cultural factors, biases, ethical considerations, policy issues and implications;
- Track 2 Technology: emerging technologies, innovative uses of mature technologies, adoption, usability, standards, and emerging/new technological paradigms (open educational resources, cloud computing, blockchain, artificial intelligence applications in education, etc.);
- Track 3 Integration of pedagogy and technology: transformation of curriculum, transformation of teaching and learning behavior, transformation of administration, best practices of infusion, piloting of new ideas.

GENERAL CHAIRS

Prof. LIU Dejian

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Prof. Kinshuk

Dean, the College of Information, University of North Texas, USA

Prof. HUANG Ronghuai

Co-Dean, Smart Learning Institute of Beijing Normal University, China

LOCAL CHAIRS

Prof. YANG Junfeng

Hangzhou Normal University, China

Dr. Daniel Burgos

The International University of La Rioja, Spain

Dr. Zehra Altınay

Near East University, Cyprus

PROGRAM CHAIRS

Dr. Ahmed Tlili

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Dr. Maiga Chang

Athabasca University, Canada

Dr. Elvira Popescu

University of Craiova, Romania

⁴ See <http://iasle.net/icsle-2022/>

Smart education is the focus of the national educational informatization at present, the current hot area of education technology research, and an important aspect of the process of education development. The International Conference on Smart Learning Environments (ICSLE) was held for the sixth time, and has been held past in Hong Kong of China (2014), Sinaia of Romania (2015), Tunis of Tunisia (2016), Beijing of China (2018) and Denton of the United States (2019), bringing together international experts in intellectual learning and research, with important international influence.

The conference is chaired by Prof. LIU Dejian (Co-dean of Smart Learning Institute of Beijing Normal University), Prof. Kinshuk (Dean of the College of Information at the University of North Texas), and Prof. HUANG Ronghuai (Co-dean of Smart Learning Institute of Beijing Normal University), and invites scholars from domestic and abroad to participate in the conference to conduct in-depth exchanges and discussions on cutting-edge and hot issues such as artificial intelligence in education, Internet of Things (IoT) and multimodal learning analytics, precise education assessment supported by AI and big data, digital literacy in education in the Intelligent Era, etc.

Criteria of defining “Smart Learning Environments” on ICSLE

Smart learning environments encompass “intelligent tutoring systems (ITSs)”, “adaptive learning systems”, “technology-enhanced learning”, “web-based learning”, “mobile learning”, “context-aware ubiquitous learning using sensing technologies”. They enable learners to access digital resources and interact with learning systems in any place and at any time, and actively provide the necessary learning guidance, hints, supportive tools or learning suggestions to them in the right place, at the right time and in the right form.

Basically, a smart learning system can be perceived as a technology-enhanced learning system that is capable of advising learners to learn in the real-world with access to the digital world resources. Various potential criteria have been identified in the literature for smart learning environments:

- A smart learning environment is context-aware; that is, the learner’s situation or the contexts of the real-world environment in which the learner is located are sensed, implying that the system is able to provide learning support based on the learner’s online and real-world status.
- A smart learning environment is able to offer instant and adaptive support to learners by immediate analyses of the needs of individual learners from different perspectives (e.g., learning performance, learning behaviors, profiles, personal factors) as well as the online and real-world contexts in which they are situated. Moreover, it can actively provide various personalized support to the learners, including learning guidance, feedback, hints and learning tools, based on their needs.
- A smart learning environment is able to adapt the user interface (i.e., the ways of presenting information) and the subject contents to meet the personal factors (e.g., learning styles and preferences) and learning status (e.g., learning performance) of individual learners. The user interface is not necessarily a conventional computer. Instead, learners can interact with the learning environment via mobile devices (e.g., smartphones or tablet computers), wearable devices (e.g., Google Glass or a digital wristwatch), or even ubiquitous computing systems embedded in everyday objects. Therefore, it is a challenging issue to adapt the user interface to meet the learners’ needs in a smart learning environment.

New Ecology of Regional Smart Education

The goal of smart education is to re-construct the smart learning environment, transform traditional teaching and learning methods, and reform the educational system with better learning experience, high content adaptability and high teaching efficiency. The demonstration zones of smart education has carried out bold explorations and beneficial attempts based on local conditions, and has formed some bright spots in terms of environment, model, service and governance. The Ministry of Science and Technology of the People's Republic of China has deployed relevant projects in the field of smart education in key research and development plans.

Report on the Construction Progress of Demonstration Zone of Smart Education

With the aims to implement the strategic action of educational digitalization, further promote the development of smart education, and enhance the dissemination of best practices and experiences of smart education, the Department of Science, Technology and Information of the Ministry of Education of P.R.C takes the lead. The secretariat of the project expert group for the construction of the Demonstration Zone of Smart Education has joined the Educational Informatization Strategy Research Base (Beijing, Central China, Northwest) to launch a campaign to collect outstanding smart education cases. One hundred twenty-three outstanding smart education cases were finalized, including 30 cases on regional construction, 77 cases on school practice, 8 cases on solutions, and 8 cases on research results.

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Report on the Construction Progress of Demonstration Zone of Smart Education

*The Demonstration Zone of Smart Education*⁵ is the one of the key tasks of *Education Informatization 2.0 Action Plan*, and it is also an innovative action for the development of regional education informatization. Since the start of the project, the regions have carried out bold explorations and beneficial attempts based on the local conditions, and formed some characteristics and spotlights in terms of environment, model, service and governance. This book summarizes excellent cases and shares experiences/paradigms, providing reference for the development of regional smart education.

In the face of the new situation, new requirements and new tasks of digital transformation and intelligent upgrading of education, the *Demonstration Zone of Smart Education* will seize the current opportunities to form a unique development path of regional smart education, and build new pattern and new ecology of smart education.

This book can be used as a reference for educational policymakers, researchers, principals of primary and secondary schools, teachers, and industry practitioners in the field of smart education.



Mr XU Lin, Director of China Educational Technology, Center for Educational Technology and Resource Development, Ministry of Education, P.R.C (National Center for Educational Technology, NCET), introduced the effect of a “Smart Education of China” Platform on the aspects of the promotion of educational reform, the inclusive sharing of high-quality resources, educating people with home and school collaboration, and the deep integration of information technology and curriculum.

Development of high-quality regional education

Professor WU Di, Executive Deputy Director of Education Informatization Strategic Research Base (Central China) of the Ministry of Education of P.R.C, gave a presentation on “Digital Transformation in Education and the Development of Regional Smart Education”. He

emphasized that the development of smart education needs to consolidate the “digital base”, and the smart education pilot zone should become the “pioneer” of the digital transformation in education. During the promotion process, we should focus on teaching innovation, education evaluation reform, teacher professional development and education governance optimization. In the future, the amalgamation of differentiated teaching, personalized learning, refined management, data-driven teaching research, and intelligent services will build a better education landscape.

Professor GU Xiaoqing, a member of the Secretariat of the Project Expert Group for Construction of “Demonstration Zone of Smart Education”, focused on the development and future vision of smart education. She explained that the fundamental essence of smart education could be highly summarized as human-machine

5 See http://www.moe.gov.cn/srcsite/A16/s3342/201804/t20180425_334188.html

collaboration, which is embodied in precision, individuality, optimization, collaboration, thinking and creation. The practice of smart education needs to determine the bottom-line principle of human-machine collaboration and follow the learner-centered humanistic learning concept. The future of smart education needs awareness of the future trend, which looks forward to the future and reflects on the present.

Professor XIONG Zhang, Head of the Expert Group on Information Technology Curriculum Standards for Compulsory Education of the Ministry of Education, introduced the "Information Technology Curriculum Standards". He pointed out that we are already in a new social form that is different from the traditional information society - the online society, which puts forward higher requirements for cultivating students' literacy in quality education. Students in the online society must have information awareness and be equipped with computing thinking, digital learning, and innovative ability. They shall also be able to take responsibility for the information society. The discipline logic of the information technology curriculum in compulsory education pursues big concept, theme, experiences and integration, which are interrelated and jointly serves quality education.

Professor Tak-Wai Chan, the Founder of the Global Chinese Conference of Computer in Education (GCCCE), believed education design is to design the future, and we should pay attention to interest-driven education.

Professor J. Michael Spector from the University of North Texas believed educational technology should focus on innovation, integration, and inspiration. The key to the success of the integration of education and technology lies in whether students pay more attention to the learning process and tasks rather than the technology itself.

Practice of Regional Education

Mr LI Yongzhi, Deputy Director of Shanghai Municipal Education Commission, shared the "Strategic Vision and Practical Exploration of Digital Transformation in Education". He introduced Shanghai's digital transformation strategy from five aspects:

- improving the digital literacy and skills of the whole society;
- innovating a high-quality personalized lifelong learning system;
- deepening the reform of education and teaching;
- systematically building digital educational resources; and
- promoting the reengineering of education management and service process.

He further demonstrated the practice and exploration of Shanghai's digital transformation in education from the perspectives of data governance, base connection, ecological cultivation, service purchase, and educating people.

Ms XIONG Qiuju, Director of the Education Bureau of Changning district in Shanghai, pointed out three dilemmas of regional education: uneven resources, insufficient teaching, and lack of operation and maintenance. The path of digital transformation at Changning district will be based on the digital base and build regional smart education with characteristics of standardization and personalization.

Mr HE Meilong, Director of the Education Bureau of Minhang district in Shanghai, focused on the construction of a digital smart

education platform, big data-driven teaching and learning, digital transformation for teachers and digital education public services. He also described the specific practice of how digital transformation promotes the transformation of smart education in the Minhang district.

Mr ZHANG Xianguo, Director of the Information Technology Department of the Beijing Municipal Education Commission, shared the achievements of Beijing's practice of digital transformation in education, including effectively guaranteeing online teaching, innovating education and teaching approaches, supporting individualized and independent learning, exploring multiple educational evaluation methods, promoting teacher professional development, and planning intelligent education models. Aligning the path of digital transformation in education – “one base”, “six scenes”, and “three spaces” – Beijing will initially form a new future-oriented education ecology by 2025.

Mr GAO Wei, Director of the Education Commission of Dongcheng District in Beijing, introduced the progress of smart education construction in Dongcheng District. The district has formed a unique development path around the “1+7+N” smart education service system. At present, “1” “data brain” has begun to take shape, “7” projects have been solidly advanced, and several (“N”) future schools are in exploration.

Mr QIU Chengyu, Deputy Director of Shenzhen Education Bureau, introduced the development of smart education in Shenzhen. Shenzhen has adopted the systematic top-level design of “integrated empowerment, four innovations and six intelligence, and eight scenarios” and makes the achievements in smart governance, teaching reform,

resource construction, talent team building, and mechanism innovation. It realizes the goal of “improving quality and innovation through digital transformation and reducing the burden and increasing efficiency through intelligent upgrade”.

Mr SHENG Liang, Director of the Education Bureau at Bengbu, shared the promotion of education informatization mechanism based on the collaboration of government, enterprise, school, and research. He introduced the practices in the areas of organizational construction, teacher training, subject research and education governance, which benefits the co-construction and co-sharing of resources, the in-depth promotion of application, the innovation of teaching mode and the construction of teacher teams.

Mr ZHU Jinggao, Deputy Director of the Education Bureau of Wenzhou, introduced the progress of smart education construction in Wenzhou. The city has built a “1+3+X” construction system of “digital brain”, formed an education data center, established three digital service centers, supported multiple educational application scenarios, and realized data-enabled education.

Mr WANG Yi, Director of the Education Bureau of Wuhou district in Chengdu, introduced the practical exploration of Wuhou's smart education. Wuhou district mainly focuses on three areas: teaching, service and governance, and three tasks: building new ecology of smart education, new forms of educational services and intelligent governance, with an aim to provide a suitable education for students.

Best practices of smart education in schools

Ms DOU Guimei, Principal of Tsinghua University Primary School, introduced the situation of teachers and students in both Tsinghua

University Primary School and rural areas taking “the same class”, as well as the symbiosis model of high-quality resources based on the needs of teachers and students in rural areas.

Mr MA Long, Director of the Sports Arts Training Department of the Institute of Educational Sciences, introduced how AI is applied for data collection and application of primary school sports load and how it promotes the effective development of sports education at Dongcheng schools.

Ms XU Hongyan, Principal of the Happiness Primary School in Shaya County of Xinjiang Uygur autonomous region, is an educator who aided Xinjiang. She shared her experiences of leading a group of young teachers to go deep into the frontier, carrying out group-style teaching and research, and leading the change in local education and teaching mode in the past two years.

Ms ZHANG Xiaoyan, Vice Principal of Yongji Chengxi Middle School in Yuncheng city, shared a case on how online learning space broadens the growth path of left-behind children.

Ms GONG Mingxing, a senior teacher at Donghu High School in Yiling District in Hubei Province, introduced the achievements of the school's practice of labor education based on the smart education platform.

Mr HANG Ziping, Vice Principal of the Zhanggongshan No. 3 Primary School at Bengbu City, shared the school's exploration and innovation of online and offline teaching models, which was based on the “Smart Education of China” Platform (<https://www.zxx.edu.cn/>). It effectively helped to maintain continuous learning during COVID-19 outbreak.

Ms PENG Baobei, Principal of Erqiao Middle School in Wuhan City, presented the measures, effects and prospects of using the virtual

experimental teaching system and the Wuhan Education Cloud to carry out normalized experimental teaching.

Ms SONG Mengheng, Principal of Qingyuan Primary School at Tianxin District in Changsha City, shared a school practice case of promoting the innovative development of primary schools' thinking and political education with “Smart Thinking and Political Activity Hall”.

Smart Education Solutions for Challenges of Education

Mr XIAO Chunxi, General Manager of Industry BG Technical Department of H3C, introduced the company's practice in promoting smart education through ideological and political education, high-quality “double reduction – reducing students' homework and off-campus training burden”, and education management.

Mr ZHOU Jiafeng, Vice President of iFLYTEK, shared the practical case of how artificial intelligence empowers regional large-scale individualized teaching. **Mr JIN Xin**, General Manager of the Smart Education Division of Lenovo's major customer business group in China, focused on teacher professional growth and explained Lenovo's technical solutions to break through the difficulties of teaching and research.

New Ecology of Regional Smart Education

Key takeaways

- When building regional smart education ecology, four focus points are essential for consideration, namely, innovative teaching, assessment transformation, teacher professional development, and governance optimization.
- Establishing high-quality education system shall first of all ensure the all-round, healthy and happy growth of students, and design a more flexible school system.
- One of the key aspects of building the new ecology of regional smart education is to continuously upgrade the cloud platform and improve the resource integration, realizing the collection, classification and search for high-quality educational resource.
- The introduction of AI-driven systems in the regional schools provides assignment analysis from multiple levels and perspectives, which enhances teachers' teaching coordination ability, helps teachers adjust teaching methods, optimizes school-based question banks, and promotes the overall teaching effectiveness of schools.
- Achieving the digital transformation in regional schools shall address the data isolation problem. Specifically, it includes the continuous use of existing data, the integration and application of inter-school data, and the sharing of data between schools.
- The promotion of regional informatization shall give full play to the advantages of the government, enterprises, schools, and research institutions. The cooperation among these four entities and clarification of their individual responsibilities or functions can help to formulate effective work promotion plans and managerial work mechanisms.

Student Forum on Learning Crisis and Futures of Education

Based on the actual situation of their countries and regions and combined with their own experiences, 15 outstanding university student representatives from China, Malaysia, Bangladesh, Serbia, South Africa, Tunisia, Uganda, and Nigeria shared their understanding of the learning crisis and their expectations for the futures of education from four dimensions: learning environment reform, learning method innovation, rural student training and inclusive education realization.

Transforming Learning Environments to Solve the Learning Crisis

It is one of the learning crises in the world that learning in schools may not necessarily acquire the required knowledge and skills. The learning environment needs to be developed, and the education ecosystem, school form and teaching methods need to be developed accordingly. Governments, schools, families and the whole society need to work together to promote the digital transformation of education to help students acquire the abilities needed in the fourth industrial revolution.

Ms LIU Yufei from Beijing Normal University held that it was a prominent learning crisis that students' learning achievements do not match the future social needs. Moreover, teaching cannot support learners' development and well-being in the future, which requires the joint efforts of the school and the whole society to resolve. She mentioned under the guidance of the concept of Outcomes-Based Education (OBE), we could systematically think and redesign the learning environment from the perspectives of teaching objectives, teaching contents and

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Ms NI Jiaqi

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Transforming Learning Environments to Solve the Learning Crisis

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Ms Jelica Ristić

PhD candidate, Teacher Education Faculty of the University of Belgrade, Serbia

Ms Salwa Mrayhi

PhD candidate, Virtual University of Tunis

Mr YANG Liu

Undergraduate student, School of Arts and Communication, Beijing Normal University, China

Developing Learning Methods to Solve the Learning Crisis

Ms ZHANG Wenjie

Graduate student, Educational Psychology, The University of Hong Kong, China

Mr Oluwatayo Israel Olasunkanmi

Post-doctorate, Chongqing University, China

Ms MEI Zixuan

Graduate student, College of Education, Capital Normal University, China

Ms YAO Jia

Undergraduate graduate, School of Government Management, Beijing Normal University, China

Developing Competencies for Sustainable Development among Rural Students

Mr ZHU Xuan

Undergraduate student, Art Center College of Design, USA

Mr Muganga Allan

Graduate student, Mathematics education, Southwest University, China

Mr Shrorif Mollah

PhD candidate, Faculty of Education, Beijing Normal University, China

Mr LIU Jiahao

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Integrating Resources to Achieve Inclusive Education

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Ms Har Wee Ai

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teaching evaluation, so as to promote students' flexible, active and spontaneous learning, and thus improve their comprehensive ability required in the future.

Ms Jelica Ristić from the University of Belgrade recalled that during the COVID-19 pandemic, students' obstacles to self-identity and teachers and students' inability to adapt to the rapidly developing digital learning environment are the crises that we must pay attention to. A blended learning environment and teacher training

services are one of the solutions to overcome the crisis. The blended learning environment carried out by the University of Belgrade in the form of Flipped Class Model had proved its important role in improving the learning experience, enhancing the interaction between teachers and students, and improving the overall learning. Based on the Edmodo learning platform, she and her team designed a Metaverse Application Skills Improvement Program to help teachers conduct daily teaching, online teaching and B-teaching in the metaverse.

Ms Salwa Mrayhi from Virtual University of Tunisia held that it was a great crisis that teachers and students cannot complete effective learning in the digital learning environment, and that governments and schools need to implement the digital learning environment strategy. She proposed to provide teachers with rich tools and necessary training. Her team designed a system framework of massive open online courses (MOOC), aiming to provide personalized learning and support for students to improve their learning efficiency.

Mr YANG Liu from Beijing Normal University emphasized that it was a major crisis that the traditional classroom is not suitable for students' equal exchange and effective learning, and the widespread application of new technologies may cause privacy and ethics problems. He said that school should be a friendly, open, free, inclusive, fair, safe and healthy place. The application of intelligent technology must be people-centered and it is essential to build a student-centered learning space. He worked with his team to design an immersive future classroom based on an intelligent interactive system (Illusion), which provides space for equal communication and cooperation between special children and ordinary children, so as to achieve educational equity.

Developing Learning Methods to Solve the Learning Crisis

Education is at a critical stage of digital transformation, and technology-based learning methods emerge in an endless stream. However, "using technology just for the sake of technology" has brought new learning crises. The innovation of learning methods should help students improve their interest in learning, involve in the process of learning, and cultivate them to shape their future "transformative attainment". This is about creating new values, assuming responsibilities, mediating pressure and coping with difficulties, all from the perspective of promoting people's all-round development.

Ms ZHANG Wenjie from the University of Hong Kong mentioned that students' poor learning skills and poor learning quality were a major crisis at present, and students' skills for the 21st century should be improved through online education. She said that the frequency and level of students' classroom questioning could reflect their cognitive level. Therefore, she worked with her team members to design a software that automatically analyzes students' classroom questioning, which can provide visual analysis charts and feedback reports. Teachers can provide guidance according to the data, so that students can be good at asking questions and improve their meta-cognitive ability.

Mr Oluwatayo Israel Olasunkanmi from Chongqing University pointed out that the uneven quality of education in various countries in the world was one of the current learning crises. In particular, many school-age children in low-income countries do not have the basic skills of reading and calculating numbers. Moreover, teachers cannot get the support and development they deserve. He believed that it was necessary to strengthen global cooperation, adopt digital learning to promote education equity, and train 21st-century skills for learners in low-income countries.

Ms MEI Zixuan from Capital Normal University emphasized that students' failure to develop the transferable ability and general attainment was a major learning crisis, which would hinder students from integrating into the future society. She said that the direction of learning method innovation should be "making the world a classroom". The situational learning method can create real problem situations, help students participate in the learning process, solve real problems through interdisciplinary knowledge, and cultivate students' abilities to shape the future.

Ms YAO Jia from Beijing Normal University highlighted that the insufficient use of

technology, lack of qualified teachers and insufficient access to high-quality education were the three major learning crises in China, and COVID-19 had brought challenges to educators. She believed that China's experience during the COVID-19 was worth promoting, such as building a reliable network infrastructure, using convenient learning tools and platforms, and providing appropriate digital learning resources. We should jointly build a community with a shared future in cyberspace and bridge the "digital divide" to cope with today's learning crises.

Developing Competencies for Sustainable Development among Rural Students

Rural students lack sufficient resources during their study and life in general, and the learning crisis caused by dropouts, absenteeism and school-weariness make it worse. In the face of the complex and changeable future society, it is necessary to strengthen the close integration of education with rural economic development and social environment, cultivate students' sustainable development ability, and make full preparations for the effective integration of rural students and economic society.

Mr ZHU Xuan from the ArtCenter College of Design held that the lack of design thinking and innovation ability were major issues of the learning crisis faced by rural students. He mentioned that it was very important to make rational use of the natural resources in rural areas to create conditions for rural students. He worked with his team to design a low-cost rural students' design thinking educational project. Through three different spaces, students are allowed to operate experiments to design and create works based on local resources, which helps to cultivate students' curiosity, observation ability and practical ability.

Mr Muganga Allan from Southwest University mentioned that the imbalance in education between urban and rural areas, and the serious shortage of teachers were the common challenges of the learning crises in Uganda. Some rural primary schools have only one teacher to teach all courses, and even many students have classes under trees. When it rains, the courses will be canceled. He held that rural areas need basic facilities and Internet access, as well as enough teachers to ensure students receive formal education. All countries in the world need to work together to achieve the goal of "ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all".

Mr Shorif Mollah from Beijing Normal University mentioned that the lack of high-quality learning resources was a learning crisis in Bangladesh and other developing countries. Especially in rural areas, teaching is basically a teacher's oral and dictation process, which cannot cultivate students' sustainable development ability. He introduced an Open Educational Resources (OER) research project, and emphasized the importance of OER in achieving quality education for all and promoting the sharing of education resources.

Mr LIU Jiahao from Beijing Normal University pointed out that it was the main crisis in education that teachers' application of technology was overloaded, and the effectiveness of technology application in education was questioned. He held that in the process of promoting sustainable development education in rural areas, we should not overemphasize technology. Instead, we should guide teachers to master basic technologies and apply them rationally and help students learn to deal with the relationship between themselves and the society, the world, the nature and ultimately make contributions to the overall social progress and development.

Integrating Resources to Achieve Inclusive Education

There are still several problems in the world that children with special needs face. Many do not have access to schools. Many girls are out of school due to gender discrimination. Vulnerable groups do not receive high-quality education. During the COVID-19, the response measures of various countries did not take children with special needs into account. As a result, their basic learning and emotional needs could not be met. We need to make collective efforts and integrate various resources to ensure everyone's right to education.

Mr CHEN Xing'an from the Diablo Valley College held that the lack of barrier-free learning resources and fair employment opportunities for disabled people was one of the crises in achieving inclusive education. As a visually impaired person, he was considered unable to enter a university or have a good job from an early age. He faced many restrictions in primary and middle school stages. He proposed three solutions—community support, online learning programs and public-private partnerships programs to promote the formal learning and career development of the disabled.

Ms Har Wee Ai from Beijing Normal University mentioned that the basic health services and education services in Malaysia did not include the disabled, and this exclusion and discrimination had brought a great crisis. She held that people should have a common understanding of inclusion and diversity. The United Nations International Children's Emergency Fund (UNICEF) in Malaysia has launched an inclusive playground for disabled children, which is a very good way to achieve emotional education. She worked with her team to design a metaverse education game called "Mind Forest Pro" for students aged 4-12 to promote the social and emotional learning of autistic children.

Ms Khutso Tania Segooa from Fordham University highlighted that the students in special schools in South Africa had a serious lack of learning and did not have the basic reading and writing skills required for employment, which was a major crisis. She held that the disabled should be included in mainstream schools to study and communicate with the non-disabled. She proposed an APP with visual elements to support the understanding, expression and communication of speech-impaired children, and she hopes to use the APP as a bridge for interaction between speech-impaired children and teachers as well as classmates.

Mr SONG Weizu, Founder of Beijing Design Society, pointed out there were still some problems in education in today's world, such as dropouts, lack of teachers, difficulty in going to school and many more. The learning crisis caused by primitive educational knowledge and rigid teaching methods needs to be paid attention to. With the advent of the new era of innovation-driven development, the knowledge structure and knowledge learning content have developed in the direction of art, science and technology, and that they are complementing and completing each other. It has become a new trend to pay equal attention to knowledge and skills, interdisciplinary learning, and the unification of brains and hands.

On behalf of UNESCO IITE, **Ms Tatiana Shutova**, the Programme Specialist, expressed a warm congratulation to Beijing Normal University's 120th anniversary. She pointed out UNESCO IITE and BNU had been cooperating in many projects, especially the concluded 5th Global Competition on Design for Future Education, in which a number of unique university students' projects and primary and secondary school teachers' cases have been produced, and some of them have been included in the UNESCO E-Library For Teachers. Built by UNESCO IITE and NetDragon, E-Library For Teachers has effectively solved the

problems of teachers' lack of professional knowledge and rigid teaching methods, helped teachers master new technologies, improved their teaching ability, and provided effective solutions for education and teaching.

Professor Danimir Mandic, Dean of Teacher Education Faculty at the University of Belgrade in Serbia, mentioned that in response to the learning crisis, future education should make full use of the advantages of AI technology to innovate teaching methods and improve teachers' ability. On one hand, it can analyze and reorganize the knowledge structure to improve students' learning motivation; on the other hand, through training, seminars and other forms, it can help teachers master new technologies and improve their teaching ability.

Ms NI Jiaqi, Deputy Secretary of Beijing Normal University Committee of Communist Youth League of China, argued the learning crisis was complex. Some people do not have the conditions for learning; some have good conditions but are not interested in learning; and some are interested in learning but lack effective

learning methods. These problems are closely related to the futures of education and the development of human society. Education is an effective way to eliminate poverty and promote social progress. It plays an important role in building a 'Community with a Shared Future for Mankind'. University students are the backbone of future social development. They have knowledge, dreams and a sense of social responsibility. In his congratulatory letter to the World Youth Development Forum, President Xi Jinping pointed out "the youth of all countries should carry forward the shared values of humanity's peace, development, equity, justice, democracy and freedom; to promote the global development initiative with practical actions; to help implement the UN 2030 Agenda for Sustainable Development; and to jointly write a new chapter in the era of solidarity and cooperation among the world's youth". Ms NI Jiaqi looks forward to building a platform through the Forum so that university students from all over the world can perceive the crisis, exchange and learn from each other, and achieve common development.

Student Forum on Learning Crisis and Futures of Education

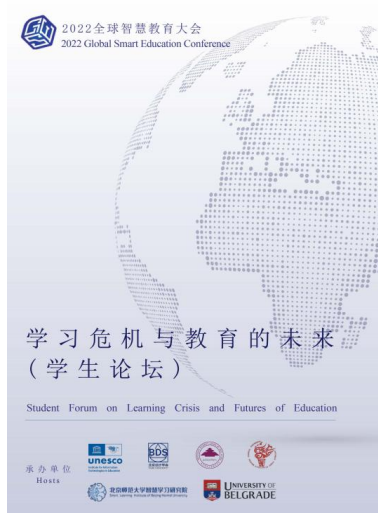
Key takeaways

Future Education Envisioned by International University Students

University students have their own imaginations about futures of education. They hope to achieve high-quality, inclusive and equitable education through innovative technology integration, ubiquitous learning, resource sharing, intelligent learning environment and effective teaching methods, so as to promote everyone's ability development and well-being and the sustainable progress of a harmonious society. The construction of a 'Community with a Shared Future for Mankind' is a key phrase repeatedly mentioned.

- Students hope that technology can play a more important role in education.
 - Mr YANG Liu summarized the characteristics of future education with four keywords: ubiquitous, personalized, predictable, and dynamic.
 - Mr Muganga Allan hopes that technology in the future can be better integrated with education, and teachers and students can easily use technology for personalized learning, so as to truly cultivate students' basic skills for the 21st century.

- Mr LIU Jiahao hopes that with the support of technology, the future learning space will be everywhere and interconnected, with seamless connections between school, family and society, and that informal learning and formal learning will be organically combined.
- Students hope that future education will be more inclusive.
 - Mr CHEN Xing'an expects that future education will enable every disabled people to have access to high-quality learning resources and employment opportunities.
 - Ms Khutso Tania Segooa hopes that the restriction of disabled children in education will be greatly reduced in the future, and that they can learn various useful skills in school to have better opportunities in the society.
 - Ms Har Wee Ai held that “promoting learning through design” can help us re-envision the world, and all professions can participate in creating inclusive infrastructures, products and services to create a quality life for mankind.
 - Mr Shrorif Mollah hopes future education to be more inclusive, global and practical.
- Students hope that future education will be more equitable.
 - Ms LIU Yufei expects that in the future, everyone in the world can learn more flexibly and independently, and enjoy high-quality educational resources and educational fairness.
 - Ms Salwa Mrayhi hopes that future education will enable students to enjoy the learning process, realize personalized learning and lifelong learning, and transform the world into a more equitable and sustainable future.
 - Ms MEI Zixuan has a vision that future education will be more fair and equitable, so that everyone can enjoy a decent life.



Report on Student Forum on Learning Crisis and Futures of Education⁶

6 See http://sli.bnu.edu.cn/uploads/soft/220921/1_1656079011.pdf

Teacher Forum on Technology Empowered Teaching Innovation

Education is eminently a human-centric endeavor, not a technology centric solution. As they have humanistic characteristics, teachers could make new contributions to the development of fairer and higher quality education through rationally using technologies. This forum invited teachers, policy makers and researchers from domestic and overseas universities, vocational colleges, primary and secondary schools, kindergartens to discuss and exchange new mechanisms, new ideas and new methods of technology-supported teaching.

Professor ZHENG Qinhu from Beijing Normal University pointed out the major issues in this intelligent era featured by "human-machine collaboration, cross-discipline integration, co-creation and sharing". That is to

- preserve the value of human beings;
- carry forward the humanistic spirit of harmony and difference, freedom and openness, benevolence and tolerance; and
- use information technology to serve the common interests of mankind as well as the innovative development of education.

The transformation of the learning space

Professor Jim Slotta from the University of Toronto emphasized active learning classrooms. He shared several real cases of smart classrooms like WISE (<https://wise.scnu.edu.cn>) and Tangible and Embodied Learning Lab, and stressed new patterns of student-teacher interaction in the

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Mr QI Binbin

Post-doctorate, Beijing Normal University, China

SPEAKERS

Prof. ZHENG Qinhu

Deputy Director, National Engineering Research Center of Cyberlearning and Intelligent Technology, China

Ms TANG Shaobing

Vice Dean, Institute of Educational Development, Huadu District, Guangzhou, Guangdong Province, China

Prof. Jim Slotta

University of Toronto, Canada

Mr ZHANG Xiaohu

Associate Professor, Xi'an Eurasia University, China

Prof. Georgeta Panisoara

Psychology and Habilitation in Educational Sciences, Bucharest University, Romania

Mr HE Qigang

Director, Supervision Office of the Education Bureau of Tianyuan District, Zhuzhou City, Hunan Province, China

Ms DUAN Yanqing

Yuncheng City Education Bureau of Shanxi Province, China

Ms ZOU Xianlian

Principal, Xingyuan Primary School in
Liangjiang New District, Chongqing, China

Ms Li Ahui

Principal, Kaiyue Kindergarten, Xiaoshan
District, Hangzhou, Zhejiang province, China

Dr. Jördis Weilandt

Assistant Program Manager, Rebus
Community, Canada

Mr FENG Hongke

Beijing No. 20 Middle School, China

Ms LI Yan

Principal, Shenyang Railway Experimental
Primary School, China

Mr LIU Chao

Academic Affairs Director of Zhengtai
Bowen School, Xiangcheng City, Henan
Province, China

Ms WU Dingcui

Principal, Bagu Primary School in Lugu Town,
Mianning County, Sichuan Province, China

Prof. Ramesh C. Sharma

Ambedkar University Delhi, India

Prof. Mauricio Xavier Prado Ortega

Technical University of Machala, Ecuador

Ms ZHAO Jing

PhD candidate, Tongji University, China

Mr FAN Yizhou

Research Associate, School of Informatics,
the University of Edinburgh, Britain

21st-century classrooms. For example, he suggested that teachers shall create small-group discussions instead of giving lectures while students could use phones or computers as learning resources. He also shed light on the design of classroom space for active learning.

Ms ZOU Xianlian, Principal of Xingyuan Primary School in Chongqing, China, shared her views on the new exploration of digital transformation in primary classrooms. She elaborated on key common factors of different classroom models, new forms, features, application logic, platform support and exploration results of “multi-course mixing”. She believed it would help to explore a new paradigm of learning and promote the digital transformation in education.

Mr FENG Hongke from Beijing No. 20 Middle School gave a presentation on “Empirical Research on Intelligent Teaching Behaviors in Real Classroom Scenarios”. He suggested that AI-driven data collection could help to relieve teachers’ burden and enhance the effectiveness of teaching practice.

Technology-empowered teaching innovation

Ms TANG Shaobing, Vice Dean of the Institute of Educational Development in Guangzhou, China, delivered a speech on “Regional Intelligence Teaching and Research Empowered by Artificial Intelligence”. She pointed out 6 key factors of regional intelligence teaching and research: teacher, classroom, platform, technology, real-world problems, and methods. She noted that the underpinning theory is a data-supported regional collaboration model; in other words, it is a closed loop based on problem-driven classrooms, technology empowerment, platform support, and collaborative innovation.

Ms LI Yan, Principal of Shenyang Railway Experimental primary school, focused on “Information technology energizes the education scene and upgrades the dimension of

school space ecology". She introduced the school's development of "cloud research, cloud teaching, and cloud management", which helped build a smart campus where both students and teachers benefited.

Professor Mauricio Xavier Prado Ortega from the Technical University of Machala delivered a speech on "Learning analytics in higher education through the application of collaborative tools". Through this research, he found that the application of learning analytics could help to monitor and evaluate students' learning in a real-time manner; and collaborative tools like Google Analytics could help to measure students' progress and level of connectivity in synchronous learning.

Ms WU Dingcui, Principal of Bagu Primary School in Sichuan Province, China, focused on the application and practice of VR in education in minority areas. She believed teachers in rural primary schools in the ethnic minority area should not only strengthen the cultivation of cultural quality but also apply modern educational technology to classroom teaching. Teachers should also utilize the advantages of modern educational technology to expand children's horizons, and improve children's cognitive ability and thinking abilities.

Dr. Jördis Weilandt, Assistant Program Manager of Rebus Community, focused on compassionate and inclusive student learning in higher education. She shared the OER publishing project called "Textbook Success Program", which guides participants to move smoothly through the steps of publishing open teaching materials. She also suggested 3 ways to design for inclusion and equity: technical, content, and human accessibility.

Mr HE Qigang, Director of the Supervision Office of the Education Bureau of Tianyuan District in Hunan province, China, introduced the concept

of "Educational Micro-Universe", which he believed will address some of the current challenges facing the metaverse application in education.

Ms ZHAO Jing from Tongji University talked about the Metaverse Game from a novel perspective of Lao Tzu's Cosmology. She explained the thinking model of Lao Tzu's cosmology, based on which the possibilities of applying it in the field of education in the metaverse were discussed.

Mr ZHANG Xiaohu, Associate Professor from Xi'an Eurasia University, focused on the "Construction and Practice of Promoting Deep learning of OMO Integrated Teaching During Epidemic Situations". He shared his research paper results on the teaching practice of OMO in multi-scenario, which makes the online and offline learning more seamless.

Ms DUAN Yanqing from Yuncheng City Education Bureau of Shanxi Province, China, highlighted professional development of regional maker teachers. She noted that the curriculum system should be established based on local conditions, and schools should provide organizational, financial, institutional, and environmental support.

Professor Ramesh Sharma from Ambedkar University Delhi believed the 5th education revolution would be driven by the desire to achieve sustainable development goals as well as the science of learning. In a longer-living and aging society, everybody would have access to secondary careers and lifelong learning.

Building 21st century competencies for intelligent era

Ms Georgeta Panisoara, Associate Professor from Bucharest University in Romania, shared the research outcomes of her paper - Teaching

the Next Generation (Generation Z and Alpha) in Digital Society. She talked about digital pedagogy from the aspects of teacher adaptation, children's skill, digital textbooks, VR, platforms, etc. In her view, children shall be equipped with creative skills, communicative skills, and the ability to use technologies to prepare them for the future. During this process, digital resources and technologies like VR could help to build such competencies.

Ms LI Ahui, Principal of Kaiyue Kindergarten in Hangzhou, China, highlighted the integrated design and exploration of digital intelligence in kindergarten. She talked about the need for digital and intelligent development in preschool education and practices on kindergarten management, learning space, early childhood development, and curriculum construction. She believed digital intelligence would help to prepare children for the future, including the adaptation of pedagogic approaches and

learning styles and optimization of curriculum resources.

Mr LIU Chao, Academic Affairs Director of Zhengtai Bowen School in Henan Province, China, focused on the Challenges and Countermeasures of Rural Primary and Secondary School Teachers' Professional Development. He suggested the pathway for fostering teachers' smart teaching ability is to study famous educators' works, learn how to use digital tools, actively apply teaching practice and reflect on classroom performance, follow the latest journal articles and accumulate professional knowledge.

Mr FAN Yizhou, a researcher from the University of Edinburgh, shared his research findings on self-regulated learning, including the measurement, analysis, and intervention of learners' self-regulation process. He noted that the bottom line is understanding the technology, students, and the teaching and learning process.

Teacher Forum on Technology Empowered Teaching Innovation

Key takeaways

- The personal development of teachers requires a learning community that can inspire and complement each other, and this cooperative group can prompt teachers to generate new understandings and rise to new levels.
- The development of digital teaching materials is the basis for leveraging the digital transformation of classroom teaching and realizing the sharing of high-quality educational resources. The key point of developing digital teaching materials is to design interactive and editing tools, build knowledge graphs and platforms, and explore new models of digital teaching based on various application scenarios.
- The 21st century classroom will show new patterns of student-teacher interactions empowered by intelligent technologies. Teachers could be able to get off the stage, stop lecturing, and work with small groups of students; as a result, teachers would have clearer understanding of what their students are thinking and how they make sense of the ideas.
- Teachers can match different class types and effectively transformed the teaching and studying ways according to various situations like learning base, disciplinary features and lesson content to reach high-quality classes.
- As primary school teachers in rural ethnic minority areas, we should be more adapt at applying various advanced teaching methods like VR to make the process of imparting knowledge more direct, so that students can more intuitively feel the knowledge they want to master, and learn the knowledge they want to learn in a relaxed and pleasant environment.

Smart Village and Transformation of Rural Education

More than 3.4 billion people in the world, or more than 43% of the world's population, and about 80% of the poor still live in rural areas. In the process of realizing the transformation and modernization of education, making up for the shortcomings of rural education is a major issue and challenge facing all countries. This forum shared the experiences or cases of how education promotes rural development and transformation in different countries and regions, discussed educational solutions for smart village and rural sustainable development, and contributed to the realization of rural revitalization strategy and the United Nations Sustainable Development Goals.

Responding to the global education crisis through joint efforts

Mr WANG Lei, Deputy Director of the Office of International Exchange and Cooperation, Beijing Normal University, delivered an opening address at the forum. He briefed a speech about the negative effects that COVID imposed on the global education system, highlighting that women and children were particularly vulnerable. "Against the challenges of the global education crisis and learning loss, smart education will become an important breakthrough. Smart education is the target form of digital transformation of education." Wang noted. He also stressed his appreciation to all co-organizers and guests on behalf of Beijing Normal University, expressing the organization's wish to cope with the global education crisis and strive for the SDGs together with its global partners.

MODERATOR

Prof. ZENG Xiaodong

Executive Director, UNESCO INRULED

Dr. ZHAO Yuchi

Deputy Director, UNESCO INRULED

SPEAKERS

Prof. WANG Lei

Deputy Director, Office of International Exchange and Cooperation, Beijing Normal University, China

Dr. Ethel Agnes P Valenzuela

Director, SEAMEO Secretariat

Dr. Faiz H. Shah

Director, Yunus Center AIT, Thailand

Prof. Muhammad Yunus

Founder of Grameen Bank in Bangladesh, Nobel Laureate, Chairman of Yunus Center at AIT

Prof. WANG Jixin

Faculty of Artificial Intelligence in Education, Central China Normal University, China

Dr. Roger Y. Chao Jr.

Assistant Director/Head, Education, Youth and Sports Division, the Association of Southeast Asian Nations (ASEAN) Secretariat

Dr. HAN Wei

Executive Deputy Director, International Centre for Higher Education Innovation under the auspices of UNESCO (UNESCO-ICHEI)

Dr. Janaka Jayalath

Deputy Director General, Tertiary and Vocational Education Commission, Sri Lanka

Dr. Glenn B Gregorio

Director, SEAMEO Regional Centre for Graduate Study and Research in Agriculture, Philippines

Digital Education in K-12 Schools in China: A Comparative Case Study of Rural and Urban Areas

Prof. ZENG Xiaodong

Executive Director, UNESCO INRULED

Dr. LI Baoping

Associate Professor, Deputy Dean of Institute of Rural Education and Rural Development, Beijing Normal University, China

Dr. Pietro Borsano

Executive Deputy Director, School of Integrated Innovation, Chulalongkorn University, Thailand

Mr QI Zhiwen

Dean, Department of Higher and Vocational Education, Gansu Institute for Educational Research, China

Prof. Moshed M Ahmad

Head, Department of Development and Sustainability at AIT, Thailand

Prof. Kiichi Oyasu

Director, Education Cooperation Department, Asia-Pacific Cultural Centre for UNESCO, Japan

Dr. Nguyen The Manh

Rice Program Manager, Rikolto in Vietnam and Rice Programme Director, Rikolto in Southeast Asia, Vietnam

Mr Emmanuel Krou N'Guessan

President, NGO GA-TIC, 2021 Laureate of the UNESCO Confucius Prize for Literacy, Côte d'Ivoire

Dr. Shoukat Ali

Associate Professor, Institute of Agricultural Extension Education and Rural Development, University of Agriculture, Pakistan

Mr Asrul Sidiq

Researcher, International Centre for Aceh and Indian Ocean Studies (ICAIOS), Indonesia

Mr Phonedalom Bounkham

Director, Permanent Secretary Office, Ministry of Foreign Affairs, Lao PDR

Dr. Ethel Agnes P Valenzuela, Director of SEAMEO Secretariat, expressed her thanks to the invitation from Beijing Normal University and introduced the motivation and missions of SEAMEO. She stressed the COVID-19 was also an education crisis. A series of strategies adopted by the organization, combining ICT and updating pedagogy, successfully helped the region downsize the aftermaths of lockdowns in terms of education. Finally, she urged that it was the

time for achieving educational transformation.

Dr. Faiz Shah, Director of Yunus Center AIT, Thailand, stressed the significance of AI and ICT in education because they make education "less expensive" and "ubiquitous." With some examples, he demonstrated the transformational role of education with the help of technology, who shared the same idea with Professor Yunus. He introduced some work that AIT Yunus center has been doing to prompt digital inclusion and digital transformation. Through videos, he shared with the guests Professor Yunus's interpretation of three-zero world and three-zero club.

Professor Muhammad Yunus, Founder of Grameen Bank of Bangladesh and the laureate of Nobel, highlighted the significance of the right education and the right thinking for building the future world. Combined with his experience of founding Grameen Bank, he emphasized fostering creative thinking and ensuring the well-being of students, and proposed the wish of three-zero world — "zero emission, zero poverty and zero unemployment", and introduced three-zero club, aiming to build a platform for people to discuss about creating a three-zero world.

Building smart education environment in rural areas

Professor WANG Jixin from Central China Normal University introduced the findings of his team's experiment of augmented interactive teaching reform, which aimed to improve the teaching quality of rural schools.

Dr. Roger Y. Chao Jr., Assistant Director/Head of Education, Youth and Sports at the ASEAN Secretariat, reviewed the history and a series of documents and initiatives issued by ASEAN on promoting a society of life-long learning.

Dr. HAN Wei, Executive Deputy Director of UNESCO-ICHEI, talked about the Practices and Experience of Building a Global Community of

Higher Education Digital Transformation in three dimensions: theoretical research on education; a platform of extensive consultation, joint contribution and shared benefits; and international and interdisciplinary collaboration.

Dr. Janaka Jayalath, Deputy Director general of Tertiary and Vocational Education Commission in Sri Lanka, introduced the project "Skill Passport" to the audience. As an innovative practice integrating technologies, the project aimed to improve the quality of tertiary and vocational education in Sri Lanka.

Dr. Glenn B. Gregorio, Director of the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEAMEO-SEARCA) in the Philippines, gave a speech about the six key areas for R&D to accelerate the transformation of the agriculture sector and food security in a post-COVID period.

Digital Education in K-12 Schools between Rural and Urban Areas in China

A research outcome - Digital Education in K-12 Schools in China: A Comparative Case Study of Rural and Urban Areas (*School Case Study Report*) - were jointly released by **Dr. LI Baoping**, Deputy Dean of the Institute of Rural Education and Rural Development, Beijing Normal University, and **Professor ZENG Xiaodong**, Executive Director of UNESCO INRULED. The study revealed the differences between rural and urban schools in terms of the use of digital methods and career support for teachers. Based on the findings, the paper proposed that a more precise investment model should be provided for rural schools to enable sustainable and quality improvement in rural education.

The development path of rural education and excellent cases of smart villages

Dr. Pietro Borsano, Executive Deputy Director (Industrial and Global Alliances) of School of Integrated Innovation (SCII) of Chulalongkorn

University in Thailand, shared his insights about the development of the digital economy across the 10 Southeast Asia economies and how the pandemic accelerated the digital transformation of SMEs, with a notable growth of digitalization in non-metropolitan areas of Southeast Asia.

Mr QI Zhiwen, Dean of the Department of Higher Vocational Education in Gansu Institute for Education Research (GIER), pointed out the analysis and suggestion of their team on the imbalanced development of rural schools, particularly, boarding schools and small-scale schools in rural areas.

Professor Morshed M Ahmad, Head of the Department of Development and Sustainability at Asian Institute of Technology (AIT) of Thailand, shared the comparison research conducted in three countries. He stressed that the government should issue long-term plans and framework to help recover from the pandemic.

Professor Kiichi Oyasu, Director of Educational Cooperation in Asia-Pacific Cultural Centre for UNESCO (ACCU), introduced the challenges that Japanese rural areas faced in development, particularly in an aging society. He shared the solutions and cases of disaster prevention and building smart communities.

Dr. Nguyen The Manh, Rice Programme Manager of Rikolto in Vietnam and Rice Programme Director of Rikolto in Southeast Asia, introduced various ways that minority ethnics in Vietnam used to cope with climate changes.

Mr Emmanuel Krou N'Guessan, President of the NGO GA-TIC, Côte d'Ivoire, and the winner of the 2021 UNESCO-Confucius Literacy Prize, shared his experience in decreasing illiteracy among women in his country and proposed his vision of prompting digital transformation in Africa with the help of ICT and International cooperation.

Dr. Shoukat Ali, Associate Professor from the University of Agriculture Faisalabad in Pakistan, talked about various digital initiatives launched by the School Education Department of Punjab Pakistan. The study of his team contributed to improving and sustaining quality education through the recommendations.

Mr Asrul Sidiq, a lecturer at Syiah Kuala University and researcher at the International Centre for Aceh and Indian Ocean Studies (ICAIOS), discussed processes and outcomes of TORA — the reform of land making use of land titling to improve management and protection of natural resources.

Mr Bounkham Phonedalom, Director of Permanent Secretary Office, Ministry of Foreign Affairs of the Lao PDR, gave a presentation about how the agricultural information through the use of ICT has impacted on vegetable growers/farmers in Vientiane province, Lao PDR.

Smart Village and Rural Education Transformation

Key takeaways

- In the process of digital transformation in education, it is necessary to prevent new regional differences and urban-rural differences, bridge the digital divide and the gap in the application of smart technologies, and build an inclusive and equitable culture.
- The university's research team is stationed in the countryside and coordinates with the teachers and students of the experimental school to carry out research work around related research problems, and explores ways to improve quality and efficiency by discovering problems and solving problems.
- To achieve digital transformation in rural schools, we shall always focus on lifelong learning, provide the software and hardware facilities and open education resources the school needs, connect schools, modify teaching methods, and reduce the gap between urban and rural areas.
- "Skills passport" creates a digital smart space that allows learners to recognize and record their skills. This is especially beneficial to rural communities, which could pave the way for them to find better employment opportunities within the country and abroad.
- The rural boarding schools and rural small-sized schools have been the weak parts of the high-quality and balanced education system, and are generally faced with the issue of "migrating out". Although the conditions like infrastructures and facilities in these two types of schools have been improved in recent years, the key elements to promote the high-quality development of education, such as teacher team construction, school governance, and teaching quality, still have crucial needs.
- Smart and sustainable rural development needs to find "attractions" through infrastructure development, capacity development of stakeholders, inter-generational learning, collaborations, and conversions for innovation.

AI-driven Open Education

Nowadays, artificial intelligence (AI) is widely used in educational technology products and plays an increasingly prominent role in the entire field of education. The application of AI provides great opportunities and possibilities for open education, and also provides educational institutions with a variety of ways to organize teaching activities. The forum touched on topical issues on the deep integration of AI and education, the reform of evaluation empowered by AI, ethics of AI, the openness of education, etc.

AI in open education

Dr. Mohamed Jemni, Director of the ICT Department of the Arab League Educational, Cultural and Scientific Organization (ALECSO), pointed out that artificial intelligence provides new possibilities for addressing challenges such as equity, inclusiveness and intelligence in education. It is also fundamental for achieving SDG 4. He believed open education is of great significance to promoting education equity and narrowing the digital divide.

Professor LI Song, Vice President of the Open University of China, noted that the Open University of China would build a platform for lifelong education, online education, flexible education, and foreign cooperation. At present, the transformation and upgrading of Radio and TV University, as well as the high-quality development of the Open University, have entered a new stage. Artificial intelligence will help improve the quality of education and learners' learning experience and will play a positive role in promoting the development of open education.

Professor Lilia Chniti from the University of Sousse in Tunisia delivered a speech on "Towards

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Dr. ZHANG Xiangling

Beijing Institute of Education, China

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Prof. LI Song

Vice President, Open University of China

Dr. Lilia Chniti

University of Sousse, Tunisia

Dr. LU Yu

Associate Professor, Beijing Normal University, China

Dr. Eamon Costello

Associate Professor, Dublin City University, Ireland

Dr. Rob Farrow

Researcher, Institute of Educational Technology at The Open University, Ireland

Dr. Soheil Salha

An-Najah National University

Dr. Abderrahim Ghassoub

Education Orientation and Planning Center - Rabat-Morocco

Dr. Qing Tan

Associate Professor, Athabasca University, Canada

Dr. Marek Wosinski

Arizona State University, USA

Open Intelligent and Innovative Learning”. She pointed out that technology can facilitate learners' learning and can be applied to educational evaluation. She proposed a "blended learning framework" that includes elements such as teaching and learning practice, resources (content), assessment, teacher capacity development, and inclusive facilities. She also elaborated on integrating artificial intelligence and education from three dimensions: resources, learner, and teacher.

Ethics of AI

Dr. LU Yu, Associate Professor from Beijing Normal University, discussed how artificial intelligence could promote education. He believed people need to understand the process and basis of the decision-making model of artificial intelligence. “Explainability” has become a key factor in deciding whether artificial intelligence can be widely applied. The role of explainable artificial intelligence in promoting education is a research question worthy of attention.

With the development of technology, the importance of the openness of education and the ethics of technology has become increasingly prominent. **Dr. Eamon Costello** from Dublin City University and **Dr. Rob Farrow** from The Open University of Ireland discussed issues on open educational resources (OER), open educational practice, and artificial intelligence ethics. They also proposed a framework for artificial intelligence ethics.

AI-driven assessment

Dr. Abderrahim Ghassoub from an Education Orientation and Planning Center (called Rabat) in Morocco talked about the difference between artificial intelligence and human intelligence. He emphasized the need to increase investment in research and development to improve the AI-driven evaluation system and to strengthen teacher training for better application of artificial intelligence teaching tools.

Dr. Qing Tan from Athabasca University gave a presentation on “Content Validation using Machine Learning - Open Learning Content Creation Platform”. He proposed a platform driven by machine learning technics for creating open learning content, using artificial intelligence algorithms to enhance the ability of content verification and learning behavior analysis, using blockchain technology to improve the credibility and traceability of creation, aiming to better support individualized learning among users.

Mr FAN Xing, Co-Founder and CTO of Squirrel AI, focused on how the application of artificial intelligence software and hardware in education can improve students' autonomous learning ability and truly help lessen the burden of both students and teachers for greater efficiency.

Dr. Marek Wosinski from Arizona State University pointed out that education can promote the knowledge, skills, values and actions required for sustainable world development, and technology plays an important role in it.

AI-driven Open Education

Key takeaways

- Deploying AI for education effectiveness requires the digital transformation of educational systems, preparation for the effective and human rights based use of AI, and capacity building of educators and learners on AI technologies and applications.
- Due to the complexity the internal structure and intransparent decision processes, deep learning models are hard to provide clear and easily understandable explanations and interpretations. Fortunately, explainable artificial intelligence (xAI) can be an effective tool to tackle the interpretability issue of deep learning models.
- Open Learning Content Creation is an innovative solution to continue updating course content and to provide personalized learning.
- One-on-one personalized teaching through artificial intelligence teachers and a real facilitator/teacher could effectively achieve large-scale individualized learning and improve the teaching quality.
- Investing in the professional qualification of teachers for effective uses of assessment could be based on artificial intelligence tools and applications.

Digital Governance of Education

As a strategic technology leading the future, artificial intelligence has been elevated to a national strategy in major countries and regions in the world, and the application of artificial intelligence has provided new teaching methods for education as well as solutions to teaching problems, which has led to the reform of teaching models and a huge leap forward in education. The government grasps the social situation and public opinion in a timely manner, uses quantitative methods to improve work efficiency, and solves the problem of uneven distribution of resources in various industries, making "smart+" a new development trend in the field of education and people's livelihood. This forum discussed how intelligent technology would be deeply integrated with education, people's livelihood and other fields to provide new horizons, new ideas and new paths for the digital governance of education.

Professor WANG Yaonan, Academician of Chinese Academy of Engineering, introduced the cutting-edge trends of digital and intelligent technology. He introduced a digital technology system constituting memory technology, perception technology, action planning and machine learning. This system is not only the cornerstone of a highly autonomous and networked closed-loop control system and multiple application scenarios but also provides possibilities for improving the government's educational supervision function, innovating teaching reform models and offering new learning styles for students. In the future, with the intelligent technology, the collection of educational data will be more complete, the analysis will be more precise, and the understanding will be more accurate. The digital technology system will provide a scientific basis for educational decision-making and form a new path for the digital governance of education.

MODERATOR

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SPEAKERS

Prof. WANG Yaonan

Academician of Chinese Academy of Engineering

Ms SONG Shanping

Executive Dean, China Institute of Education and Social Development (CIESD)

Prof. TANG Yayang

Secretary, Party Committee of Hunan University of Science and Technology, China

Dr. Eugene G. Kowch

Former President, Association for Educational Communications and Technology (AECT)

Dr. Ig Ibert Bittencourt

Associate Professor, Co-Director, Center of Excellence in Social Technologies, Federal University of Alagoas, Brazil

Dr. TONG Lili

Associate Professor, Beijing Normal University, China

Dr. Mutlu Cukurova

Associate Professor, University College London, UK

Penal Discussion

Mr JIANG Yanshuang

Office Director, Educational
Informatization Strategy Research Base
(Beijing), Ministry of Education, P.R.C

Mr WEI Xiaoliang

Deputy Director, Shenzhen Education
Information Technology Center, China

Mr XUE Gang

Director, E-Education Center of Erdos, Inner
Mongolia, China

Ms XIAO Chenhui

Principal, Chnagtangli Primary School, Yuhua
District, Changsha, China

Mr WANG Xianguang

Vice Principal, Guangxi Rongshui Miao
Autonomous County Ethnic Senior
Secondary School, China

Mr ZHENG Furui

General Manager, Higher Education Division
of Beijing Business Center, Hikvision

Ms XU Bingyu

Inspector General, Education Division, No.2
Division Company of Beijing Unicom

New directions for policy-making and governance

Ms SONG Shanping, Executive Dean of the China Institute of Education and Social Development (CIESD), stressed that the tasks of the digital governance of education are realizing the transformation from “digitalization + education” to “education + digitalization” and developing

digital education with humanistic characteristics. As the first high-end think tank dedicated to the research of education and social governance in China, CIESD will conduct research on governance strategies of education reform and development, release high-quality outcomes, and provide strong support for promoting the educational governance system, accelerating the modernization of education and building a powerful nation of education.

Professor TANG Yayang, Secretary of the Party Committee of Hunan University of Science and Technology, noted that rural areas are at a relative disadvantage in the construction and governance of the digital education environment. To achieve rural revitalization, improve education equity and promote the realization of the national strategic goal of high-quality development of education, we must pay attention to three governance directions:

- rural education is the focus of modernization of educational governance;
- digital environment is the difficulty of the governance of rural education; and
- students are the central focus of construction of digital environment of rural education.

Based on the three directions, he suggested we should make plans, focus on key points, promote implementation, and effectively carry out digital governance to promote the high-quality development of rural education, especially on the problems and obstacles in rural areas.

Dr. Eugene G. Kowch shared his thoughts on the innovation policy-making framework for AI-enhanced education. He stressed that policy formulation should change the focus from linear to non-linear system to include inequity, poverty, and environmental problems. The economy, society, culture and other factors should be

considered to form a policy network. He argued that the key to integrating education and AI is cultivating effective managers and educational governance mechanisms.

Dr. Ig Ibert Bittencourt noted that smart education should focus on improving the quality of teachers and students based on the local needs. The Federal University of Alagoas in Brazil has developed a series of applications and systems in response to problems such as education imbalance and insufficient writing skills of students, which aims to improve the teaching quality, better realize the implementation of educational policies and applications, effectively promote the research and development based on the real demand, and improve the level of digital governance of education.

Ms TONG Lili, Associate Professor from Beijing Normal University, delivered a speech on “The Application and Governance Strategy of Full-cycle Internet Education from the Perspective of Technological Experiments”. In response to the new requirements of digital governance of education and the latest developing trend of Internet + education, she shared five key technical experiments of closed-loop governance, including a review of multimodality teaching content, protection of personal information, user behavior portrait and algorithm analysis, and risk monitoring for Internet education applications.

These technical experiments are aimed to actively explore the governance strategies of full cycle Internet + education, open up the design concepts and practical applications of the technology used for Internet + education, and establish a full-cycle governance model for the application of Internet + education.

Dr. Mutlu Cukurova, Associate Professor from the University College London, found that the use of intelligent technology in the teaching process can increase interactivity and improve teaching efficiency. The integration of intelligent technology into classroom activities will encourage the innovative design of teaching scenarios, provide a practical basis for analyzing human behavior, and build a visual module of human emotions and IQ, thereby effectively improving the fairness and efficiency of the classroom.

Pathway and solution for digital governance of education

The panel discussion focused on the “pathway and solution for digital governance of education” and discussed its mechanism construction, current plan, optimization and exploration from multiple perspectives, including governance of regional education, teaching scenarios in the school context, and the application of digital technology.

Digital Governance of Education

Key takeaways

- For policy-making in smart artificial intelligence education contexts, it is suggested to shift from narrow (subsystem) innovation understanding in complex education systems to broad (ecosystem) innovation understanding, and shift from economic and mission-oriented technical policy at local, and national levels to society problem-focused policy-making networks.
- For today's Internet+education applications, young students learn online (e.g. online virtual learning environments) for most of the time. Assessing their learning effects in objective way requires educators to carry out technical simulation of the online perception environment to evaluate the learning effect. These experiments needs multi-party collaboration, including technical experts designing simulated scenes and researchers conducting data analysis.
- Digital governance is the periodical result of digital transformation. Three key points in the transformation process are following the user first principle, providing timely feedback through multi-party collaboration, and regional coordination that ensures the basics and accessibility.
- Concerning the establishment of platforms at district and municipal level, Shenzhen realized the school collaborative work mechanism through financial support, set up informationized team through establishing information center in each school, encourage cooperation between universities.
- For countryside schools in ethnic minority, the transformation to smart schools can bring convenience to students' lives and relieve teachers' work pressures. The cooperation between veteran teachers and pre-service teachers can promote the application of informatized resources and teaching effectiveness.

Reform of School Education in the Intelligent Era

The development of the new generation of information technology has promoted the transformation of school education. The intelligent era has put forward a new test for the integration of technology and education from the aspects of concept, path, system and model. New changes are required in school education to adapt to future digital developments. It is of vital importance to pay attention to the opportunities and challenges brought by school education reform to teachers and students.

Education reform driven by intelligent technology

Professor HU Qintai, Secretary of the Party Committee of Guangdong University of Technology, believed the advent of the intelligent era has brought major changes in the educational environment and has also put forward new goals and requirements for school education. We shall actively promote the in-depth integration of intelligent technology and education, apply student-centered learning, and promote innovation in educational concepts, pedagogic approaches, and management models. We shall strive to cultivate creative talents and lay a solid foundation for achieving educational equity, building a high-quality educational system and a more open and inclusive lifelong learning system.

Professor LIU Jian, Dean of China Education Innovation Institute of Beijing Normal University, pointed out that intelligent technology not only brings a new educational mission but also provides strong support for promoting fair and quality education. The starting point for studying the futures of education is to reflect on and

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Ms JIAO Yanli

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Prof. LIU Jian

Dean, China Education Innovation Institute, Beijing Normal University, China

Prof. KE Qingchao

Vice Dean, School of Information Technology in Education, South China Normal University

Prof. LI Yushun

Faculty of Education, Beijing Normal University, China

Prof. LUO Fang

Faculty of Psychology, Beijing Normal University, China

Prof. CAO Xiaoming

Faculty of Education, Shenzhen University, China

Prof. Anthony Seldon

President and co-founder, International Alliance for Active Education, UK

Dr. Christina Hong

President, Technological and Higher Education Institute of Hong Kong (THEi), Hong Kong, China

Ms GAN Lu

Pre-school Teaching Researcher, Longhua District Education Science Research Institute, Shenzhen, China

Mr SONG Yan

Director, Information Center, Beijing Eleventh School, China

Ms ZHANG Jia

Secondary School Researcher, Teacher Development Center, Suzhou Industrial Park, China

Ms CHENG Xin

Director, Educational Technology Office of Tianjin Yinghua International School, China

discuss how school education will be reformed in an intelligent era. He believed aspects of school education in this intelligent era are likely to be changed in this fashion: top-level design, student learning styles, data-driven teaching, and the construction of a collaborative education ecosystem connecting schools, families, and society.

Professor LI Yushun from Beijing Normal University highlighted the developing trend of smart campuses. He noted that intelligent technology drives the construction of a smart campus. With the enhancing technical features

and the increasing application of information technology in the teaching process, teaching has gone through a big change. The data-empowered smart campus and precision teaching together promote the development of quality education.

Professor KE Qingchao from South China Normal University focused on the cognitive revolution and school teaching innovation in the intelligent era. He stressed that the development and superposition of AI (Artificial Intelligence) technology would subvert human's cognitive boundaries and bring a new cognitive revolution to human beings. The school teaching reform and innovation in an intelligent era need "brain-based learning", which is based on the research of brain science and AI. In the process of promoting the deep integration of AI and education, it is expedient to conduct various educational social experiments, and to study and judge the development trends, risks and challenges of intelligent education.

Professor LUO Fang from Beijing Normal University shared her findings from an "Intelligent Assessment of Mental Health". She discovered that psychological measurement in an intelligent era is becoming more precise, and the measurement method will be transformed from the traditional self-report scale to intelligent assessment. Text information in the social media, wearable sensor data, and audio and video data can be analyzed by AI, achieving a seamless and accompanying assessment of students' mental health.

Professor CAO Xiaoming from Shenzhen University delivered a speech on "Reform and Remodeling - The Prospects of School Education in the Intelligent Era". He put forward eight characteristics of the futures of schools: focusing on fostering global citizenship skills, innovative and creative skills, technical skills, and interpersonal skills; putting emphasis on

individualized and autonomous learning, accessible and inclusive learning, problem-based and cooperative learning, and lifelong and self-driven learning.

Professor Anthony Seldon, who is the President and Co-Founder of the International Alliance for Active Education and the author of “The 4th Education Revolution”, explained how to change the traditional educational concepts and methods to make students better adapt to the changing society. He gave a detailed presentation on how intelligent technology has changed education, including the management and supervision of the educational system as well as education in rural areas. Also, the development of technologies such as the Internet and VR provides more choices for reading textbooks and conducting assessments.

Dr. Christina Hong, President of Technological and Higher Education Institute of Hong Kong (THEi), shared her vision of the futures of smart learning. She introduced the construction of a smart campus at THEi, the education and training of Hong Kong Vocational Education to cultivate STEM (science, technology, engineering, and mathematics) talents for the development of smart cities, and some examples for the next-generation campus. She suggested the top 10 digital skills Education 4.0 demands: complex problem solving, critical thinking, creativity, people management, coordinating with others, emotional intelligence, judgement and decision-making, service orientation, negotiation, and cognitive flexibility.

School cases of technology-supported education

Ms GAN Lu, Chief Principal of Preschool Education Group of Longhua District Education Science Research Institute in Shenzhen, focused on how information technology empowers children’s inquiry-based learning. She introduced three important roles that information technology plays in children’s learning progress:

children being “indigenous people” in the information age, inquiry-based learning for children, and environmental support. She further enumerated three typical cases of how technology is integrated into teaching.

Mr SONG Yan, Director of the Information Center of Beijing Eleventh School, gave a presentation on technology-empowered school transformation. He introduced how Beijing Eleventh School uses intelligent technologies for a new school form, including the topics on the top-level design of school informatization, technology-assisted classroom projects, project-based learning and online learning, and Internet service purchase.

Ms ZHANG Jia, a secondary school researcher at the Teacher Development Center of Suzhou Industrial Park, emphasized technology-empowered project-based learning, aiming to provide every child a "good" learning experience. She shared the experience of developing smart education in Suzhou Industrial Park from the aspects of growth, exploration, and the future.

Ms CHENG Xin, Director at the Educational Technology office of Tianjin Yinghua International School, focused on the "Paths and Practices of Digital Transformation in Primary and Secondary Schools". She shared the exploration of smart education practice in Tianjin Yinghua International School, including the blueprint framework of Smart Yinghua, solutions on data island, the construction of business systems based on data center, the path of smart Yinghua’s construction and thinking of digital transformation.

Reform of School Education in the Intelligent Era

Key takeaways

- The reform of school in the intelligence era includes but not limited to building high-quality education system from multiple perspectives such as policy, theory and practice; focusing on students' development and promoting personalized learning; using big data to achieve data-driven teaching and learning; and constructing innovative educational ecology in which government, schools, enterprises, families, and society make joint contributions.
- With the accelerated development of intelligent technology, classroom teaching is moving towards openness, and the integration of online and offline modes brings about the reconstruction of time and space, enhances students' learning ability, and promotes the transformation of the modernity of the classroom.
- To a certain extent, the solidification of the learning space directly restricts the flexibility of teaching and curriculum, and indirectly affects the development and cultivation of learners' personalized ability. It is a bottleneck problem that needs to be broken through in the implementation of educational reform in modern schools.
- The digital transformation of the school is the result of the digital transformation of each specific departments in a school, where all the personnel is trained to develop their information literacy and technology application capabilities.
- Rather than a bricks and mortar approach, the next generation campus approach shall be an ecosystem approach where we have the relationships between the education provider, the industry in the profession, the community and the student as our learning partner.

Leveraging Intelligent Technology for Education Innovation

Leveraging the technology for assessment and talent cultivation

Professor CHEN Li from Beijing Normal University highlighted “Intelligent Technology-based Performance Assessment and Monitoring of Students' Comprehensive Development”. She believed evaluation is the baton of educational reform and development, and she found that evaluation in real educational contexts still needs improvement. For example, the traditional paper-and-pencil tests are not able to test students' multi-faceted abilities. She suggested 3 future directions: improving the existing limitations of comprehensive quality evaluation, constructing a basic database for the comprehensive development of Chinese students, and revealing the law of the development of comprehensive literacy of Chinese students.

Dr. XIN Bing, Director of the Children & Youth Science Center (CYSC) of the China Association for Science and Technology, proposed 3 initiatives on “The Thinking and Practice of Educating People Through the Combination of Technology and Education”. The first is to seize the opportunity of the history of the information revolution and use information technology to empower the development of educational innovation. The second is to build a platform for international exchanges and jointly cultivate global youth science and technology talents. The third is to vigorously strengthen online and offline cooperation to jointly cope with the challenges of science and technology education.

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Researcher & Director, Children & Youth Science Center (CYSC), China Association for Science and Technology

Prof. ZHU Wenwu

Deputy Head, Department of Computer Science and Technology (DCST) of Tsinghua University, China

Prof. HUANG Xiankai

Secretary, Party Committee of Beijing Technology and Business University, China

Dr. Sanjaya Mishra

Director in Education, Commonwealth of Learning (COL), Canada

Mr WU Fei

Head, Expert Group of Artificial Intelligence and Science and Technology Innovation, Ministry of Education, P.R.C

Prof. Hirotaka Nanba

Hiroshima University, Japan

Prof. WU Wenjun

Beihang University, China

Dr. Joseph South

Chief Learning Officer, International Society for Technology in Education (ISTE), USA

Prof. Alan Lesgold

Dean (2000-2016) & Professor Emeritus, University of Pittsburgh, USA

Prof. Ebba Ossiannilsson

Chair, ICDE OER Advocacy Committee, Sweden

Professor HUANG Xiankai, Secretary of the Party Committee of Beijing Technology and Business University, believed digital education had become an important part of the national development strategy, and digital transformation is the key to the transformation of higher education. Beijing Technology and Business University have built a Digital Future Center which interconnects all kinds of digital resources. Realizing the transformation of digital talent training in business could be achieved through building an integrated platform for intelligent teaching to realize the digitization of management processes and constructing a teaching space for digital interaction between teachers and students.

Technology-empowered innovative teaching and learning

Professor ZHU Wenwu, Deputy Head of the Department of Computer Science and Technology (DCST) of Tsinghua University, focused on autonomous-driven machine learning. He noted that the overall idea of autonomous-

driven machine learning is similar to that of pedagogy, which needs to be adjusted from both internal and external states. That is to say, adjusting learning goals and choosing learning strategies based on the learning environment and students' own state. Pedagogical ideas play a guiding role in the development of machine learning, and vice versa, the development of artificial intelligence technology will further promote the technological transformation of education.

Mr WU Fei, Head of the Expert Group of Artificial Intelligence and Science and Technology Innovation of the Ministry of Education, P.R.C, noted that we had entered a data-intensive era, where we can collect thousands of data that characterizes different human behaviors and patterns. The connotation of artificial intelligence is data-supported models and algorithms, computing power and systems, scenarios and applications. On the basis of this connotation, technology can be formed to intersect in different fields or different scenarios.; therefore, artificial intelligence technology must be combined with scene applications to promote the advent of the intelligent era.

Professor WU Wenjun from Beihang University delivered a speech on "Research and Thinking of Group Intelligence in Smart Education". He stressed that we could learn from the model of Open Source Community to build a group learning space so that the group intelligence would be better formed. In his view, we could first design a group organizing structure and interaction model for teaching; then, we construct a hybrid, effective learning incentive mechanism and provide a series of intelligent auxiliary tools such as cognitive modeling, homework review, human-computer mutual evaluation, performance prediction, etc., with an aim to build a more complete group pattern and intelligent learning space.

Professor Emeritus Alan Lesgold from the University of Pittsburgh gave a presentation on “Enculturating Smart Learning Technology”. He believed that technology could facilitate interaction between people, which is when learning happens. The key lesson learned from past practices of learning improvement is that we need to narrow the cultural knowledge gap required to acquire and apply new technologies as much as possible. The knowledge and culture of technology application play an important role in the successful deployment of new technologies.

Professor Hirotaka Nanba from Hiroshima University shared his research results from a comparative study of paper reading and digital reading in medium-scale and small-scale schools. He suggested that

- digital reading should not be introduced in the lower grades but in the middle grades and firmly implemented in the upper grades;
- digital reading is suitable for objective reading comprehension while paper reading is suitable for immersive reading.

Professor Ebba Ossiannilsson, Chair of the ICDE OER Advocacy Committee, focused on Mainstreaming OER. She pointed out that open education is the only way to achieve the equality and lifelong learning advocated by UNESCO. Open access to educational resources is essential for the sustainable development of education and the achievement of human rights equality. OER is public resources, including various teaching resources, media and platforms, which are publicly authorized and accessible to all and can be re-edited, copied or distributed to third parties for use.

National Smart Education Strategy for teaching and learning

Dr. Sanjaya Mishra, Director of Education of Commonwealth of Learning (COL), gave a

presentation on “Smart Education Strategies for Teaching and Learning”. He shared a report on the strategy of smart education in teaching and learning, related case studies and a framework for smart education. He believed smart education could be defined from three aspects: the first is to enable people to immerse themselves in learning and transfer knowledge; the second is the innovative application of technology, interactive participation and the availability of learning resources; and the third is the ethical aspect, which needs to focus on cybersecurity and equity issues.

Dr. Joseph South, Chief Learning Officer of the International Society for Technology in Education (ISTE), believed that the core idea of the “Rethinking and Redesigning National Smart Education Strategy” is to transform teaching and learning through technology. He explained it from 3 aspects:

- transformative teaching and learning enabled through technology;
- a digital learning environment conducive to smart education; and
- forward-thinking governance and policy initiatives.

Under the impact of the COVID-19 pandemic, it is difficult for us to return to the original form of teaching, so we need to examine existing teaching methods, create new teaching methods, think about the right teacher-student relationship, and build a strong learning community to create a good learning environment.

Leveraging Intelligent Technology for Education Innovation

Key takeaways

- We must break through a series of key intelligent technologies, say, those for collection, analysis and traceability, to achieve process-based performance evaluation. For example, collecting data from multiple sources such as schools, families, communities, science and technology venues, etc. could help to achieve data integration and cross-platform data aggregation, realizing the objective recording of learners' performance.
- It is very important to accelerate the construction of a high-quality personnel training system for the vast number of young people to advocate the scientific spirit, establish scientific thinking, master scientific methods, and enhance their practical ability.
- Technology will not be used well and extensively for teaching and learning unless it enacts an approach to learning that comes close to what was done by good teachers before that technology existed and unless the skills needed to employ the technology are already adequately enculturated into our society.
- We need to examine the whole process of managing a school from digital perspective - to examine the digital transformation of universities from macro perspective, examine digital management from mid-level perspective, and examine smart classrooms from micro perspective.
- The implementation of smart education policy has five levels: global smart education and AI in education frameworks; geopolitical/Regional level; national transversal level; dedicated smart education policies/strategies; and ministerial level taskforce.
- It is recommended to develop strategies to monitor the educational effectiveness and long-term financial efficiency of OER, which include participation of all relevant stakeholders. Such strategies could focus on improving learning processes and strengthening the connections between findings, decision-making, transparency, and accountability to inclusive and equitable quality education and research.

Concluding Comments and Follow-up Actions

Professor ZHOU Zuoyu, Vice President of Beijing Normal University, made a concluding speech for GSE2022. He pointed out four spotlights of this year's conference:

- the learning crisis and the futures of education were discussed from the perspective of students;
- the exploration of how intelligent technology supports the digital transformation in education featured by all elements, all businesses, all processes and all fields from the perspective of two-way empowerment of technology and education;
- the launch of Initiative for Global Smart Education Network (GSENet) for building an international exchange and cooperation network;
- the released outcomes on the GSE 2022 includes home and abroad research results: "Rethinking and Redesigning National Smart Education Strategy" and "Report on the Construction Progress of Smart Education Pilot Zone & Best Practices on Smart Education".

Ms XIA Juan, who is the Deputy Director of the China Center for International People-to-People Exchange, Ministry of Education, P.R.C (CCIPE), thought the agenda of GSE2022 was rich in content and insightful and provided diverse ideas, experiences and cases for education practitioners in China and other countries in the world, which is of great practical significance. The technology-empowered education could be further promoted through people-to-people

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Ms XIA Juan

Deputy Director, China Center for International People-to-People Exchange Ministry of Education, P.R.C (CCIPE)

Prof. LIU Dejian

Co-Dean, Smart Learning Institute of Beijing Normal University, China

Prof. ZHAN Tao

Director, UNESCO IITE

Prof. HUANG Ronghuai

Co-Dean, Smart Learning Institute of Beijing Normal University, China

International Report of Supportive Environment on Artificial Intelligence Courses in K-12

Prof. LI Yanyan

Co-Director, Lab of Knowledge Modeling and Analysis of National Engineering Research Center of Cyberlearning and Intelligent Technology, China

exchanges. She hoped all relevant parties could build more platforms to create more opportunities for schools, teachers and students to communicate in smart education, promote mutual learning between Chinese and foreign schools, and promote the popularization, application and improvement of technology in teaching and learning.

Releasing the *International Report of Supportive Environment on Artificial Intelligence Courses in K-12*

Professor LI Yanyan, who is the Co-Director of the Lab of Knowledge Modeling and Analysis of the National Engineering Research Center of Cyberlearning and Intelligent Technology, released the “International Report of Supportive Environment on Artificial Intelligence Courses in K-12”. In this report, the development of artificial intelligence education in primary and secondary

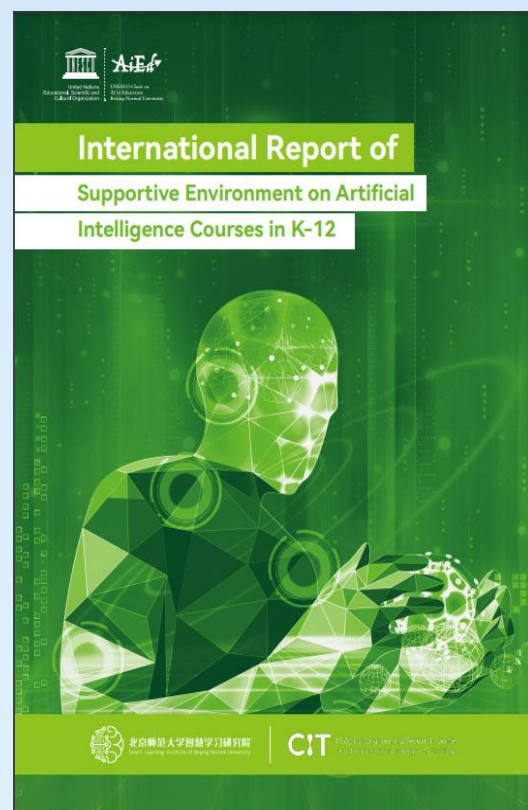
schools around the world is summarized, and recommendations are made. She presented six key points on how AI will be developed in the future:

- the development of AI is based on open educational resources;
- the design of teaching materials needs to take into account the student's needs;
- it is necessary to improve the basic knowledge on an algorithm for teachers;
- the AI teaching laboratory plays an important role in the basic process of developing AI for teachers;
- education policies should support sustainable development; and
- we should pay attention to the safety and ethics of AI.

International Report of Supportive Environment on Artificial Intelligence Courses in K-12

With the development of big data, computing power, and machine learning algorithms, the application of AI technology is becoming more and more common in various industries and people's daily life. The integration of AI and education is becoming closer and closer. How to use AI technology to improve education quality and teaching efficiency, and how to cultivate professionals who master AI technology have become the focus of global attention. In 2019, the president of the People's Republic of China Xi Jinping to International Artificial Intelligence and Education Conference pointed out that grasp the global AI development situation, find the breakthrough and main direction, cultivate a large number of innovation ability and cooperation spirit of AI high-end talents, is the important mission of education. As an important result of the meeting, more than 100 member countries and UN institutions, AI, civil society and the private sector of about 500 representatives jointly published the BEIJING CONSENSUS — AI and education (Beijing consensus), The consensus is committed to implementing appropriate policy strategies through AI and education system, comprehensive innovation education, teaching, and learning methods. In addition, the consensus is to use AI to speed up the construction of an open and flexible education system to ensure that people enjoy fair, suitable for everyone, and high-quality lifelong learning opportunities. This will thus promote the realization of the Sustainable Development Goals and a community with a shared future for mankind. At the opening ceremony of the AI and Education International Forum, Chinese Education Minister Huai Jinpeng stressed the importance of AI in education, and mentioned that "AI will give education power, change education and innovate education, which will undoubtedly create a better future for everyone else."

To promote youth AI education and analysis of the supportive environment, the National Engineering Research Center for Cyberlearning and Intelligent Technology joined the Smart Learning Institute of Beijing Normal University in carrying out the International Report of Supportive Environment on Artificial Intelligence Courses in K-12. This report aims to, through all kinds of data collection, summary, analysis, and comparison, for academia, education, and industry to provide a comprehensive understanding of the supportive environment for AI courses in K-12. The report also discusses the key elements that affect K-12 learning in AI courses. For instance, it includes teaching techniques for K-12 students, such as assigning independent learning, analyzing possible trends for the future AI development of youth education, and providing sufficient teaching resources for teachers, scholars, or other personnel.



Professor LIU Dejian, Co-Dean of Smart Learning Institute of Beijing Normal University, noted that idealized education is future-oriented and learner-centered. Idealized education could be further developed by considering the application of intelligent education products and tools, promoting human-computer cooperation, and supporting flexible learning for students. With the help of smart educational technology tools, students receive guidance and coaching, resources, and targeted learning when needed. On-demand learning is an important learning mode in the future, making students' learning easier and their lives better.

Professor ZHAN Tao, Director of UNESCO IITE, pointed out that the word "SMART" brings us together. For the sake of a common mission and goal, we need to constantly learn about the new digital transformation of the education system. Only through cooperative activities, meeting new partners, achieving goals together, and building a new educational system can we build smart education in such a challenging historical period.

Professor HUANG Ronghuai, Co-Dean of Smart Learning Institute of Beijing Normal University, made the concluding report. He concluded five spotlights of this year's conference:

- the conference embraced openness and cooperation, featured by 28 international partners and 12 thematic forums;
- the conference produced global impact with more than 200 domestic and overseas speakers;
- welcoming multicultural guests by providing 5 participant modes, namely, live streaming, main venue, local venues, ZOOM meeting, and metaverse exhibition;
- the Initiative for Global Smart Education Network (GSENet) was launched; and
- the "Report on the Construction Progress of Demonstration Zone of Smart Education" and the best practices on Smart Education were released.

He also talked about five concerns:

- the fields of technology and education are both actively influencing each other and showing a development trend of systematic integration;
- in the face of uncertain crises, the Futures of Education needs a new social contract for transformation, and young students shall take concrete actions to promote the global development initiative;
- we shall not only make full use of intelligent technology to empower teacher professional development but also examine the challenges of teacher education and teacher development brought by the intelligent era in an objective and rational manner;
- building the new ecology of smart education includes but is not limited to the planning of digital strategy and system, the construction of new infrastructure, technology-supported pedagogic transformation, and technology-empowered innovative evaluation; and
- rural revitalization is facing a major issue in all countries. We shall pay equal importance to construct the smart village and the smart city to transform rural education effectively.

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Appendix: Concept note

Global Smart Education Conference 2022

Launching of Global Smart Education Network (GSENet)

Intelligent Technology and Digital Transformation in Education

18 - 20 August 2022

Synthesis Report



Background

Intelligent technologies, such as Artificial Intelligence, Big Data, and VR/AR/MR, are important driving forces leading a new round of scientific and technological revolution. These technologies are profoundly changing the way we live, work, think, and even accelerating social transformation and deepening educational reform.

Affected by the ongoing pandemic wave, global education is becoming more uncertain and fragile than ever. Numerous efforts have emerged to respond to the challenges of COVID-19 at the international level. As the 2030 deadlines are fast approaching, the United Nations intend to convene a Transforming Education Summit in the coming September to mobilize action, ambition, solidarity and solutions with a view to transforming education before 2030. In tandem, many countries and organizations rolled out digital development strategies at the national level to promote a comprehensive digital transformation in education. UNESCO released the *Beijing Consensus* at the first edition of the International Conference on

Artificial Intelligence and Education. The *Beijing Consensus* recommends making appropriate policies that aim at systematic integration of AI and education to innovate education, teaching and learning. According to the report of *Digital Strategies in Education across OECD Countries*, a total of 17 member countries released digital education-related strategies between 2015 and 2019. Furthermore, the *Digital Education Action Plan (2021-2027)* issued by the European Union emphasizes two priority areas, namely, "Fostering the development of a high-performing digital education ecosystem" and "Enhancing digital skills and competences for the digital transformation".

The Chinese government also proposed a series of strategies and policies aimed at further promoting the systematic integration of intelligent technology and education. These include *China's Education Modernization 2035 Plan*, *The New Generation Artificial Intelligence Development Plan*, *Education Informatization 2.0 Action Plan*. In addition, the Ministry of Education of the People's Republic of China also stressed the importance of implementing the strategic action of education digitalization as well as accelerating the process of digital transformation and intelligent upgrade for education.

Digital transformation in the domain of education is based on digitization and digitalization, and is committed to 1) consolidating digital foundation; 2) building smart learning environments; 3) promoting co-creation and co-sharing of quality digital educational resources; 4) exploring personalized models for cultivating students and training teachers; 5) improving the digital literacy and digital skills of teachers and students; and 6) enhancing digital awareness, thinking and capabilities at digital transformation stage. Smart education can be considered as the educational behaviours provided by schools, regions, or governments, with the characteristics of high learning experience, learning content adaptation, and teaching efficiency. In smart education, modern science and technologies are used to provide diversified supports and on-demand services for students, teachers and parents, etc., the data of participants and learning and teaching processes are recorded and used to promote the quality and equity of education. From this perspective, smart education shall have great potential to be a breakthrough that integrates intelligent technologies with education for the future.

Beijing Normal University (BNU) is a comprehensive and research-intensive university with its strength in teacher education, educational science, and basic disciplines of liberal arts and sciences. BNU has taken the lead in the theoretical innovation and practical exploration of smart education. It has put forward policy suggestions on developing smart education and promoting the reform of the education system. It also serves as the secretariat of the expert group of the Smart Education Pilot Zones. During the pandemic, the Smart Learning Institute (SLI) of Beijing Normal University and the National Engineering Research Center of Cyberlearning and Intelligent Technology (CIT) have been seeking educational solutions under special circumstances. Specifically, they worked with UNESCO, finalizing and publishing a series of handbooks and guidance which comprise *Ensuring Effective Distance Learning under COVID-19 School Closures: Guidance for Teachers* as well as *AI and Education: Guidance for Policy-makers*. A variety of learning strategies and practical experience adopted in China have been collected in these publications, which provide institutions with feasible recommendations for minimizing disruption and ensuring continuity of course delivery during the pandemic.

UNESCO Institute for Information Technologies in Education (UNESCO IITE), as the co-organizer of the conference, is the only UNESCO Category One Institute that holds a global mandate for ICT in education. In 2020, IITE in cooperation with The Commonwealth of Learning (COL), International Society for Technology in Education (ISTE), National Research University - Higher School of Economics (HSE) and Beijing Normal University launched the Joint Project of Rethinking and Redesigning National Smart Education Strategy to explore the solution of infusing technology into education. IITE also worked together with SLI of Beijing Normal University, releasing a *Handbook on Facilitating Flexible Learning During Educational Disruption: The Chinese Experience in Maintaining Undisrupted Learning in COVID-19 Outbreak*. This handbook has been translated into several languages and was widely disseminated around the world.

Since 2016, BNU, in conjunction with international organizations and universities worldwide, has held four consecutive US-China Smart Education Conferences (UCSEC) and two Global Smart Education (GSE) Conferences. Thousands of experts and scholars in the field of education and technology from more than 50 countries and international organizations, including UNESCO and OECD attended the meeting. These conferences held discussions on frontier fields and hot issues such as K-12 Education, Higher Education, Vocational Education, Transforming Education through Intelligent Technology, AI and Future Education, Smart Learning and Futures of Education. At the conferences, a series of projects and research results such as *the Horizon Project Regional Report*, *the White Paper on Smart Education Pilot Zones Construction*, the Joint Project of *Rethinking and Redesigning National Smart Education Strategy*, as well as the project of E-Library for Teachers were released. The Global Competition on Design for Future Education also had a launch session at the conferences.

Aims

To promote the digital transformation and intelligent upgrade in education and strengthen international communication, BNU will convene the Global Smart Education Conference 2022 in conjunction with international organizations, universities and research institutions on 18th-20th August 2022. The theme of this conference is Intelligent Technology and Digital Transformation in Education. Experts and scholars from the fields of education and technology will be invited to discuss new theories, emerging technologies, latest achievements and trends in smart education globally to share relevant cases, build platforms for communication and to establish alliances for cooperation. In partnership with international organizations, GSE2022 will release a report of the Joint Project of Rethinking and Redesigning National Smart Education Strategy, a case collection on smart education, a white paper on smart learning environment, and a portfolio of Global Competition on Design for Future Education, etc.

The Global Smart Education Conference 2022 is organized by Beijing Normal University, co-organized by UNESCO Institute for Information Technologies in Education, and jointly hosted by Smart Learning Institute of Beijing Normal University, China Institute of Education and Social Development, Collaborative Innovation Centre of Assessment for Basic Education Quality, National Engineering Research Center of Cyberlearning and Intelligent Technology, Educational Informatization Strategy Research Base of the Ministry of Education (Beijing), etc.

Sub-themes

- Intelligent Technology Empowerment for Smart Education
- e-Textbooks and Pedagogy under Digital Transformation
- Smart Environment and Evaluation for Digital Transformation
- Public Service System and Digital Governance of Education
- Rural Education and Smart Village
- Systematic Integration of Technology and Education

Provisional Agenda

Due to the COVID-19 pandemic, GSE2022 will be held in both onsite and online modes (Zoom Meetings). Some forums will be presented in the form of metaverse.

Date: 18th – 20th August 2022

Onsite venue: Changping campus of Beijing Normal University

Online venue: Zoom, Live streaming

Conference Agenda (Onsite and Online)□

[China Standard Time (CST), UTC+8]

Date	Time	Agenda
18th August 2022 □ Thursday□	14:30-18:00	Opening Ceremony & Forum on Digital Transformation for Smart Education
	19:00-23:00	Forum on Teacher Education in Metaverse World
	19:00-22:00	Forum on Promoting Digital Literacy in Smart Learning Environment
19th August 2022 □ Friday□	9:00-18:00	Forum on the New Ecology of Regional Smart Education
	9:00-12:00	Teacher Forum on Technology Empowered Teaching Innovation
	14:30-18:00	Student Forum on Learning Crisis and Futures of Education
	14:30-20:30	The 6th International Conference on Smart Learning Environments
	19:00-23:00	Forum on Smart Village and Transformation of Rural Education
	19:00-22:0	Forum on AI-driven Open Education
20th August 2022 □ Saturday□	9:00-12:00	Forum on Digital Governance of Education
		Forum on Reform of School Education in the Intelligent Era
	14:30-18:30	Forum on Leveraging Intelligent Technology for Education Innovation & Closing Ceremony

Target Participants

GSE2022 intends to invite academicians, experts and scholars, government officials, representatives of international organizations, school principals and teachers, and business leaders in the fields of education and technology to give keynote speeches (Speakers of the conference will be later announced on the website.).

GSE2022 also intends to invite policymakers, researchers, practitioners, technicians, industry practitioners, teachers and students in the field of smart education to participate in the conference offline or online.

Partners

We welcome global partners to join us to co-host the conferences, forums and parallel sessions.

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Global Smart Education Conference 2022

Launching of Global Smart Education Network (GSENet)

Intelligent Technology and Digital Transformation in Education

Synthesis Report

The Global Smart Education Conference 2022, held on August 18-20, explored the theme 'Intelligent Technology and Digital Transformation in Education'. This publication is a synthesis of the key discussions, focusing on the how intelligent technologies empower smart education, digital transformation in regional and rural education, the futures of education in the eyes of teachers and students, how digital governance of education can be enhanced to direct intelligent technologies to the common good for education and humanity.

Stay in touch



Global Smart Education
Conference
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