



北京師範大學  
BEIJING NORMAL UNIVERSITY



# Global Smart Education Conference 2020

Smart Learning and Futures of Education

20 - 22 August 2020

Synthesis Report

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## 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.



## UNESCO IITE

The UNESCO Institute for Information Technologies in Education was established as an integral part of UNESCO by the General Conference of UNESCO at its 29th session (November 1997) and is located in Moscow, Russian Federation. IITE is the only UNESCO category 1 Institute that holds a global mandate for ICT in education.



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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 academics, for the true research needs evidence.**

**--- HUANG Ronghuai March 20th, 2017**



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## Organizer

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## Co-organizer

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## Hosts

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# Executive Summary

To promote the innovative integration of intelligent technology and education and identify the promise of futures of education, BNU convened the Global Smart Education Conference 2020 (GSE2020) in conjunction with international organizations, universities and research institutions on 20th - 22nd August 2020. The theme of this conference is “AI and Futures of Education”. GSE2020 is organized by Beijing Normal University 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, and the National Engineering Research Center of Cyberlearning and Intelligent Technology.

GSE2020 featured by 12 thematic forums. They are the Opening Ceremony & Forum on AI and the Futures of Education, Forum on the Futures of Education and Teachers' Capacity Building, Forum on Smart Education in 5G Era, Forum on Governance and Social Perspective for AI, Forum on AI and Big Data in Education, Forum on K12 Education in the Age of Intelligence, Forum on Open Educational Resources for Inclusive Education, Forum on The New Ecology of Regional Smart Education, Forum on Smart Village and Smart Social Development, Forum on International Science Education, Forum on ICT Promoting the Innovation and Development of Higher Education, Forum on Smart Learning and the Futures of Education & 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 140 Chinese and overseas speakers attended our conference. GSE2020 provided three participant modes, namely, live streaming, main venue and ZOOM meeting. The live streaming of the GSE2020 was watched by more than 3,000,000 viewers.

GSE2020 released Joint Project on Rethinking and Redesigning National Smart Education Strategy, National Training Plan for Informatization Capacity of Teachers in Serbia, China Mobile's 5G Smart Campus Cloud Platform, Interactive Book on Artificial Intelligence to Combat Pandemics Vivid Stories in Prevention and Control of COVID-19, Guidance on Providing Open and Distance Learning for Students with Disabilities during School Closures: Enhancing Inclusive Learning under COVID-19, 2019 White Paper on Internet Learning, 2019 Report on Internet Learning in Higher Education in China, VSE Primer: Concept, Technology, Architecture and Implementation of Virtual and Simulation Experiment, and 2020 Global Competition on Design for Future Education.

Finally, we are pleased to announce that the Global Smart Education Conference 2021 will be held on August 18th - 20th, 2021. 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



Prof. HUANG ronghuai Released National Smart Education Strategy

# Introduction

From 2016 to 2019, Beijing Normal University, jointly with other institutions, 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.

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 20th - 22nd, 2020 with the theme of AI and Futures of Education.

The Global Smart Education Conference 2020, which is the focus of this report, involved 150 speakers from 20 countries, including 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 were released during the event. The conference was also live-streamed and watched by 3 million viewers.

Firstly, GSE2020 addressed the theme of "Intelligent Transformation in Future Education," which encompasses various emerging information technologies and digital resources, including 5G Internet, educational big data, artificial intelligence, virtual reality, and open educational resources.

Secondly, in terms of "application integration,"

intelligent technologies are closely integrated with the entire process of educational instruction, with a focus on their application in the educational sector. 5G Internet has garnered continuous attention for its capabilities in data transmission, real-time interaction, and resource connectivity. The application of educational big data is evident in measuring learning elements, documenting the growth process, and facilitating personalized teaching. Artificial intelligence is receiving significant attention in areas such as academic early warning systems, adaptive learning, scientific education management, and decision-making. The advantages of virtual reality are reflected in immersive perception, contextualized teaching, and interactive simulation experiments. Open educational resources play a critical role in providing education for disadvantaged groups and supporting remote self-directed learning.

Finally, in terms of "the application of intelligent technologies in various educational fields," it is observed that intelligent technology applications cover different stages of education and subject areas, including K12 education, higher education, artificial intelligence education, and STEM education. This demonstrates a strong practical orientation. In regional and rural educational practices, intelligent technologies facilitate the allocation and provision of educational resources, promoting equitable access to education between urban and rural areas and supporting regional sustainable development. During major emergencies, countries have explored effective strategies for smart education, and China has made contributions through the practice of "continuing education during school closures."

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.

### Forum Structure

The Global Smart Education Conference 2020 was structured around the following 12 thematic forums:

- **AI and Futures of Education**

This forum brought attention to several important topics in the post-pandemic era, including the significance of smart classrooms, the evaluation of intelligent education, and the role of educational technologies. The discussions focused on various intelligent technologies, such as cloud computing, virtual reality, augmented reality, and mixed reality, and their impact on education. Additionally, the forum emphasized the importance of ensuring educational equity for all individuals.

- **The Futures of Education and Teachers' Capacity Building**

This forum focused on key topics such as teacher development, the role of artificial intelligence in supervised learning, future teacher competencies, teacher capacity building, teaching transformation, and learner-centric education. These issues were given prominence in the discussions, highlighting their importance in shaping the future of education.

- **Smart Education in 5G Era**

This forum emphasized various key topics related to education in the 5G era, including mobile education, collaboration between humans and AI, teaching innovation, the integration of 5G technology with AI, VR, cloud computing, IoT, and big data, virtual simulation experiment teaching, personalized services, and data-driven precision teaching, etc.

- **Governance and Social Perspective for AI**

This forum focuses on the transformative power of AI and big data in education, exploring their role in formulating policies, promoting equitable development, improving quality, and enabling personalized instruction. It addresses online education during the pandemic, interdisciplinary collaboration, and practical experiences, aiming to enhance education quality, foster personalized learning, and prepare students for the future.

- **K12 Education in the Age of Intelligence**

This forum shed light on the current application status and emerging trends of artificial intelligence (AI) technology in K-12 education. It explored technological innovations, application models, and the opportunities and challenges presented by new scenarios. The discussions centered around promoting innovative development and transformation in AI education during the K-12 stage, as well as nurturing global-scale AI innovation thinking among students.

- **Open Educational Resources for Inclusive Education**

This forum focuses on utilizing OER to foster inclusive learning environments and promote accessible education. Experts and educators gather to share strategies and discuss the role of OER in addressing the needs of marginalized groups and overcoming the digital divide. Topics include Policy and Practice, Opportunities, and Challenges of Promoting Inclusive Education through OER, remote learning, self-directed learning, advancements in 5G and AI technologies, and challenges in policy, funding, and infrastructure. The forum aims to shape a comprehensive understanding of inclusive education and explore the potential of OER in creating equitable learning opportunities.

- **The New Ecology of Regional Smart Education**

This forum aims to address the key issues surrounding smart education, focusing on the transformation of learning environments, teaching methods, and the educational system. It emphasizes the importance of demonstration zones and the presentation of implementation plans to promote the development of smart education. The forum explores topics such as cultivating intelligent talents, leveraging online education and personalized teaching, enhancing educational governance, integrating information technology, and ensuring sustainable development in education.

- **Smart Village and Smart Social Development**

This forum addressed the frontier issues surrounding the use of the Internet and AI in building a new educational ecosystem for rural areas. It emphasized the promotion of balanced development between urban and rural education through educational informatization, ultimately leading to the sustainable development of smart villages and smart societies through smart education.

- **International Science Education**

This forum delves into key issues in science education on an international scale. It explores future trends, including STEM education, social sciences, and the integration of science and technology. Discussions encompass the impact of the pandemic, K-12 stage development, curriculum reforms, innovative teaching strategies, assessment methods, blended education models, digital solutions, policy development, and the integration of formal and informal education.

- **ICT Promoting the Innovation and Development of Higher Education**

This forum recognized the pivotal role of information and communication technology (ICT) in fostering global educational equity, ensuring the balanced development of high-quality educational resources, and enhancing educational quality. It focused on exploring how to leverage ICT to enhance the innovation capacity of universities, improve the system for cultivating innovative talents, and transform the application of ICT in higher education teaching.

- **Smart Learning and the Futures of Education**

This forum centers around the key topics of smart education, online learning, and educational reform in the context of smart cities. Discussions explore the impact of digital technologies, such as artificial intelligence and big data, on the future of education. The forum emphasizes the need for educational equity and quality improvement, the transformation of teaching methods, and the integration of online and offline elements.

# Opening Speeches

At the opening ceremony, **Mr DONG Qi**, President of Beijing Normal University, pointed out that the new generation of information technology (IT) represented by AI is redefining the value of human knowledge and capacity. In the future, with the support of IT, such as AI, smart education will enter into a brand new stage. BNU is carrying out the "Discussion on Education and Teaching", trying to explore the development path of "Internet + education", create a new mode of teacher education, build faculty team in the intelligence age, so as to promote the systematic transformation of education.

**Mr ZHAO Qinqing**, Academician of Chinese Academy of Engineering, gave a live video speech where he mentioned that virtual reality (VR), featured by immersion, interaction, imagination and intelligence, has become an important technology for smart education. With the potential to subvert the existing technology, VR will give birth to new methods and modes of teaching and learning. VR + AI may become the ultimate educational technology, which can have a profound implication on the futures of education. He hoped that the scientific and technological academia could join hands to explore a new research direction of "VR + education", promote the development of smart education, as well as cultivate creative talents ready for the future.

**Mr QIN Changwei**, Secretary General of the National Commission of the People's Republic of China for UNESCO, pointed out that the online education integrated with AI has considerably reduced the loss of education during COVID-19 outbreak. The innovative cases of the unprecedented massive online teaching and learning have opened a door for the futures of

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Vice President, Beijing Normal University, China

## SPEAKERS

### **Mr DONG Qi**

President, Beijing Normal University, China

### **Prof. ZHAO Qinqing**

Academician of Chinese Academy of Engineering

### **Mr QIN Changwei**

Secretary General of the National Commission of the People's Republic of China for UNESCO

### **Prof. HUANG Ronghuai**

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

### **Ms Asha S. Kanwar**

President & CEO, COL

### **Mr Joseph South**

Chief Learning Officer, ISTE

### **Mr Isak Froumin**

Head, Institute of Education, HSE University

### **Mr Tao Zhan**

Director, UNESCO IITE

education. The application of network and AI in education has made it possible to share quality education resources globally, and created new solutions for global educational problems.

### **Joint Project on Rethinking and Redesigning National Smart Education Strategy**

On August 20, 2020, **Joint Project on Rethinking and Redesigning National Smart Education Strategy**, launched by 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), was officially released at the opening ceremony of 2020 Global Smart Education Conference. The Secretariat of this joint project is located at Smart Learning Institute of Beijing Normal University (SLIBNU) for providing the necessary support and coordinating among the project.

Due to the huge blow of COVID-19 outbreak to the global education, countries across the globe have successively carried out massive online learning, facing unprecedented challenges in network conditions, teachers' capacity of utilizing information technology, students' ability of self-regulated learning, learning resources, etc. During the post-COVID-19 period, UNESCO has launched the "Futures of Education" Initiative, attempting to reimagine how education and knowledge can shape the future of humanity in a world of increasing complexity, uncertainty and precarity. The Joint Project on Rethinking and Redesigning National Smart Education Strategy, collaboratively initiated by five organizations (UNESCO IITE, COL, ISTE, HSE, BNU), is aimed at identifying the major issues and trends of the futures of education and explore the solutions of infusing ICT into education, so as to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

**Professor HUANG Ronghuai**, Co-Dean of the Smart Learning Institute of Beijing Normal University (SLIBNU) briefed the background, objectives and five initiators of the project. He mentioned that the project would last for five years or longer. For the first two-year stage, the following five initial sub-projects are proposed:

- **Review of policies on ICT in education for futures of education.** It mainly focuses on the review of national policies for ICT in education so as to explore the basic routes of infusing ICT in education.
- **Technology framework for smart learning and education.** It aims to propose a technology framework for smart learning and education to provide a template for formulating future ICT in education policies.
- **Indicators of smart education at country level (for assessing and monitoring).** It will identify indicators for monitoring the status of smart education at country level based on the technology framework.
- **National public services for smart learning.** It will explore the function, positioning, structure, working mechanism and data center construction guidelines of national public services for smart learning.
- **Standards and technique of smart campus.** It aims to provide recommendations on the technical architecture of smart campus and solutions for smart campus construction.

At the release conference, **Ms Asha S. Kanwar**, President and CEO of COL, expressed her delight as a co-initiator. She pointed out that massive online learning, application of AI and block chain as well as access to high-speed broadband will give birth to significant reform of education under the impacts of COVID-19 pandemic. Ms. Kanwar put forward that: First, joyful learning

experience can help store knowledge in long-term memory; Second, technical innovation and improvement of instructional methods can contribute to better teaching effects; Third, effective and readily available educational resources should be provided for learning; Fourth, smart education will not only facilitate individual growth but also promote the development of the world; Fifth, smart education should accord with social ethics and present solutions to issues of privacy protection, cyber security and equity. She finally extended her hope that the project could contribute to achieving equitable and inclusive quality education.

**Mr Joseph South**, Chief Learning Officer at ISTE, expressed that the project coincided with the vision of ISTE to accelerate educational innovation through science and technology. As a co-initiator of the Joint Project on Rethinking and Redesigning National Smart Education Strategy, ISTE would like to endeavor to promote inclusive and equitable education and social development.

**Mr Isak Froumin**, Head of the Institute of Education, HSE also expressed his honor to be a co-initiator of the project and to cooperate with other excellent organizations to push forward the research on smart education. He mentioned that this project would provide new ideas and support for schools and education under transformation by sharing his opinions on educational development fostered by smart education and showing his expectations on this project.

**Mr Tao Zhan**, Director of UNESCO IITE, shared his expectation on the development and research projects of the futures of education. He believed that digitalization and intelligence would inject new vigor into educational development and the project would strongly facilitate the realization of Sustainable Development Goal (SDG4) and Education 2030 proposed by UNESCO.

# AI and Futures of Education

This forum aims to explore the role and impact of artificial intelligence in shaping the future of education. It seeks to investigate how intelligent technologies can contribute to promoting educational equity and facilitating personalized growth for individuals. This endeavor not only represents a mission embraced by the realms of technology and education but also underscores a significant challenge faced collectively by humanity. The discussions hold immense importance and signify a crucial step towards addressing this issue.

**Mr WU Hequan**, Academician of Chinese Academy of Engineering, gave a keynote speech entitled “Promoting Education Innovation with 5G Technology and Cloud”. He emphasized that basic network, data center, cloud computing, payment platform, industrial Internet and other information technologies have shifted the current educational methods and approaches. Besides, 5G technology promoted the technical upgrading of high-definition video and VR/AR/MR. It has realized real-time interactive classroom live streaming, virtual teacher, teacher assistant and other functions, making it possible for students’ home study and highly customized learning content during COVID-19 outbreak. Moreover, it has also promoted the innovation of talent training mode.

**Mr ZHANG Jun**, Academician of Chinese Academy of Engineering, mentioned in his keynote speech “Five-Dimensional Education: from Smart Classroom to Intelligent Classroom” that smart education is a key component of smart society. The relationship between “man, machine, object and environment” will be reshaped based on the concept of intelligence and Internet, as well as the framework of

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## SPEAKERS

### Mr WU Hequan

Academician of Chinese Academy of Engineering

### Mr ZHANG Jun

Academician of Chinese Academy of Engineering

### Mr DONG Qi

President, Beijing Normal University, China

### Mr Isak Froumin

Head, Institute of Education, HSE University

### Mr Sobhi Tawil

Director of the Future of Learning and Innovation Team, UNESCO

intelligent network technology. The construction of “intelligent classroom” will remove the barriers caused by space, time and knowledge, creating “five-dimensional education” which consists of three-dimensional space, time and knowledge. The “five-dimensional education” will promote the construction of human-centered educational production relations and the reform of educational productivity in the new age. It will unleash the potential of education and facilitate the “valuable growth” of students and teachers, ultimately contributing to the construction of a powerful socialist country in education with Chinese characteristics.

**Mr DONG Qi**, President of Beijing Normal University, gave a keynote speech entitled “Intelligent Education Evaluation: Promoting the Reform and Development of Basic Education”. He mentioned that the traditional evaluation system in education cannot meet the demands of educational development in the age of intelligence. According to his report, the intelligent evaluation in education is faced with quite a few challenges ranging from improving the understanding of human brain and learning capacity, to properly dealing with the ethical issues in data collection and application, research and development of fusion algorithm of massive and multi-scale data to realize restructuring of the entire ecology. To tackle these challenges, five suggestions are given in the report: firstly, implementing intelligent evaluation systems in education and making them a national strategy; secondly, further exploring brain cognition in students’ learning and development to empower intelligent evaluation system in education; thirdly, stepping up the collaboration among Higher Educational Institutions (HEIs) and between HEIs and research institutes so as to push forward the innovation of evaluation methods; fourthly, promoting cooperation between HEIs and enterprises to endure timely application of research outcomes in education and fifthly,

establishing national intelligent evaluation platforms in education for openness and sharing.

**Mr Isak Froumin**, Dean of Institute of Education, HSE University, summarized five lessons for policy of educational technologies after the pandemic. He pointed out that family education would play an important part in the future. For many years, the digital infrastructure of schools has not been effectively utilized, and digitalization has exacerbated educational inequality. Therefore, students' self-regulation and self-organization are the key factors for success, and interpersonal communication is irreplaceable in education.

**Mr Sobhi Tawil**, Director of the Future of Learning and Innovation Team at UNESCO, expressed his opinion that the uncertainty and complexity of the world are increasing with the development of Internet, AI and other emerging technologies. AI may replace the jobs of human to some extent, and change the profession of many people. UNESCO has issued the initiative "Futures of Education" to promote the improvement of learners' self-directed learning ability and self-construction ability, which has reminded us to rethink the purpose of education so as to shape the future of humanity.

## AI and Futures of Education

### Key takeaways

- The integration of artificial intelligence into online education has greatly reduced the educational losses during the pandemic. Unprecedented large-scale innovations in online teaching have opened a gateway to explore the future of education. The application of online education and artificial intelligence enables the sharing of high-quality educational resources on a global scale, opening up new channels to address global educational challenges.
- AI, brain science, VR and 5G have created unprecedented opportunities for the establishment of scientific evaluation system in education, which will have an important implication on basic education and promote the educational equity as well as personalized development of students.
- Smart education is an important component of a smart society. Built on the concept of "intelligence" and "internet", it reshapes the relationship between humans, machines, and the environment based on the framework of the Internet of Things. Through the construction of "smart classrooms," it breaks down barriers between space, time, and knowledge, forming a "five-dimensional education" that synergizes three-dimensional space, time, and knowledge. This approach promotes the development of a student-centered educational production relationship, drives the transformation of educational productivity in the new era, unleashes educational potential, and facilitates the "valuable growth" of students and teachers.
- Traditional educational evaluation systems fail to meet the needs of educational development in the era of intelligence. The advent of artificial intelligence, neuroscience, virtual reality, 5G, and other technologies has created a historic opportunity to establish a scientific educational evaluation system. This will have significant implications for basic education, promoting educational equity and personalized student development.

# The Futures of Education and Teachers' Capacity Building

Teachers are the foundation and source of education, and in the context of deep integration between digital technology and teaching models, teachers' digital literacy and proficiency in digital technology applications have become important factors influencing the future development of education. This forum engaged in in-depth discussions and exchanges on topics such as the future development of education and the cultivation of future teacher competencies.

As learning becomes increasingly networked, digitalized, and personalized, it is necessary to transform teaching content, teaching methods, and teaching models to adapt to the needs of the times. **Mr Getachew Engida**, former Deputy Director-General of UNESCO, believed the trends in future education development and the direction of teacher training are issues worthy of collective consideration by all humanity.

**Mr Joseph South**, Chief Learning Officer at the International Society for Technology in Education (ISTE), proposed the concept of designing resilient learning systems. He believed flexible teaching based on diverse instructional methods and active learning for personalized development will become the "new normal" in future education. In the context of deep integration between online and offline education, resilient learning systems will create conditions for the transition from passive learning to active learning and foster learners' self-directed learning abilities, which is the fundamental driving force for advancing future education.

## MODERATOR

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### **Mr CHEN Hao**

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## SPEAKERS

### **Mr Getachew Engida**

Former Deputy Director-General, UNESCO

### **Mr ZHU Xudong**

Dean, Faculty of Education, Beijing Normal University, China

### **Mr Joseph South**

Chief Learning Officer, ISTE

### **Mr XIONG Li**

CEO, NetDragon Websoft

### **Mr Joe Lam**

Managing Director, Pearson Greater China and India Hub

### **Ms Yumiko Yokozeki**

Director, UNESCO IICBA

### **Mr CHEN Changjie**

Vice President, NetDragon

### **Mr Danimir Mandić**

Dean, Teacher Education Faculty, University of Belgrade, Serbia

**Ms Kate Baker**

Senior Community Manager, Edmodo

**Mr Masaaki Isozu**

CEO, Sony Global Education

**Mr Hayford Siaw**

Executive Director, Ghana Library Authority

**Mr Karthik Krishnan**

Global CEO, Britannica Education Group

**Mr LIN Yuandong**

Founder &amp; CEO, Chivox co., Ltd.

**Mr John Collick**Head,  
International Education Strategy for Promethean

**Mr XIONG Li**, CEO of NetDragon Websoft, shared the development concept of "3E Education - Future education will be more engaging, efficient, and effective". He emphasized that the deep integration of technologies such as AI, big data, and 5G with education is the inevitable path for future education. The "new infrastructure for education" will promote the integration and development of 5G, AI, VR, AR, and other technologies, further unleashing the potential of future education.

The new talent economy, evolving economic patterns, and the tremendous influence of technology are driving massive transformations in global education. **Mr Joe Lam**, Managing Director of Pearson Greater China and India Hub, proposed the development of "learner-centric artificial intelligence education." He believed the development of instructional technology will inevitably transform the way humans learn, shifting from a "teacher-centered" approach to a "learner-centered" approach, ushering in a new era centered around personalized learning.

Ms Yumiko Yokozeki, Director of UNESCO International Institute for Capacity Building in Africa (IICBA), shed light on the changes in education in Africa during the pandemic. Currently, many African countries still lack internet infrastructure, and there is a shortage of digital education technologies and equipment available for teachers. However, the pandemic has led some countries to implement remote teaching, which has sparked enthusiasm among local teachers to utilize information technology. To meet the needs of teachers, the IICBA, in collaboration with Beijing Normal University, Open University of China, and other institutions, has launched the "African Teachers' Remote Open Learning Program" to enhance the local teachers' capacity in applying information technology. She emphasized that humanity can turn the challenges brought by the pandemic into opportunities and provide a better lifelong learning model for African teachers and learners.

**Panel Discussion**

In this panel discussion, speakers discussed the teacher education as well as the new technology and teacher's dedication, including **Ms Kate Baker**, Senior Community Manager at Edmodo; **Mr Masaaki Isozu**, CEO of Sony Global Education; **Mr Hayford Siaw**, Executive Director of Ghana Library Authority; **Mr Karthik Krishnan**, Global CEO of Britannica Education Group; **Mr LIN Yuandong**, Founder and CEO of Chivox co., Ltd.; and **Mr John Collick**, Head of International Education Strategy for Promethean.

Some key points arising from these issues are:

- I see a real role for artificial intelligence. We need to be focusing very much on developing an energy-efficient infrastructure, possibly mobile-based, because the big question for education technology experts is how do we create

effective systems for those people who are living in those circumstances. If we develop artificial intelligence, then for education, it must very much be focused on the individual realm, based on mobile devices, and working on a personal level. This would involve coaching and providing assistance to individual teachers to enhance their capacity, as well as to students who may often be in a situation where they are literally isolated not only from education but also from the internet and access to content and money.

- In Ghana, we started recording tutorials by teachers from across the country. We immediately deployed a television channel to broadcast these tutorials for students nationwide. Currently, we are working with a module to set up an LMS platform for use in Ghana. The purpose of this platform is to support teachers who are currently at home in creating virtual classrooms and engaging with their students. We aim for equity in terms of device access and internet connectivity. Additionally, we have collaborated with telecom companies to eliminate data charges. This means that people can now access content remotely without having to pay for it. We also provided support to the library authority, the agency responsible for library services, to develop a digital mobile app.
- The education technology industry is now being forced to reconsider its approach as it realizes the core competitive advantage of traditional offline classroom teaching: the teacher. Teachers play a crucial role in keeping students focused on their learning objectives and facilitating peer learning, which in turn encourages active participation and reduces drop-off rates. This realization has prompted the entire technology industry in education to reflect on what led them to overlook the significance of the teacher in the first place.
- To build a resilient education system in the long run, it is essential to incorporate digital literacy as a key component of teacher training. This will enable teachers to effectively utilize the various digital tools made available to them. Therefore, we need to institute a digital literacy program as part of their in-service training, ensuring that they acquire the necessary skills to leverage these tools
- When dealing with technology in education, it is crucial not to overlook the fact that education is as much about socialization and interpersonal skills as it is about knowledge. The purpose of sending kids to school is to enable them to become good citizens who can effectively interact with others. Teachers play a vital role in facilitating this process. Let us not forget that one of the fundamental goals of education is to teach individuals how to engage in social, communal interactions.
- When I was in the classroom with my students, I would use technology to help shoulder much of the weight of teaching some of the work of doing the assessment and creating a data collection, but then also to support the social and emotional learning of my students and the digital citizenship of my students being able to engage in a platform.
- Technology can be used in the classroom to alleviate a significant portion of the teaching load, including assessment and data collection tasks. Technology also plays a crucial role in supporting the social and emotional learning of students, as well as fostering their development of digital citizenship skills, enabling them to engage on various platforms.

### National Training Plan for Informatization Capacity of Teachers in Serbia

As intelligent technology continues to integrate with education, profound transformations are expected in the future of education. What roles will teachers play in the future of education, and what essential qualities and skills should they possess? Educational professionals from China and Serbia shared their practical experiences and typical cases in the training of future teachers.

In recent years, NetDragon Huayu Education has implemented the "Future Teacher" development program globally. At the Forum, Mr CHEN Changjie, Vice President of NetDragon Network Corporation, presented the "National Training Plan for Informatization Capacity of Teachers in Serbia".

NetDragon will collaborate with the Faculty of Teacher Education at the University of Belgrade in Serbia to develop more detailed national standards for teacher ICT training and a nationwide teacher training program. This collaboration aims to comprehensively enhance the ICT literacy of Serbian teachers. The Faculty of Teacher Education at the University of Belgrade has already partnered with NetDragon, and both parties are training teachers and students to utilize new technologies based on artificial intelligence, virtual reality, and 3D simulation to improve the quality of teaching. Mr Danimir Mandić, Dean of Teacher Education Faculty, University of Belgrade, emphasized that while artificial intelligence contributes to enhancing interactive teaching, teaching aids and devices cannot replace teachers. The use of technology will create new possibilities for teaching and learning.

### Smart Education and Digital Resources

#### Key takeaways

- Great teachers are those that are not only able to inspire. They also enable and empower students to unlock their true potential.
- There are three-level Capacity Building in Teacher Development in Africa. On the level of Policy, it includes formulating teacher policies and social dialogue tools; defining qualifications, professional standards and professionalization of teaching; promoting teacher regulatory mechanisms and governance. On the level of Institutions, it includes supporting teacher training programs; promoting quality assurance; enhancing management and leadership. On the level of Teachers, it includes strengthening education and development (initial, continuous professional development and other professional support); fostering professional networking.
- Technology has allowed teachers to diversify their teaching and provides leverage for all students to succeed. More important than the technology tools teachers use, however, is that teachers create meaningful classroom experiences to promote reading, critical thinking and deep learning.
- In the future, teacher capacity building should focus on three aspects, including changing teachers' roles from knowledge transmitters to knowledge facilitators, improving information literacy and information teaching capabilities, and using new technologies to develop students' 21st century skills.
- It is important to recognize that teaching aids alone are not all-powerful and cannot solve the numerous challenges of modern education. It can be reasonably concluded that the pedagogical effectiveness of teaching aids and knowledge sources will be determined by the knowledge, pedagogical training, and dedication of teachers. It will also depend on the level of motivation and willingness of students to exert their own efforts and the level of cooperation between teachers and students in the teaching process.

# Smart Education in 5G Era

The Department of Basic Education of the Ministry of Education, National Center for Education Technology (NCET), industry partners, and experts gathered together to explore the future development direction of "Smart Education in the 5G Era," dedicated to using "5G+" as a means to develop smart education and promote educational equity.

**Mr Zhao Lijun**, Deputy General Manager of China Mobile Chengdu Institute of Research and Development, stated that since its establishment, the Institute has consistently pursued high-quality development, aiming to become an integrator of technological advantages in the field of mobile education and a gatherer of industry solution resources, empowering intelligent industry development. In the future, the Institute will continue to explore and practice, devoted to creating a bright future for the 5G education industry with "5G+" as a means.

**Mr HAN Jun**, Deputy Director of National Center for Educational Technology, stated that people usually refer to it in three different senses when they talk about smart education. Firstly, it pertains to education that enables learners to acquire higher levels of wisdom. Secondly, it refers to an intelligent approach to the process of teaching and learning. Lastly, it encompasses artificial intelligence education, which includes AI education as a field of specialized research, the application of AI in education as a tool, and AI education as a subject matter of study. Although these three perspectives on smart education may have their own deviations and require different technological support, they collectively imply an important proposition. That is, smart education is a vital component of future educational reforms, transforming the goals, content, processes, methods, modes, and assessment of traditional education and teaching.

## SPEAKERS

### Mr Zhao Lijun

Deputy General Manager,  
China Mobile Chengdu Institute of Research  
and Development

### Mr HAN Jun

Deputy Director,  
National Center for Educational Technology

### Mr ZHANG Quan

Director, Teaching and Equipment Information Office,  
Department of Basic Education, Ministry of Education, P.R.C

### Mr CHEN Guangju

Vice-Director,  
University Council of Beijing Normal University, China

### Mr YU Shengquan

Professor, Beijing Normal University, China

### Prof. Yang Xianmin

Dean, School of Smart Education,  
Jiangsu Normal University, China

### Mr HUANG Yu

Senior Consultant,  
Huawei Global Government Business Department

### Mr SONG Jiangong

Director,  
Modern Education Technology Center,  
Beihang University, China

### Mr LI Jianhua

General Manager,  
Beijing Easytime Digital Technology Co. Ltd.

**Mr ZHANG Quan**, Director of Teaching and Equipment Information Office in the Department of Basic Education, Ministry of Education, believed 5G+Smart Education, with its advantages in breaking spatial and temporal limitations, rapid replication and dissemination, and diverse presentation methods, holds significant potential. Although we cannot fully predict what 5G combined with smart education will entail, it is clear that it will bring about more application modes and scenarios, driving better integration and innovation between technology and education. It will provide more choices and support for the transformation of education and learning.

**Mr CHEN Guangju**, Vice-Director of the University Council of Beijing Normal University, stated that BNU is committed to leveraging its disciplinary advantages in the integration of science and education to support the application of 5G in education. As one of the pilot units of the 5th phase of the National Development and Reform Commission (NDRC), BNU, in collaboration with China Mobile and Huawei, completed the first 5G base station deployment on March 1, 2019, in the Changping campus. By utilizing a real 5G environment, students and teachers were able to experience 5G technology networks and effectively address the pressure of campus traffic. Additionally, we have integrated 5G into modern teaching environments, including the development and incubation of applications such as dual-teacher classrooms, AR/VR innovative classrooms, and campus security patrols, aiming to serve the education industry faster and better.

**Professor YU Shengquan** from Beijing Normal University, in his report titled "Smart Education in the 5G Era," pointed out that future education will be a collaboration between humans and artificial intelligence, and fully leveraging the distinct advantages of machines and humans is the key to improving educational productivity.

Schools and educational institutions will no longer be isolated social units but will converge through networks to form nodes of collective wisdom fusion. Establishing an educational system that promotes individual development based on intelligent technology is the fundamental trend in the development of smart education.

**Professor Yang Xianmin**, Dean of the School of Smart Education at Jiangsu Normal University, discussed "Teaching Innovation in the 5G Era". He emphasized that 5G technology not only brings speed but also empowers new-generation information technologies such as AI, VR, cloud computing, the IoT, and big data. This establishes a 5G information ecosystem that interconnects and interacts with all things intelligently. In terms of the new forms of teaching in the 5G information ecosystem, the application scenarios and teaching elements have been optimized and transformed, resulting in four typical teaching forms: holographic projection live teaching, virtual simulation experiment teaching, contextualized remote on-site teaching, and data-driven precision teaching.

**Mr HUANG Yu**, Senior Consultant of Huawei Global Government Business Department, presented a report titled "The Application Exploration of 5G+Education", stating that the 5G network environment, with its high bandwidth, low latency, edge computing, and management capabilities, will become the foundation for future smart education. It will seamlessly, efficiently, and in real-time connect and manage perceptual data and information, serving as the new driving force for intelligent education. Currently, the 5G terminal and module industry chain is mature, and large-scale network coverage has been achieved. Further release of potential can be achieved through network slicing and MEC, providing improved education network services.

**Mr SONG Jiangong**, Director of the Modern Education Technology Center at Beihang University, delivered a report titled "Online and Offline Blended Teaching and Learning—Constructing a Boundless Classroom." He stated that in the post-pandemic era, teaching models will adopt five major innovations: blended online and offline teaching, an internet classroom without boundaries, the generation of normalized education-related big data, a closed-loop improvement in teaching quality, and personalized services for teachers, students, and leaders. By constructing a blended cloud platform, a boundary-less classroom can be realized, enabling anyone, anytime, anywhere, and using any terminal to engage in timely learning.

**Mr LI Jianhua**, **General Manager of Beijing Easytime Digital Technology Co., Ltd**, gave a presentation on "5G Cloud XR Reshaping the Future of Education Training". He believed that 5G Cloud XR will reshape the future of education and training. XR, through exploratory learning, immersive learning, and networked learning, can effectively address the high cost, high risk, high pollution, invisibility, difficulty of reproduction, operational complexity, and access limitations in the field of education and training.

### **China Mobile - 5G Smart Campus Cloud Platform**

China Mobile's 5G Smart Campus Cloud Platform, built on the foundation of a 5G education network and centered around capability integration, brings together education data and capabilities from both the B-end and C-end. It achieves data integration and capability sharing, serving as an important practice and exploration by the China Mobile Institute of Research and Development to empower the education industry through 5G technology and platform capabilities. In the future, the Institute will further strengthen the advantages of 5G+ cloud-network integration and promote the realization at four areas: a set of smart teaching tools to address learning process tracking and evaluation issues, a set of intelligent management methods to solve campus security and resource management problems, a set of public service systems to address traditional issues in the supply of home-school resources, and a set of intelligent analysis environments to resolve campus asset data interoperability issues.

## Smart Education in 5G Era

### Key takeaways

- Foundational education must embrace and actively engage in the trend of 5G technologies. It needs to adapt to the evolving ways of acquiring and imparting knowledge brought by technological advancements, the revolutionary changes in the teacher-student relationship, and enhance the level of educational informatization and the digital literacy of teachers and students. This requires promoting innovative changes in teaching organization and management models, and accelerating the realization of modernization in foundational education.
- Education informatization is one of the important means to solve various educational challenges in the new era. With the widespread adoption of 5G networks in China, which are characterized by high broadband, low latency, and multiple connections, it will provide significant momentum for the deep reform of education informatization.
- 5G and AI are driving the intelligentization of smart environments, characterized by the integration of virtual and physical elements, remote collaboration, data-driven processes, intelligent management and control, human-machine fusion, natural interaction, and intelligent ecological perception.
- The combination of 5G and the Internet of Things enhances the system's perception capability; 5G+AI enhances computational power; 5G+VR enhances the integration of virtual and physical elements; and 5G+human-machine interaction technologies (e.g. edge computing) enhance interaction capabilities.
- The impact of 5G technology on smart teaching tools can be discussed from two aspects. Firstly, it leads to increasingly intelligent, convenient, and personalized smart hardware terminals. Secondly, through the integration of 5G with AI, big data, and blockchain, intelligent software systems in education can become more reliable, intelligent, and adaptive, enhancing the overall quality and adaptability of the teaching process.

# Governance and Social Perspective for AI

Representatives from universities, research institutions, government departments, and the business community from China, the United States, the United Kingdom, France, and Japan engaged in in-depth discussions on the deep integration of intelligent technology with education, healthcare, and elderly care. This exploration provided new perspectives, ideas, and pathways for the construction of a smart society.

**Mr WANG Yaonan**, Academician of Chinese Academy of Engineering, delivered a speech on "Intelligent Technology Enables Smart Society". He believed the organic fusion and innovation of new-generation foundational information technologies serve as powerful means and tools for building a smart society. Currently, traditional robots face three major challenges: weak adaptability in environmental perception, inability to optimize decisions in real-time, and low efficiency in human-robot collaboration, which fails to meet the demands of the high-end equipment manufacturing industry. To address these challenges, three breakthroughs need to be achieved: real-time intelligent perception of robots, online planning and autonomous decision-making by robots, and collaborative operation of robots.

**Professor Chee-Kit Looi** from Nanyang Technological University in Singapore believed the future empowerment of education by AI primarily manifests in three aspects: providing personalized tutoring for each student, offering intelligent support for group learners, and creating realistic virtual learning environments to address real-life problems. He proposed that, to embrace the AI era, education should focus on six aspects: cultivating learners and workers with knowledge, skills, abilities, and character to

## MODERATOR

**Prof. ZHAO Qiuyan**

Beijing Normal University, China

**Ms TONG Lili**

Associate Professor, Beijing Normal University, China

**Prof. LV Peng**

Central South University, China

## SPEAKERS

**Mr WANG Yaonan**

Academician of Chinese Academy of Engineering

**Prof. Chee-Kit Looi**

Nanyang Technological University, Singapore

**Mr Wayne Holmes**

Nesta Foundation, UK

**Mr Colin de la Higuera**

University of Nantes, France  
Mr CAI Xiongshan

**Deputy Director & Chief Researcher,**  
Legal Research Center, Tencent Research Institute

**Mr LU Tao**

Director, Alibaba Ding Talk's Education Department

**Prof. LUO Zhiwei**

Kobe University, Japan

**Mr YUN Fengbai**

Deputy Secretary, Politics and Law  
Committee, Commission of Binhai New  
Area, Tianjin, China

**Mr ZHU Yaoyin**

Vice Chairman, China National  
Committee on Aging

**Prof. TANG Deliang**

Mailman School of Public Health,  
Columbia University, USA

adapt to situations where existing jobs are automated; fostering a positive mindset towards embracing change; enabling learners to collaborate and fully utilize automation tools in the process; transforming learners into not just users of technology but also creators and innovators; developing computational thinking and understanding the workings of computers; and fostering AI literacy to understand how machines learn.

**Mr Wayne Holmes**, an expert from the Nesta Foundation in the UK, suggested that AI applications for learning primarily focus on collaborative learning, continuous assessment, AI tutoring, and other aspects. The impact of AI on education is a double-edged sword, with both positive and negative aspects. The key lies in close interaction between education practitioners, learning scientists, decision-makers, computer scientists, and AI developers to ensure that AI education applications meet practical needs. AI should always aim to enhance the capabilities of teachers rather than replace them.

**Mr Colin de la Higuera** from the University of Nantes in France introduced the X5-GON project, which is aimed at open educational resources. The platform provides learners with a comprehensive data-driven learning environment. The project's research and exploration in AI applications were shared. Before building an index, the X5-GON project transcribes and translates materials into multiple languages. Then, three methods—keyword-based, word embedding, and topic modeling—are used to construct the index. Finally, users access relevant materials through search engines or recommendation systems.

**Mr CAI Xiongshan**, Deputy Director and Chief Researcher of the Legal Research Center at Tencent Research Institute, believed that data resources are key production factors in the new generation of technology and industrial revolution. He conducted a comparative study of data protection, data openness, data flow, and data property rights systems in the European Union and the United States. He proposed that China should strengthen data regulatory frameworks from four aspects to promote the market cultivation of data elements: accelerating data openness to unleash data into the market, clarifying data property rights to facilitate data transactions, enhancing data protection to ensure data security, and actively participating in multilateral/bilateral agreements to promote cross-border data flow.

**Mr LU Tao**, Director of Alibaba Ding Talk's Education Department, believed the value of "AI + online education" lies in providing customized educational content and learning paths, intelligent and automated educational and management processes, and more interactive educational means. He stated that "Internet + basic education," known as the "new infrastructure" in the education sector, will follow an intensive and integrated construction approach at the county level, becoming the

future development model. By leveraging five online components - online ecosystem, online business, online collaboration, online communication, and online organization online - an inclusive digital foundation can be achieved.

**Mr LUO Zhiwei**, Professor at Kobe University in Japan, believed it is important to properly handle the relationship between imitative thinking and innovative thinking and actively address the challenges of the intelligent era. He emphasized the need for a shift from passive healthcare to proactive well-being and from technology-assisted to technology-driven human progress. He called for a focus on talent education, humanistic exploration, collaborative research, and social engagement, contributing to the construction of a social governance system and supporting global sustainable development.

**Mr YUN Fengbai**, Deputy Secretary of the Politics and Law Committee, Commission of Binhai New Area, Tianjin, introduced the exploration and implementation of AI in its social governance. In terms of smart city construction, Binhai New Area promotes innovation in urban management methods, models, and concepts through smart architecture, focusing on modernizing the urban governance system and capabilities. In terms of smart social governance, Binhai New Area has greatly alleviated traffic congestion in the ecological city through the use of IoT monitoring devices, intelligent transportation systems, and AI algorithms. Regarding smart healthcare services, the "Binhai Internet Smart Healthcare Integrated Service Platform" utilizes high-tech tools such as the Internet, IoT, big data, and AI to improve grassroots public health services. In terms of smart scenario applications, AI-based applications such as AI-person and vehicle recognition and touchless temperature measurement channels have been implemented in smart communities, ushering in an "intelligent mode" for community life.

**Mr ZHU Yaoyin**, Vice Chairman of the China National Committee on Aging, emphasized the need to address the "digital divide" experienced by the elderly in the era of rapid technological development. The focus should be on enhancing the autonomy, independence, and social engagement of older adults, attending to their needs in various stages and aspects of life, and promoting their integration into society. Suggestions for policies include incorporating voluntary service records for elderly technology learning, integrating elderly technology training into government public services, incorporating age-friendly smart technology cities into livable cities and community evaluation systems, among other proposals.

**Mr TANG Deliang**, Professor at the Mailman School of Public Health, Columbia University, USA, pointed out that the population of older adults is increasing in almost every country worldwide, making intelligent technology even more crucial in the field of geriatrics. He believed two major issues contributing to elderly mortality are neurodegenerative diseases and fall accidents, and an effective approach to addressing these issues is to tap into the "brain reserve." Currently, institutions are utilizing AI technology to simulate human functions and compensate for the functional loss caused by age-related dementia. Practice has shown that connecting AI with education and training is a feasible way to stimulate the brain and explore its reserves.

## Governance and Social Perspective for AI

### Key takeaways

- In the future of high-end manufacturing, the development direction is focused on human-machine collaboration. Currently, we see robots operating independently, but in the future, the vision is for humans and machines to work together in a collaborative manner. This collaboration will possess characteristics such as intelligence, flexibility, agility, and cooperation to adapt to our large-scale customized production. It involves equipping robots with brains and central processors, enabling them to have the ability for decision analysis and judgment. This will allow robots to have deep perception, intelligent decision-making, and precise control.
- The rapid development of AI technology presents new requirements for talent cultivation, providing new paths for educational transformation. The advancement of all technologies relies on education to nurture creative talents that are suitable for the development of the times.
- The field of education needs to be forward-thinking, adaptive, and proactive, engaging in theoretical innovation and practical exploration through various means to contribute to the common interests of all humanity.
- AI empowers schools, changing the form of education, expanding learning spaces, and improving the level of services provided by schools, creating a learner-centered learning environment.
- AI empowers educational governance, transforming governance approaches, promoting the scientific decision-making in education, and precise resource allocation, accelerating the formation of a modern education public service system.

# AI and Big Data in Education

With the continuous acceleration of the education process, the development of information technologies have become intrinsic driving force for educational transformation. The deep application of AI and big data in education has played an important role in assisting the formulation of educational policies, promoting equitable education development, improving educational quality, optimizing teaching effectiveness, and personalized instruction.

Online education during the pandemic, facilitated by information technology, has broken the barriers of time and space and driven the transformation of the education ecosystem. From online to offline, the research and application of AI and big data are promoting management innovation among educational administrators, fostering personalized intelligent learning, alleviating teachers' instructional burdens, and enhancing students' learning efficiency.

**Mr WU Xiaoru**, Rotary President of iFLYTEK, stated that in the era of the internet, the significance of big data in education and personalized instruction is akin to the crucial role of telescopes in modern astronomy. Introducing big data into education allows us to have a clearer, more accurate, and faster understanding in the process of teaching and learning.

**Mr ZHENG Qinhua**, Professor and Director of the Distance Education Center at Beijing Normal University, pointed out that the application of AI technology in education requires interdisciplinary collaboration among education, psychology, neuroscience, and systems science. Clear rules for assessment, matching, and intervention need to be established, followed by the integration of domain knowledge and machine learning to construct a model system.

## MODERATOR

**Prof. FENG Xiaoying**

Beijing Normal University, China

## SPEAKERS

**Mr WU Xiaoru**

Rotary President, iFLYTEK

**Prof. ZHENG Qinhua**

Director, Distance Education Center, Beijing Normal University, China

**Mr WANG Yong**

Deputy Director, Hefei Education Bureau, Anhui Province, China

**Mr WANG Xiaoming**

Teaching Researcher, Zhejiang Provincial Department of Education

**Mr LI Xin**

Vice Director, AI Education Institute, iFLYTEK

**Ms LI Youyi**

Principal, League of Beijing NO.12 High Schools, China

**Ms ZHANG Wanqiong**

Executive Principal, Beijing New Talent Academy, China

**Mr FU Jiaguo**

Director, High School Affiliated to Yunnan Normal University, China

**Mr WANG Yong**, Deputy Director of the Hefei Education Bureau in Anhui Province, shared the practical experience of the "Dual-Teacher Classroom" model in Hefei. During the period of "suspension of classes but not suspension of learning," some schools in Hefei implemented teaching through a combination of recorded or live-streamed unified lessons by teachers and online tutoring by their own teachers. He also shared four key experiences in implementing the "Dual-Teacher Classroom": ensuring online classroom management, providing after-class tutoring and answering questions, implementing parental educational responsibilities, and implementing school teaching management.

**Mr WANG Xiaoming**, Teaching Researcher of the Zhejiang Provincial Department of Education (ZPDE), shared the exploration process of precision teaching in Zhejiang Province. In 2017, Zhejiang Province began exploring precision teaching and ultimately chose to empower education with technology. It formulated "new goals" and implemented reforms such as "new curriculum," "new classrooms," "new evaluation," and others, promoting precision teaching, personalized learning, scientific assessment, empirical research, and intelligent management. The series of smart education products developed by iFLYTEK, such as smart classrooms, Zhixue.com, and personalized learning manuals, played a significant role.

**Mr LI Xin**, Vice Director of the AI Education Institute of iFLYTEK, presented on "Personalized Teaching and Learning Fostered by AI and Big Data". This approach, centered around the AI Education Super Brain, utilizes big data and AI to facilitate precision teaching. It empowers teachers by providing resources and insights into students' situations prior to class, promotes efficient interaction and AI-guided practice during lessons, and enables intelligent grading after class. Additionally, the combination of big data and AI supports personalized learning by utilizing knowledge graphs and personalized

learning records. This allows for precise identification of students' weaknesses and provides AI-based specialized courses to help them overcome key challenges. Lastly, the consolidation of knowledge is achieved through error correction and variant training.

**Ms LI Youyi**, Principal of the League of Beijing NO.12 High Schools, discussed the practical experience of smart education at Beijing NO.12 High Schools from four perspectives: "AI-empowered Online Education and Teaching," "AI-promoted Personalized Learning," "AI-facilitated Innovative Talent Cultivation," and "AI-promoted Educational Equity".

**Ms ZHANG Wanqiong**, Executive Principal of Beijing New Talent Academy, stated during her presentation, "Today's world is immersed in information, with technological advancements represented by big data, cloud computing, and the Internet of Things on the rise. With the advent of the intelligent era, the world will undergo significant and profound changes. The most important question in education today is how to enable children to adapt to the future, and even to win the future." She introduced the construction of the "future-oriented learner competence model" at New Talent Academy.

**Mr FU Jiaguo**, Director of the High School Affiliated to Yunnan Normal University, shared the practical experience of the smart learning platform (Zhixue.com) and its utilization of AI and big data in teaching. Through Zhixue.com, school administrators can dynamically understand the overall situation of the school and the working status of teachers. Each grade can also grasp the average learning situation and personalized characteristics of each class, allowing for fine-grained dynamic data. Subject teachers can identify the weaknesses of their classes and individual students, and students can accurately understand their own learning situations, providing a basis for personalized learning.

## AI and Big Data in Education

### Key takeaways

- The essence of applying AI in education is "based on the aggregation of relevant big data in the field of student learning, utilizing machine learning algorithms to provide intelligent measurement, evaluation, prediction, and other services for specific educational scenarios.
- The integration of information technology with educational services is a challenging task. Educational departments understand education and educational management, but they may not have specific knowledge about the technical requirements. On the other hand, technical departments understand how to implement technology but may not fully grasp the underlying issues and root causes of educational challenges. Therefore, it is essential to establish a collaborative mechanism between these departments to bridge the gap.
- A stable synergy between business and technology needs to be established to facilitate the long-term and stable advancement of data classification and data mining efforts. This collaboration will enable a better understanding of the practical challenges in education and their underlying causes, while leveraging technical expertise to implement effective solutions.
- With big data and artificial intelligence technologies at its core, our approach focuses on precise teaching for teachers and personalized learning for students, aiming to popularize the practice of tailored instruction. From the teacher's perspective, precise teaching can be divided into three phases: pre-class, in-class, and post-class. During the pre-class phase, teachers need to prepare lessons and assess students' pre-existing knowledge and understanding. In the in-class phase, a blended learning approach combining online and offline methods can make the classroom more engaging and provide timely feedback to students. In the post-class phase, assigning different types of homework allows for intelligent grading, reducing teachers' workload.
- Artificial Intelligence could promote personalized learning by adopting a platform and terminal teaching application development model. Then, a unified and authenticated user identity registration and management system is established. Different application systems utilize a unified user identity authentication service. Additionally, a single sign-on feature enables one-stop access to services. Users are provided with personalized application spaces in the form of personal accounts that align with their usage habits. Users can add or remove applications according to their preferences, enabling true on-demand and personalized applications.

# K12 Education in the Age of Intelligence

In the era of artificial intelligence, how to effectively utilize intelligent technologies and tools to improve the effectiveness and quality of education, as well as enhancing the information literacy of young people, has become a hot topic in the field of education.

**Mr ZHENG Qinhua**, Vice Director of National Engineering Laboratory for Cyberlearning and Intelligent Technology, introduced an overview of the development of artificial intelligence and its current major application scenarios. He further discussed the application of AI in the field of education and the efforts of various countries in AI education. Finally, he summarized the significance of AI in education and its applications in the field.

**Mr XIONG Zhang**, Professor at Beihang University, discussed the significant impact and changes brought about by the COVID-19 pandemic on global work, life, and learning. A large number of students worldwide have shifted to remote online learning, which has posed great challenges and disruptions to the existing educational models. Under this new learning mode, students, teachers, parents, and educational practitioners are all facing varying degrees of change and adaptation.

**Ms WANG Su**, Director of the International and Comparative Education Research Center at the National Institute of Education Sciences, highlighted that the transformative effects of AI on education are still in progress and have not yet become mainstream. However, this integration process is continuously evolving. The application of AI in education is expected to increase and deepen in the future.

## MODERATOR

**Prof. FAN Lei**

Capital Normal University, China

## SPEAKERS

**Mr ZHENG Qinhua**

Vice Director, National Engineering Laboratory for Cyberlearning and Intelligent Technology

**Prof. XIONG Zhang**

Beihang University, China

**Ms WANG Su**

Director, International and Comparative Education Research Center, National Institute of Education Sciences

**Prof. LI Xiaoming**

Peking University, China

**Ms Min Chi**

Associate Professor, North Carolina State University, USA

**Mr Avron Barr**

Member, Educational Activities Board, IEEE

**Ms Annie Ning**

Director, Asia Affairs, ISTE

**Ms WANG Qianying**

Vice President, Lenovo

**Ms ZHUANG Rongxia**

Associate Professor, Beijing Normal University, China

**Prof. HU Xiang'en**

University of Memphis, USA

**Mr LI Xiaoming**, Professor at Peking University, gave a presentation on "From Inspiring Mathematics to Exciting Algorithms to Interesting Programming". He showcased how the guidance of computational thinking for young people is evolving along with the progress of the times, starting from mathematics to algorithms and eventually programming.

**Ms Min Chi**, Associate Professor at North Carolina State University, USA, explored the four abilities and three influencing factors of Prepare for Future Learning (PFL). Based on this foundation, an analysis of PFL's background and related work was conducted, along with an introduction to the main methods, evaluation models, and relevant conclusions.

**Mr Avron Barr**, from the Educational Activities Board at the Institute of Electrical and Electronics Engineers (IEEE), discussed the broad impact of artificial intelligence on technology and products. The latest standards and specifications in AI education were introduced, and a discussion was held on educational engineering and the reconstruction of educational approaches in the K12 stage.

**Ms Annie Ning**, Director of Asia Affairs at ISTE, shared insights on how educators can help children navigate an unpredictable era from four perspectives: understanding human nature, understanding technology, computational thinking, and self-love and empathy. In terms of computational thinking, several interesting examples were shared to illustrate how teachers can go the extra mile in different subject teaching to cultivate computational thinking skills in children.

**Ms WANG Qianying**, Vice President of Lenovo, China, explored the deep integration and innovation between new technologies and educational teaching in the age of intelligence. The discussion encompassed hot topics in AI-

enabled education and AI talent development, the trends of educational transformation accelerated by the pandemic, and the challenges and opportunities brought by the new educational infrastructure in the post-pandemic era. The aim was to collectively explore the best practices of applying emerging technologies to the field of education in the future.

### **An Overview of Education Development in the Arab Region: Insights and Recommendations Towards Sustainable Development Goals (SDG)<sup>1</sup>**

*Interactive Book on Artificial Intelligence to Combat Pandemics Vivid Stories in Prevention and Control of COVID-19* introduces AI to children, between the age of 9 and 15, in an easy and fun way. It also presents vivid stories about some AI-based solutions that were developed to combat the pandemic. Furthermore, this book presents a hands-on learning experience about AI by showing simple programming code that children could use and implement on the JupyterLab environment. JupyterLab is an open-source web-based interactive development environment that can support a wide range of workflows in data science, scientific computing, and machine learning. The book is structured according to the Five Big Ideas in AI developed by Computer Science Teachers Association (CSTA) for K-12 students, namely perception, representation and reasoning, learning, natural interaction and societal impact. The interactive AI-based version of this book, where readers can interact with the presented content and code (test, modify and download it), can be found on the Jupyter environment:

<http://yuanzhuo.bnu.edu.cn/article/653>



<sup>1</sup> See [http://sli.bnu.edu.cn/uploads/soft/200918/2\\_1546141161.pdf](http://sli.bnu.edu.cn/uploads/soft/200918/2_1546141161.pdf)

## K12 Education in the Age of Intelligence

### Key takeaways

- **Pathways of AI-empowered Education:** The first stage is the teacher's workload reduction assistant. It assists teachers in efficiently completing tasks that involve heavy workloads and repetition, such as grading assignments, exams, analyzing knowledge points, and error rates. The second stage is the student care companion. It continuously monitors, diagnoses, and provides feedback on students' learning progress, physical and mental well-being, emotions, and social interactions throughout their learning journey. This helps teachers better cater to the individual differences in each student's learning process. The third stage is the personalized instruction expert. It assists teachers in recommending and implementing different teaching methods and content tailored to each student's learning differences, enabling teachers to better facilitate personalized student development.
- **The future trend of Youth Education in the post-pandemic era** would follow four paths: exploring new teaching models based on information technology, rebuilding teaching evaluation and management approaches, promoting tailored instruction and personalized development, and fostering the cultivation of innovative abilities in talents.
- **Applications of Artificial Intelligence in the Education Sector:** (1) Personalized learning and tailored instruction: Developing individualized teaching plans based on students' unique characteristics and learning styles. (2) Automated tutoring and Q&A: Utilizing artificial intelligence to assist with homework guidance and answer student queries. (3) Intelligent assessment: Employing AI to automate tasks such as grading assignments and evaluating test papers, reducing the workload for teachers. (4) Simulation and gamified learning platforms: Enhancing students' exposure to real-life work environments through simulated teaching in virtual scenarios. (5) Education decision-making: Utilizing AI and big data analysis to assist students in selecting suitable academic paths and formulating career plans. (6) Feedback and evaluation of instructional systems: Monitoring and evaluating students' learning processes comprehensively using various AI-enabled methods, thereby aiding in the development and improvement of instructional systems.

# Open Educational Resources for Inclusive Education

This forum focuses on the utilization of open educational resources to foster inclusive learning environments. It brings together leading experts, educators, and stakeholders to engage in insightful discussions and share effective strategies for leveraging OER in promoting accessible and equitable education. Through collaborative exchange of knowledge and innovative ideas, the forum aims to shape the future of inclusive education by harnessing the full potential of open educational resources.

**Mr Tony Mays**, Specialist from the Commonwealth of Learning (COL), delivered a speech introducing COL's recent practices in promoting inclusive learning. He emphasized that remote learning models and OER, which support self-directed learning, contribute to creating learning opportunities for those who cannot access physical campuses. These approaches are particularly beneficial for girls, women, and people with disabilities in impoverished regions.

**Mr Mohamed Jemni**, the Director of the ICT Department of the Arab League Educational, Cultural and Scientific Organization (ALECSO), expressed in his speech that ALECSO is committed to managing and coordinating relevant projects in the fields of education, culture, science, and information technology. ALECSO upholds values such as tolerance, moderation, respect for others, and promoting diversified development. They are actively experimenting with using OER to promote inclusive education.

**Ms Svetlana Knyazeva**, Director of the Section of Digital Teaching and Learning Materials at UNESCO IITE, shared IITE's policies and practical

## MODERATOR

### Prof. LI Yan

Director, Research Center for Intelligence Education, Zhejiang University, China

### Mr Mohamed Jemni

Director, ICT Department, ALECSO

### Mr Daniel Burgos

President, ICDE; Director, UNIR iTED

## SPEAKERS

### Mr Tony Mays

Specialist, COL

### Mr Mohamed Jemni

Director, ICT Department, ALECSO

### Ms Svetlana Knyazeva

Director, Section of Digital Teaching and Learning Materials, UNESCO IITE

### Mr CHENG Gang

Director, Digital Learning Resource Center, Open University of China

### Ms Ebba Ossiannilsson

Vice President, Swedish Association for Distance Education

### Ms Fahriye Altinay

Director, Graduate School of Educational Sciences; Chair, Societal Research and Development Center, Near East University, Cyprus

**Prof. Curtis J. Bonk**

School of Education, Indiana University,  
USA

**Prof. Edison Spina**

Computer Engineering and Digital  
Systems Department, University of São  
Paulo, Brazil

**Mr Ahmed Tlili**

Post Doctor, Beijing Normal University,  
China

experiences in promoting the application of OER in non-English-speaking countries. She introduced the free online courses jointly launched by IITE and the World Wide Web Consortium (W3C). She emphasized that inclusive education should consider not only learners with physical disabilities but also different age groups, ethnic minorities, learners of rare languages, marginalized groups, learners from low-income families, displaced persons, and vulnerable populations.

**Mr CHENG Gang**, Associate Professor and Director of the Digital Learning Resource Center at the Open University of China, shared China's policies and practices in promoting inclusive education. These include policies related to compulsory education, education for disabled students, education for girls, ICT infrastructure construction such as the "Three Connections and Two Platforms," the National Public Resource Education Service Platform, and major OER projects like China University MOOC. He pointed out that promoting inclusive education through OER still faces challenges such as the digital divide and the sustainable development of funding and human resources. However, the rapid development of 5G and AI technologies and the continuous improvement of online learning communities will bring more possibilities for promoting inclusive education through OER.

**Ms Ebba Ossiannilsson**, Vice President of the Swedish Association for Distance Education, shared the policies and initiatives of European countries in promoting open educational resources. She introduced UNESCO's publication "Learning for all: Guidelines on the inclusion of learners with disabilities in open and distance learning" and the European Commission's "European Disability Strategy 2010-2020." She pointed out that promoting inclusive learning through OER still faces challenges in terms of policy, funding, ecosystem development, and capacity building. She emphasized that all measures to promote inclusive education through OER should be guided by the UNESCO OER Recommendation and effectively implement relevant monitoring and evaluation mechanisms.

**Ms Fahriye Altinay**, Director of the Graduate School of Educational Sciences and Chair of the Societal Research and Development Center at Near East University, shared the practices of eight Central and Eastern European countries, including Cyprus, Germany, and Poland, in utilizing OER to promote inclusive education. She pointed out that the current OER practices lack understanding of inclusive education and innovative approaches, strategic planning, and human resources that ensure equal participation for all. Cultural and regional biases still persist. She suggested the need for regular training to help teachers acquire knowledge and strategies related to open teaching methods.

**Mr Curtis J. Bonk**, Professor at Indiana University's School of Education, USA, introduced the practices of North American and Southern Hemisphere countries in utilizing OER and MOOCs to promote inclusive education. He proposed four recommendations to foster inclusive classrooms, including providing diverse guidance, reducing the cost of course materials, offering alternative assignments for special circumstances, and understanding students' technological preferences and special needs. He emphasized that with the development of AI

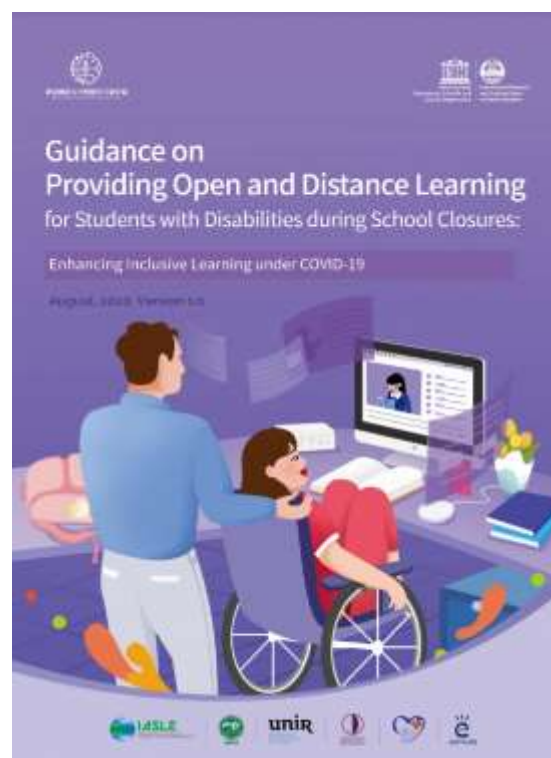
technology, learning will become more inclusive, free, and open, and OER and MOOCs have tremendous potential in achieving inclusive education.

**Mr Edison Spina**, Professor from the Computer Engineering and Digital Systems Department of the University of São Paulo, provided an overview of the legal regulations, standards, and policies in Brazil and Latin American countries regarding the use of open educational resources to promote inclusive education from a social technological systems perspective. He highlighted the importance of building a social educational ecosystem by raising awareness of OER and inclusive education, offering specialized training courses on using OER to promote inclusive education, fostering collaboration and sharing of practical experiences, providing policy and funding incentives, and establishing robust infrastructure and technical support teams. Technical challenges remain a significant hurdle in utilizing OER to promote inclusive education.

### **Guidance on Providing Open and Distance Learning for Students with Disabilities during School Closures: Enhancing Inclusive Learning under COVID-19<sup>2</sup>**

According to the World Report on Disability, published by the World Health Organization (WHO) and the World Bank, there are almost 2 billion people with disabilities over the globe, accounting for 37.5% of the world's population (Inclusive City Maker, 2019). Children with disabilities are particularly at risk of exclusion from education. Especially, due to the COVID-19 response measures, persons with disabilities, including students, face more specific barriers in carrying out their daily lives and learning. UNESCO (2020) mentioned that those with sensory, physical or intellectual disability are 2.5 times more likely to have never been to school than their peers without disability because they face more complex barriers.

Under the above background, this handbook discusses open and distance learning for students with disabilities during COVID-19, through vivid stories and experiences. Particularly, it describes, through illustrative stories, innovative approaches on how to design learning activities in open and distance learning environments for students with disabilities. Additionally, this handbook provides guidelines on designing accessible learning materials based on Universal Design (UD). Finally, it provides guidelines for different stakeholders, including parents, policy makers, teachers and designers on how to facilitate open and distance learning for students with disabilities.



<sup>2</sup> See [http://sli.bnu.edu.cn/uploads/soft/200902/2\\_1916206341.pdf](http://sli.bnu.edu.cn/uploads/soft/200902/2_1916206341.pdf)

## Open Educational Resources for Inclusive Education

### Key takeaways

- Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others.
- There are four types of policy in Europe: policies focusing specifically on opening up education through the promotion of open educational resources (OER) and open educational practices (OEP); policies relating to general ICT (Information and Communication Technologies) for learning with some open education component; comprehensive strategic educational policies with some open education component; policies designed as National Open Government Plans with some open education component.
- For policymakers, it is important to develop affordable and accessible technologies, including assistive technologies, to address the issue of the digital divide. Initiatives should be measured to ensure that families with special needs can also utilize these technologies at home. Specific funding should be allocated to support these families and their children with disabilities.

# The 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 have carried out bold explorations and beneficial attempts based on local conditions, and have 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.

During the forum, more than nine representatives at the provincial and ministerial level from Ningxia's "Internet + Education" National Demonstration Zone and the first batch of eight "Smart Education Demonstration Zones" under the Ministry of Education delivered reports. They presented specific implementation plans and emphasized construction priorities based on their own circumstances and characteristics to promote the development of smart education and establish distinctive smart education demonstration zones.

**Mr WU Fati**, Director of the School of Educational Technology at Beijing Normal University, stated that the ultimate focus of smart education lies in the cultivation of intelligent talents. New generation information technologies such as 5G, big data, blockchain, and artificial intelligence drive the construction of smart learning environments, providing technological support for achieving human-computer collaboration, personalized teaching, and individualized learning. The smart learning environment serves as the foundation and

## MODERATOR

### Prof. FANG Haiguang

College of Education, Capital Normal University, China

## SPEAKERS

### Mr WU Fati

Director, School of Educational Technology, Beijing Normal University, China

### Mr LU Hongming

Director, Education Bureau of Changsha, Hunan

### Mr Wang Jianping

Deputy Director, Education Department, Ningxia Hui Autonomous Region

### Ms ZHOU Yuling

Deputy Secretary, Working Committee of Education, Municipal Party Committee of Dongcheng District, Beijing

### Mr LI Ming

Director, Yuncheng Education Bureau

### Ms YUN Minxia

Director, Education Bureau, Minhang District, Shanghai

### Mr MENG Hui

Director, Wuhan Education Bureau

### Ms MIAO Yaqin

Director, Changsha Education Bureau

**Mr LIN Ping**

Secretary, Party Committee; Director,  
Guangzhou Education Bureau

**Mr ZHU Shijun**

Deputy Director, Education Bureau, Wuhou  
District

**Mr XIA Shaohua**

Deputy Director, Public Service Bureau of  
Management Committee, Xiong'an New  
Area

guarantee for realizing smart education. Future development will be characterized by an ecological learning environment in which teachers, students, parents, and administrators integrate with this intelligent environment.

**Mr LU Hongming**, Secretary of the Party Committee and Director of the Education Bureau of Changsha, Hunan, stated that, during the pandemic, over one million primary and secondary school students in Changsha successfully pursued home learning through online education, achieving the goal of "class suspension without learning suspension." This has brought profound changes to traditional educational concepts and models. The knowledge transmission model, which centered around teacher-focused and classroom-centered teaching based on class lectures, is gradually transforming into an ability-oriented model centered on extensive learning resources, student-centered approaches, problem-centered approaches, and activity-centered approaches. The deep advancement of smart education has effectively promoted the transformation of educational and teaching methods, making personalized teaching under the class lecture model a possibility.

**Mr Wang Jianping**, Deputy Director of the Education Department of Ningxia Hui Autonomous Region, stated that Ningxia Province has incorporated "Internet + Education" into all aspects and processes of talent cultivation, educational services, and education governance. This has led to the promotion of education concept updates, model changes, and system reconstruction, striving to ensure that every student can enjoy a fair and high-quality education. He shared four practices, including establishing a unified education cloud platform covering all areas of the region, promoting balanced development of compulsory education through the application of three classrooms, innovation through integration to promote the innovation of "Internet + Education" teaching models, and demonstrating results in the demonstration zone to ensure the seamless transition of online education during the epidemic.

**Ms ZHOU Yuling**, Deputy Secretary of Working Committee of Education of the Municipal Party Committee of Dongcheng District, Beijing, mentioned that Dongcheng District has always regarded new media and technology as effective means to realize the reconstruction of the education ecosystem. Driven by data, Dongcheng District has explored a ubiquitous, flexible, and intelligent educational teaching service model, constructed an open lifelong personalized education ecosystem, promoted changes in talent cultivation models, and laid out future education. She shared practices of smart education construction, including establishing a "data brain" to gather education data resource system, establishing a youth education institute, promoting the dual classroom teaching model, building an intelligent learning platform with knowledge graphs to track and monitor students' progress.

Yuncheng City is the only fourth-tier city in the central and western regions that has been

selected to create a smart education demonstration zone. **Mr LI Ming**, Director of Yuncheng Education Bureau, shared experience in smart education construction from four aspects, including strengthening government action to create a new environment for sustainable development, focusing on application-driven approaches to establish a new mechanism for sustainable development, concentrating on integrated innovation to build a new ecosystem for sustainable development. He ended with discussions on seeking transformational breakthroughs and widening new paths for sustainable development.

**Ms YUN Minxia**, Director of Education Bureau, Minhang District, Shanghai, shared Minhang's plan of smart education demonstration zone. The construction plan consists of five parts, namely, information application, education cloud services, modern education governance, digital campus, and public service system. Based on the full coverage of information application in education, the core of the system is constructed by supporting the personalized learning education cloud service. The modern education governance system, which provides precise services, serves as the link. The digital campus construction, which is oriented towards the future, serves as the carrier. In addition, the education informationization public service system acts as the guarantee, forming a diversified and synergistic sustainable development mechanism for production, education, research, and utilization.

Wuhan City focuses on city-level coordination and has built a "Internet + Education" platform that has formed a basic education ecosystem where everyone can learn everywhere. **Mr MENG Hui**, Director of Wuhan Education Bureau, shared six specific construction tasks, including improving the smart education environment, comprehensively improving information literacy, revolutionizing the classrooms of primary and

secondary schools, innovating resource supply models, data-driven evaluation and practice, and optimizing education governance abilities. These construction tasks aim to promote the modernization of education in Wuhan City, improve the level and quality of education and teaching, and promote the comprehensive development of students.

**Ms MIAO Yaqin**, Director of Changsha Education Bureau, stated that innovative talents can be cultivated for the new era by deepening the construction and application of the network learning space, changing the way of education and teaching, promoting the deep integration and innovation of information technology and education, and promoting the comprehensive and personalized development of students. Specific measures for the construction of Changsha's network learning spaces are presented in six aspects, including reconstructing a new environment for smart education, promoting the co-construction and sharing of high-quality education resources, promoting the transformation of education and teaching models, aggregating big data for student growth, innovating educational evaluation models, and combining virtual and real environments to promote the creation of future schools.

**Mr LIN Ping**, Secretary of the party committee and Director of Guangzhou Education Bureau, shared three aspects of Guangzhou's exploration and practical experience in smart education. The first is to promote the transformation of talent training mode through information technology. The second is to build a high-quality educational resource system, optimizing the education service supply mechanism, and taking measures such as promoting the large-scale application and promotion of national curriculum digital textbooks, co-building and sharing high-quality educational resources, and using Internet-based targeted assistance. The third is to support education decision-making with big data and

promote modern education governance, including establishing a data-driven governance system, conducting thematic analysis of education big data, and supporting the professional development of teachers through big data methods.

**Mr ZHU Shijun**, Deputy Director of the Education Bureau of Wuhou District, emphasized that the construction of smart education in Wuhou District adheres to the goal of talent cultivation and steadily advances along the six integrated paths of system innovation, environmental upgrading, teaching transformation, evaluation improvement, governance innovation, and supply optimization. This progress aims to promote the innovative development of a new ecosystem for smart education, the transformation of educational service patterns, and the upgrading of educational governance. He introduced that Wuhou District takes educational governance as the starting point, leading the

transformation of concepts, breaking through institutional barriers, and promoting data integration through the construction of a data center. This ensures the innovation of educational service models and educational teaching practices.

**Mr XIA Shaohua**, Deputy Director of the Public Service Bureau of Management Committee of Xiong'an New Area, stated that Xiong'an New Area will adhere to high standards and positioning in the creation of the "Smart Education Demonstration Zone", gradually change the education ecology, achieve a leap-forward development of education, and meet the diverse, personalized, lifelong, and intelligent learning needs of the people. Xiong'an attaches great importance to strengthening the top-level design of smart education development. "Xiong'an New Area Smart Education Three-Year Action Plan" was also released.

## The New Ecology of Regional Smart Education

### Key takeaways

- In the intelligent era, it is of vital importance to realize the transformation in teaching methods, service models, and management styles; to shift from a teacher-centered approach to a student-centered approach, from knowledge transmission to skill development, from classroom learning to diverse learning methods, from single-subject teaching to interdisciplinary teaching, and from subject-based score rankings to comprehensive quality evaluation.
- Leveraging the education cloud platform and smart classroom teaching environment can promote blended learning and bridge in-class and out-of-class activities. This approach enables differentiated instruction and personalized learning, facilitates the integration of artificial intelligence into educational practices, and advances the development of smart classrooms.
- A highly agile educational administrative system should be constructed, leveraging smart city initiatives and relying on the foundation of education big data center. It can break down data barriers between different business systems and eliminate the isolation of information data, thereby achieving data-driven intelligent decision-making and management in education.
- Teachers can utilize AI teaching assistants to deepen classroom teaching transformation and adopt learner-centered approach where teaching is tailored based on individual students' learning progress. Also, by utilizing "AI and big data personalized teaching and learning systems," real-time dynamic data of students is collected in a companion-style manner. The value of this data is then harnessed to establish a student-centric academic assessment system, supporting personalized learning for students.
- The construction of the data center encompasses three aspects. First, it provides guarantees for data computation and resource storage through the combination of government cloud and cloud deployment. Second, it ensures multi-dimensional and comprehensive data by enabling cross-domain and cross-platform data integration and real-time IoT device access. Third, it establishes practical mathematical models and application scenarios to design scientifically rational algorithms for data application services.

# Smart Village and Smart Social Development

Education is a vital component of smart village development and serves as the fundamental pathway to break the cycle of intergenerational poverty. Discussions on Smart Village and Smart Social Development are essential for promoting inclusive, sustainable, and technologically empowered rural communities. By harnessing the potential of technology, education, and community participation, this forum paves the way for social and economic transformation, improving the well-being and livelihoods of individuals in rural areas.

**Mr CHEN Guangju**, Vice-Director of the University Council, Beijing Normal University, pointed out that 2020 is both the year of reaching the goal of building a moderately prosperous society in all aspects and the year of concluding the efforts to eradicate poverty. Promoting the development of smart villages and smart societies through smart education is of great significance. Further promoting the development of smart villages and smart societies is also a common challenge facing the contemporary international community, requiring strengthened domestic and foreign exchanges and cooperation, and sharing successful experiences and development experiences.

**Professor TANG Yayang**, Secretary of the Party Committee of Hunan University of Commerce, gave a presentation entitled "Making Education the Solid Foundation for Smart Village". He pointed out that education is the foundation of building the smart village, and it is an important condition for developing the smart village. We should focus on education concepts, education content, education methods, educational teams, educational environment, and qualified modernization, and promote the modernization of rural education.

## MODERATOR

### **Ms ZENG Xiaodong**

Executive Director, UNESCO INRULED

### **Mr WANG Jixin**

Executive Director, Collaborative Innovation Center of the Balanced Development of Informatization and Basic Education, Central China Normal University

## SPEAKERS

### **Mr CHEN Guangju**

Vice-Director, University Council, Beijing Normal University, China

### **Prof. TANG Yayang**

Secretary, Party Committee, Hunan University of Commerce

### **Prof. YING Ruoping**

First-level Inspector, Department of Education, Hunan Province

### **Mr LI Ping**

Vice Governor, People's Government of Dali City, Yunnan Province

### **Ms Suleeporn Bunbongkarn Choopavan**

Director, Foreign Affairs Department, Royal Foundation of Thailand

### **Ms LI Baoping**

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

### **Mr XING Zhen**

Director, Qinhuangdao City Education Bureau for Educational Technology

**Ms WU Dingcui**

Principal, Bagu Primary School,  
Liangshan Yi Autonomous Prefecture,  
Mianning County

**Mr HU Longgen**

Deputy General Manager, Department of  
Education, China Division, Huawei

**Mr XU Ran**

CTO, Roobo Company

**Professor YING Ruoping**, First-level Inspector from the Department of Education of Hunan Province, stated that Hunan Province's 2.0 education informationization pilot work is centered around the strategic task of promoting the balanced development of urban and rural education, taking classroom reconstruction as the main theme. New types of classrooms were used as a breakthrough to promote education reform and construct a new ecology of balanced education through the application of new information technology. Currently, Hunan Province has preliminarily formed a Hunan characteristic 2.0 education informationization solution with promotional value in central provinces.

**Mr LI Ping**, Vice Governor of People's Government of Dali City, Yunnan Province, introduced the basic situation of education informatization development, the difficulties faced, and the exploration practices in the mountainous border areas of Yunnan Province. Currently, the development of education informatization in the western Yunnan region is still constrained by outdated educational concepts, insufficient high-quality resources, and a large funding gap, and an overall informationization resource cooperation has not yet been formed. He shared the experience of "1+N" video interactive classrooms supporting the balanced development of education and

pointed out that the development of education informatization in the western Yunnan region should focus on the digitization of educational elements, the full-domain networking of education, and the intelligentization of education and teaching. This would promote the sharing of high-quality educational resources, improve the quality of education and teaching, and help achieve modern education.

**Ms Suleeporn Bunbongkarn Choopavan**,

Director of Foreign Affairs Department of the Royal Foundation of Thailand, gave a speech titled "Smart Bamboo Stick: Simple, Affordable and Practical Technology that Shifted Small Farmer's Mindset." The speech shared the Thai government's practices in developing agriculture and helping small farmers receive better benefits. A technology called "Smart Bamboo Stick" helped small farmers in the Northeast region of Thailand dig ponds on their farms, solved the problem of water storage during dry seasons, and promoted the local agriculture development. She believed the application of smart technology is the key to changing the mindset of farmers.

**Mr WANG Jixin**, Executive Director of the Collaborative Innovation Center of the Balanced Development of Informatization and Basic Education at the Central China Normal University, analyzed the problems of regional education resource allocation, supply, and uneven development structure from the perspectives of teachers, students, and schools. He proposed a new architecture of "Internet+AI+Localization," which includes three parts, namely, education ecological theory, collaborative development theory, and situational learning theory. The program aims to promote the transformation of teaching methods and upgrade precision teaching through the dual-track rural digital school strategy, teacher community strategy, multi-party cooperation and precision education strategy for students, and curriculum and teaching structure reorganization strategy.

## Panel Discussion

Smart rural development refers to the application of the concept of smart development in rural areas. It not only emphasizes the integration of information technology with various sectors in rural areas but also relies on fostering an innovative spirit among talents to promote sustainable development in rural economy, society, and ecology. Approximately two-thirds of China's primary and secondary school students reside in rural areas. Without modernizing rural education, there can be no modernization of education in China. Accelerating the modernization of rural education serves as a crucial lever to address the imbalance in educational development and is an important aspect of targeted poverty alleviation through education.

Over the years, with the support of national investments and policy mechanisms, the level of informatization in rural education has gradually improved. However, there are still several issues related to rural education informatization. For instance, there is a need to enhance the information literacy of education staff, broaden the access to resources for rural schools and students, etc.

In 2018, the Ministry of Education initiated special training programs on education informatization for primary and secondary school principals in "three regions and three prefectures," with a focus on enhancing the information literacy of principals and teachers in remote areas. The goal is to facilitate the sharing of new smart education concepts between urban and rural teachers. At the same time, education enterprises have also increased their investments to actively propel rural areas into the era of mobile internet, providing technological support for the development of smart rural communities.

In this panel discussion, speakers discussed the construction of smart village, including Ms Li

Baoping, Deputy Dean of Institute of Rural Education and Rural Development, Beijing Normal University; Mr XING Zhen, Director of Qinhuangdao City Education Bureau for Educational Technology; **Ms WU Dingcui**, Principal of Bagu Primary School, Liangshan Yi Autonomous Prefecture, Mianning County, Sichuan Province; **Mr HU Longgen**, Deputy General Manager, Department of Education, China Division, Huawei; and **Mr XU Ran**, CTO of Roobo Company. They shared their views on various aspects related to the construction of smart rural communities, including the experiences, research, and practices in this field. They also explored the connections between smart rural development, nostalgia, rural issues, rural education, as well as the integration of cultural education and socio-economic development. Smart rural communities represent the application of rural development concepts, emphasizing the need for the effective integration of information technology across various sectors in rural areas. Furthermore, they underscored the importance of fostering an innovative spirit among talents to drive comprehensive and sustainable development in rural economy, society, and ecology.

Some key points arising from these issues are:

- The construction of smart rural communities requires substantial investments in new technologies. By combining smart education with rural settings and implementing smart educational practices, alternative approaches should be explored in areas with limited information technology infrastructure, in order to realize educational concepts aligned with social development.
- From the perspectives of rural education and informatization, given that approximately two-thirds of China's primary and secondary school students

reside in rural areas, modernizing rural education is imperative for the modernization of education in China as a whole. China should accelerate the level of modernization in rural education, addressing the challenges of imbalanced and insufficient educational development at the grassroots level. This is also an essential aspect of targeted poverty alleviation, with an emphasis on prioritizing intelligence in poverty reduction efforts.

- The realization of the smart rural community strategy requires addressing issues related to logistics, talent flow, capital flow, and information flow. New infrastructure construction is also a significant topic, with the aim of achieving comprehensive coverage of rural areas.
- From a technological standpoint, "smart" embodies intelligence, particularly in terms

of efficiency, which contributes to enhanced personal work efficiency and societal productivity. Efficiency is manifested through time and cost savings. Another aspect of intelligence lies in the precise and accurate comprehension of acquired content.

- The development of smart campuses in rural areas is closely linked to overall rural development. This includes prioritizing the development of smart campuses and education in rural areas. Additionally, rural schools should be transformed into information service centers, serving as demonstration and experiential centers for showcasing new technologies, concepts, innovations, and entrepreneurial activities. The orderly development of smart rural communities will also help retain and attract talent.

### High-Level Dialogue on New Normal and Sustainable Development for Education

#### Key takeaways

- Education plays a crucial role in enhancing the quality of rural human resources. It is essential to develop talent locally and elevate the quality of local talents. Rural education should not be limited to school education but also encompass vocational skills education closely related to the youth and rural development, as well as education targeting women, aiming to enhance human resource capabilities through multidimensional education.
- Challenges facing rural education informatization include the need to enhance the information literacy of education staff, broaden the avenues for rural schools and students to access resources, address the disparity between the development of rural schools and their application levels, and move beyond superficial applications.
- The concept of connecting the digital world to individuals, families, and organizations and building an interconnected world can play a significant role in the construction of smart rural communities.
- Rural education should play a role as a cultural education center, where schools of the future are not isolated institutions but are closely connected to the outside world. Rural schools should break down barriers and integrate information from different levels and sectors in rural areas, thereby jointly promoting coordinated rural development.

# International Science Education

This forum aims to foster meaningful discussions and insights that will contribute to the advancement and improvement of science education on an international scale. Exploring future trends allows for proactive planning and adaptation to meet the evolving needs and demands of a rapidly changing world, ensuring that science education remains relevant and impactful for future generations.

**Mr Lee Yee Cheong**, Honorary Chairman of UNESCO International Science Technology Innovation Centre for South-South Cooperation, Kuala Lumpur, stated that STEM education must not emphasize only physical science, engineering, technology and mathematics, it must place equal importance to social sciences so as to instil age-old virtues to the young, such as hard work, respect for elders and caring for the community.

**Professor DONG Yan**, Vice President of the Research Center of Science Education at Beijing Normal University, highlighted that the pandemic has emphasized the importance of science and technology. She emphasized President Xi Jinping's statement that science and technology are the most powerful weapons in the battle against diseases, and overcoming major disasters and pandemic requires scientific development and technological innovation. The development of science education, especially in the K-12 stage, lays the foundation for enhancing a country's scientific and technological capabilities.

**Professor HU Weiping** from Shaanxi Normal University presented a speech on science education in primary and secondary schools in China. He pointed out that science education is a broad field of research and practice, encompassing policy, discipline development, research, teacher training, curriculum design, teaching, and assessment. He shared insights

## MODERATOR

### **Prof. DONG Yan**

Vice President, Research Center of Science Education, Beijing Normal University, China

### **Mr ZHU Lixin**

Senior Engineer, National Engineering Laboratory for Cyberlearning and Intelligent Technology

## SPEAKERS

### **Mr Lee Yee Cheong**

Honorary Chairman, UNESCO International Science Technology Innovation Centre for South-South Cooperation, Kuala Lumpur

### **Prof. DONG Yan**

Vice President, Research Center of Science Education, Beijing Normal University, China

### **Prof. HU Weiping**

Shaanxi Normal University, China

### **Prof. Jim Slotta**

University of Toronto, Canada

### **Mr Manzoor H. Soomro**

President, Eco Science Foundation

### **Ms Natalia Amelina**

Senior National Project Officer in Education, UNESCO IITE

### **Prof. Zehra Altınay Gazi**

Near East University, Cyprus

### **Ms Wendy Sadler**

Cardiff University, UK

into the curriculum reforms in science education in China's compulsory education stage, including the nature, concepts, and goals of science curriculum in primary and middle schools. He also discussed the quality assessment of science education, including evaluation organizations, assessment frameworks, and test formats. Finally, he explored the future directions of science education reform.

**Professor Jim Slotta** from the University of Toronto, Canada, shared his insights on STEM teaching and learning. He discussed key issues in STEM education and promising new directions, such as assessment, the application of new technologies, and innovative teaching strategies in STEM education. He highlighted the role of professional learning communities in promoting collaborative creation, resource sharing, and mutual support among peers. He also shared the application of the WISE project in China and the use of inquiry-based learning in science education.

**Mr Manzoor H. Soomro**, President of Eco Science Foundation, discussed the application of blended education models in science education in the post-pandemic era. He shared his participation in various science education activities organized by the Pakistan Science Foundation, including the Belt and Road Initiative Science Education Coordination Committee and maker camps. He also highlighted the vibrant and diverse science education activities in Pakistan.

**Ms Natalia Amelina**, Senior National Project Officer in Education at UNESCO IITE, presented innovative digital solutions in STEM education. She emphasized that the world is changing rapidly, and digital technology has become a core part of our lives. STEM education goes beyond imparting scientific knowledge and focuses on innovation and creativity. Innovative digital solutions in STEM education will help address various challenges and contribute to a better and more sustainable future.

**Professor Zehra Altınay Gazi** from Near East University in Cyprus shared the current status and challenges of science education in Central and Eastern Europe. She discussed the need for policy development for the future of science education and the integration of new technologies into the learning environment. Ms Wendy Sadler from Cardiff University in the United Kingdom presented an analysis of the impact of informal education on science education. She provided valuable solutions for effectively integrating formal and informal education in current science education. She also highlighted the reflection on the influence of the pandemic on learning and the need to reconsider science education in the post-pandemic era.

## International Science Education

### Key takeaways

- UNESCO aspirations of Innovative digital solutions in STEM education: (1) Prominent and lasting interest in the STEM education wherever it is offered; (2) Skills, values, attitudes and knowledge that enable people to lead healthy and fulfilled lives, make informed decisions and respond to local and global challenge; (3) Universally increased investment in STEM education, developed and mainstreamed competency-based curricula to ensure obtainment of core competences for sustainable living in the rapidly changing world.
- Science education should promote the basic scientific literacy of all students' sustainable development. Scientific attitude, scientific method and scientific spirit should be cultivated through students' exploration in activities, and traditional scientific education channels should be widened, such as attaching importance to informal education, etc.
- Science education plays an important role in the reconstruction of the spiritual world, promoting the harmony between human material life and spiritual world, and in turn promoting the development of science and technology to form a kind interaction.
- Curriculum Idea of Primary School Science should promote the development of scientific literacy for all students, advocate inquiry learning, protect students' curiosity and thirst for knowledge, and highlight the dominant position of students.
- Strengthening scientific and technological innovation education and improving scientific quality of teenagers are of great significance to improve national independent innovation ability, realizing comprehensive, coordinated and sustainable economic and social development, and building an innovation-oriented country.

# ICT Promoting the Innovation and Development of Higher Education

This forum provided a multidimensional platform for discussions on utilizing ICT technology to promote innovation and development in higher education. The topics discussed and exchanged during the forum revolved around the core issues of information technology application in higher education, which are crucial for enhancing education quality, expanding educational reach, and combating the challenges posed by COVID-19. It is expected that this forum will provide valuable insights and support for leveraging ICT technology to foster innovation in higher education, facilitating the achievement of the global education goals set for 2030, particularly in developing countries.

**Mr LI Ming**, Director of International Center for Higher Education Innovation, UNESCO, introduced the innovative work carried out by the International Center for Higher Education Innovation since its establishment. They have initiated numerous higher education cooperation projects along the Maritime Silk Road countries. Strategic partnerships have been formed through MOU agreements with four Asian and seven African universities. In April 2020, the International Institute of Online Education (IIOE) was established. Partner institutions include universities and enterprises from developing countries in the Asia-Pacific and African regions, as well as Chinese partner institutions. Since its establishment, the IIOE has conducted diverse training and resource promotion activities, providing concrete support for teachers from Asian and African universities to engage in online learning during the pandemic.

**Ms HAN Yun**, Deputy Director of International Platform and Curricula Construction Committee,

## MODERATOR

### **Prof. ZHAO Jianhua**

Education Research Center, Southern University of Science and Technology

### **Mr LI Fan**

UNESCO ICHEI

### **Ms HU Xiao**

Associate Professor, University of Hong Kong

## SPEAKERS

### **Mr LI Ming**

Director, UNESCO ICHEI

### **Ms HAN Yun**

Deputy Director, International Platform and Curricula Construction Committee, Ministry of Education, P.R.C

### **Prof. Lim Chirp**

UNESCO ICHEI

### **Mr WANG Libing**

Head, Education Innovation and Skills Development Department, UNESCO Asia and Pacific Regional Bureau for Education

### **Prof. Nancy Law**

University of Hong Kong

### **Mr WANG Shuaiguo**

CEO, XuetangX

### **Prof. HUANG Xiaodi**

Charles Sturt University, Australia

**Prof. LI Xiaoming**

Peking University, China

**Prof. Carol Chan**

University of Hong Kong, China

**Prof. Nicholas Bowskill**

University of Derby, UK

**Prof. CHEN Wenli**Nanyang Technological University,  
Singapore**Prof. GU Xiaoqing**

East China Normal University, China

**Mr ZHOU Wei**Technical Director, Beijing Normal  
University, China

Ministry of Education, gave a comprehensive introduction to the construction and application of the iCourse International Platform. She talked about its foundational aspects, platform development, and operational status of the iCourse International Platform. Currently, there are 291 courses with the participation of 74 universities covering disciplines such as medicine, natural sciences, economics, AI, and VR. The iCourse International Platform has been selected as part of UNESCO's Global Education Coalition, providing remote education solutions for learners worldwide.

**Professor Lim Chirp** from International Center for Higher Education Innovation, UNESCO, highlighted the establishment of the International Institute of Online Education (IIOE) initiated. IIOE aims to leverage the "Belt and Road" initiative to increase access to quality higher education in developing countries. It serves as an online training platform to enhance the ICT capabilities of teachers in partner institutions from developing countries. By

utilizing the IIOE online course platform, the project offers high-quality online courses under the supervision of a curriculum guidance committee, with clear monitoring and evaluation plans, robust support from multilateral partner organizations and universities. This initiative assists teachers in partner institutions from developing countries in enhancing their ICT application abilities, establishing blended and online learning capacities, thereby increasing their opportunities to access quality higher education and better achieving UNESCO's "Education 2030 Goals."

**Mr WANG Libing**, Head of Education Innovation and Skills Development Department of UNESCO Asia and Pacific Regional Bureau for Education, emphasized that the outbreak of the COVID-19 has propelled online learning from a supplementary role to a mainstream educational form. Online and blended learning will become the new normal in education in the future. He believed without a supportive ecosystem to address disparities in different domains, mainstreaming will not be achieved. This new ecosystem requires not only policy and mechanism support, as well as ICT infrastructure updates and upgrades, but also the enhancement of institutional capacity building and a rethinking of project and curriculum design.

**Professor Nancy Law** from University of Hong Kong emphasized the importance of specialized learning design in the new normal from the perspective of learning design. She proposed using online learning design work as a design tool, supported by a triangular design framework and theory, to cultivate hierarchical, systematic, and institutionalized learning design capabilities among teachers. She illustrated the application of ICT-supported innovative learning design in higher education through examples from the University of Hong Kong's course practices.

**Mr WANG Shuaiguo**, CEO of XuetangX, Founder

of Rain Classroom, introduced the contributions of XuetangX and Rain Classroom, which showed China's efforts on a global scale during the pandemic. XuetangX, the world's first large-scale Chinese online classroom platform launched by Tsinghua University, went international during the pandemic and provided free access to learners worldwide. It served three million learners per second during the pandemic. Additionally, the international version of XuetangX is integrated with Rain Classroom, enabling authorized courses to be used for blended teaching and learning by Rain Classroom's global educators and students. It provides universities with comprehensive data support related to courses, visualizing teaching and learning data.

Professor HUANG Xiaodi from Charles Sturt University, Australia shared insights on combining learning assessment with online course knowledge to create a multimedia innovative assessment mechanism. Through the use of big data, the learning process and outcomes of students are tracked and assessed more accurately and diversely, enabling effective online feedback and recommendations to be provided to students.

### Panel Discussion

Theme: Online Education during the Outbreak to Promote the Transformation of Higher Education.

**Professor LI Xiaoming** from Peking University suggested that whether it is "supporting teaching" or "improving teaching," online education has gained recognition as a permanent fixture in higher education. For teachers who enjoy exploring teaching methods, the "unexplored territory" offered by the new normal of online teaching provides them with significant creative space. Teaching designs in the new normal should aim for high expectations, establish solid frameworks, and encourage students to climb upward on their own.

**Professor Carol Chan** from the Faculty of Education at the University of Hong Kong analyzed the challenges and opportunities in higher education in the post-pandemic era from the perspectives of learning science and knowledge construction. She shared innovative design cases of knowledge construction in higher education during the pandemic.

**Professor Nicholas Bowskill** from University of Derby, UK introduced the educational transformation in the post-autonomy era, discussing the relevant ideas and developments. He used research cases from the University of Derby to emphasize that post-autonomy in the current new normal is a unique, group-based learning approach. Its primary design objective revolves around fostering a sense of belonging within groups to facilitate the development of individuals within the group and support the educational paradigm shift from individual to collective learning in the new normal.

**Professor CHEN Wenli** from Nanyang Technological University shared insights on scripting and assessing computer-supported collaborative argumentation. She proposed using collaboration as an improved spiral model and leveraging Apple Tree technology to assess and support students' argumentative writing, fostering their critical thinking skills.

**Professor GU Xiaoqing** from East China Normal University discussed the current status of internet-based learning in higher education in 2019, as well as the internet learning habits and preferences of learners in the higher education field. She highlighted the necessity of cultivating students' self-directed learning abilities in the new landscape of blended learning in the post-pandemic era and shared feasible suggestions for enhancing students' online learning capabilities.

### 2019 White Paper on Internet Learning

Professor GU Xiaoqing from East China Normal University represented the white paper project team and released the "2019 Report on Internet Learning in Higher Education in China." She systematically introduced the ideas and research findings behind the preparation of the report. Through data analysis, she presented the status of internet learning development in higher education in 2019, characteristics of learners in higher education, as well as existing problems and trends in internet learning development. She pointed out that the revolutionary impact of information technology on higher education has started to emerge, but there is still a gap in

meeting the requirements of the new era.

**VSE Primer: Concept, Technology, Architecture and Implementation of Virtual and Simulation Experiment**

The third achievement release in this forum was presented by Mr ZHOU Wei, the Technical Director of the Academic Affairs Office (Graduate School) at Beijing Normal University. He represented the project team and released the "VSE Primer: Concept, Technology, Architecture, and Implementation of Virtual and Simulation Experiment."

## ICT Promoting the Innovation and Development of Higher Education

### Key takeaways

- The rapid development of Information and Communication Technologies (ICTs), represented by artificial intelligence, big data, and learning analytics, has provided possibilities for innovation and transformation in higher education. Various changes have occurred in the forms of higher education teaching organizations, demands and models of talent development, and modes of higher education management to adapt to the requirements of knowledge economy and digital society for innovation.
- Incorporating online and blended learning into mainstream teaching practices is not without challenges for traditional universities. COVID-19 has prompted a genuine reflection on how to integrate online and blended learning into higher education on a broader scale, where ICT can play a positive and pivotal role.
- Every new international platform faces the challenge of capturing the attention of target users and establishing itself as the preferred learning choice for overseas users. Firstly, it is crucial to prioritize accurate demand verification, especially in terms of course categories and content. While considering domestic demand, it is essential to overcome the tendency to select course categories based on domestic thinking. Secondly, effective publicity and promotion strategies are necessary. Collaborating with internationally renowned platforms can also be beneficial for promotion. Lastly, language-related aspects, such as the platform's language and curriculum language, need to be addressed to ensure seamless communication and learning experiences.
- The learning platform could be built upon some key systems to create a seamless learning environment, catering to the needs of learners through flexibility and personalization. The online learning system provides the desired adaptability and customization, while the online learning settlement authentication system guarantees accurate and effective assessment of learners' progress. Additionally, the big data system utilizes learning data and behavior to drive course iteration and enhancement. Together, these systems ensure a smooth and immersive learning experience for users.
- The question of whether information technology education should be incorporated into higher education teaching has become a key issue. Quality assurance plays a crucial role in this regard, as it is necessary to assess the implementation of courses when designing and developing tools. Additionally, it is essential to establish an ecosystem within institutions that supports the professional development of teachers.

# Smart Learning and the Futures of Education

With the development of cities and the improvement of people's life quality, the overall quality of education is also increasing. Education and cities are closely intertwined, and the development of smart cities and even smart societies in the future is inseparable from smart education. Meanwhile, with the vigorous development of educational informatization, online education has gradually become the new norm in education in recent years. Intelligent means will fully support students' learning, leading to the gradual generalization of classrooms and the blurring of boundaries in future schools. Intelligent technologies are influencing various areas of education and bringing new opportunities and challenges to the future of education.

**Professor ZHONG Binglin** from Beijing Normal University delivered a speech titled "Online Teaching and Learning and the Revolution of Learning". He focused on the forefront of educational reform and analyzed the new opportunities and challenges brought about by online teaching. He explored five aspects: promoting educational equity and quality improvement, changing knowledge acquisition methods and channels, disrupting traditional teaching and learning processes, actively addressing new challenges in online teaching, and embracing the new era of technology and education integration. He explained that online teaching is an inevitable trend in the revolution of learning. In conclusion, he emphasized that schools should actively adapt to the changes in educational forms and the job market brought about by information technology innovation, seize opportunities, meet challenges, and foster collaborative innovation while providing human and intellectual support for the information technology revolution.

## MODERATOR

### Mr XIONG Li

Deputy Director, National Engineering Laboratory for Cyberlearning and Intelligent Technology

## SPEAKERS

### Prof. ZHONG Binglin

Beijing Normal University, China

### Mr MIAO Fengchun

Chief of the Unit for Technology and Artificial Intelligence in Education, UNESCO

### Mr SHAN Zhiguang

Director, Department of Informatization and Industry Development, State Information Center

**Mr MIAO Fengchun**, Chief of the Unit for Technology and Artificial Intelligence in Education at UNESCO, delivered a speech titled "Effective Distance Learning and Tech-enabled Open Schools: UNESCO's Guiding Frameworks." In his presentation, he first introduced UNESCO's initiatives in educational technology, including information and communication technology (ICT) in education policies and overall planning, the ICT competency framework for teachers, open educational resources (OER), mobile learning, artificial intelligence in education, and the UNESCO ICT in Education Prize. He also shared UNESCO's guidance provided to teachers during the pandemic to ensure effective distance learning, as well as the guiding frameworks for tech-enabled open school systems that support technological advancements.

Mr SHAN Zhiguang, Director of the Department of Informatization and Industry Development at the State Information Center, delivered a speech titled "Smart Education: Building an Educationally Intelligent New Era." He mentioned that smart education needs to integrate with digital technologies such as artificial intelligence, big data, Internet of Things, 5G, and blockchain. He emphasized the exploration of new educational models, the promotion of educational system reform and innovation, and the advancement of

smart education. By accelerating the application of various new technologies in education, the goal is to achieve the transformation and upgrade of education development through comprehensive coverage of the entire population, all timeframes, all elements, and all processes in the field of education. The continuous enhancement of digital technologies drives the development of education towards a more humanized, intelligent, and convenient direction.

## Smart Learning and the Futures of Education

### Key takeaways

- Online education can promote equity and improvement in the quality of education. Internet-based teaching models, such as crowdfunding courses, flipped classrooms, micro-courses, and blended learning, have emerged and become practical. These models can overcome the limitations of time and space, allowing students and learners to engage in personalized online learning and access high-quality course resources. They can also expand the coverage of quality educational resources, creating favorable conditions for promoting educational equity and building a learning society
- Online education has changed the way people acquire knowledge and the channels through which knowledge is transmitted. In terms of its impact on schools, it first involves a transformation in the role of teachers. In the context of knowledge transmission evolving from a unidirectional approach to multidirectional interactive exchanges, teachers are transitioning from being knowledge providers to becoming designers, guides, and organizers of student learning activities.
- In the field of school education, we need to leverage technology and ensure that we keep pace with the times even when schools are closed. We can utilize different platforms to accommodate various functionalities. When schools reopen, we need to consider how to integrate online and offline elements, making technology an infrastructure for learning solutions that seamlessly combine technological content with human interaction. We aspire to establish business-oriented education based on schools, ensuring that students can learn effectively in any suitable location. Even in the time of school closures, effective assessment methods are necessary to develop sound instructional frameworks.
- Educational changes in today's era always exceed our imagination. If we lack a deep understanding of the smart era and cling to traditional educational thinking and practices without embracing innovation, it will become the biggest obstacle to the future development of education. Only by following the innovative path of personalized, differentiated, smart, and individualized education can we truly unleash and harness the inherent characteristics and advantages of human nature, and align ourselves with the wave of intelligence.
- Smart education is not simply the digitalization of educational approaches. It should involve a reshaping and reformation of educational methods in the cyberspace. It is a process of reform, innovation, and transformation. Smart education should prioritize human needs and growth, constructing a learning platform and environment that are more conducive to human development in both the physical world and cyberspace.

# Concluding Comments and Follow up actions

**Mr LI Nan**, Director of Department of Science and Education, Ministry of Education, stated that the COVID-19 pandemic has presented unprecedented opportunities and challenges for the development of smart education. It is believed that the outcomes of this conference will provide policy support for education in the post-pandemic era and play a proactive role. The fourth education revolution, characterized by digitization, intelligence, lifelong learning, and integration, is accelerating and will drive profound global education transformation. The pandemic has accelerated the reform of higher education, and the reforms during the pandemic will unfold in three modes, namely, enhanced, blended, and fully online. Faced with the challenges of new technologies and revolutions, as well as significant issues in the public health domain, China is willing to collaborate with countries worldwide to promote research on intelligent education transformation and foster integrated innovation and development in smart education. Together, let us build a closely-knit international community with a shared future for humanity.

**Mr DING Lianpu**, Director of the Mechanism Affairs Office of China Center for International People-to-People Exchange, Ministry of Education, stated that the conference facilitated exchanges and discussions on "educational informatization and the development of smart education" through the internet. It promoted educational exchanges and mutual learning between China and foreign countries, fostering mutual understanding and friendly people-to-people exchanges. The event held at this particular moment holds extraordinary significance in the present reality.

**Mr Tao Zhan**, Director of UNESCO Institute for Information Technologies in Education (UNESCO

## MODERATOR

### Ms LIU Min

Vice Director, Office of International Exchange and Cooperation, Beijing Normal University

## SPEAKERS

### Mr LI Nan

Director, Department of Science and Education, Ministry of Education, P.R.C

### Mr DING Lianpu

Director, Mechanism Affairs Office of China Center for International People-to-People Exchange, Ministry of Education, P.R.C

### Mr Tao Zhan

Director, UNESCO IITE

### Prof. HUANG Ronghuai

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

### Mr LIU Dejian

Chairman,  
NetDragon Websoft Holdings Limited

### Prof. CHEN Guangju

Vice-Director, University Council, Beijing Normal University, China

### Mr Omer Rana

Dean, International for the Physical Sciences and Engineering College, Cardiff University, UK

### Mr Dieter Wilhelm Trau

Dean, School of Engineering and Technology, Asian Institute of Technology

Institute for Information Technologies in Education (UNESCO IITE), pointed out that the COVID-19 pandemic has made more people realize the importance of smart education and digital education. In the process of education's transition towards intelligence, key issues such as educational innovation, education for all, and the innovation process of smart education should be given attention. Not only should technology be used to promote educational development, but the process of educational innovation will also further stimulate technological innovation.

**Professor HUANG Ronghuai**, Co-Dean of Smart Learning Institute of Beijing Normal University, delivered the conference summary report. From 2016 to 2019, Beijing Normal University successfully organized four consecutive Sino-US Smart Education Conferences. In response to the global pandemic, the 2020 Global Smart Education Conference was held in a blended online and offline format. The forum covered topics such as artificial intelligence and future education, smart education in the era of 5G, and the new ecosystem of regional smart education, reflecting the pulse of the times. The conference showcased six major highlights, including diverse participation, efficient dissemination, authoritative voices, impactful achievements, reputable companies and outstanding practices. It comprised 12 thematic forums, featuring 4 academicians and 75 keynote and invited speakers representing 21 countries. More than 150 guests attended, with over 100 from domestic institutions and over 50 from international organizations, attracting an online viewership of over 3 million. During the conference, the Joint Project on Rethinking and Redesigning National Smart Education Strategy was unveiled, consisting of one framework, one training project, and six research reports. The event received support from over 10 co-organizing institutions, over 10 endorsing companies, and approximately 30 influential and authoritative media outlets, including Xinhua Net, which provided live streaming coverage.

## 2020 Global Competition on Design for Future Education

During the closing ceremony, the official launch of the 2020 Global Competition on Design for Future Education was announced. Mr LIU Dejian, Chairman of NetDragon Websoft Holdings Limited, delivered the opening speech for the competition. He shared scientific insights on design and the future, emphasizing that future lifestyles will become more intelligent and that the production of learning content is undergoing changes. Future education should enhance learners' self-directedness, learning abilities, and self-construction capabilities. He expressed the hope that more teachers and students would participate in this year's competition, using their intelligent perspectives to envision the future environment, tools, platforms, and robots for teaching and learning, unleashing their imagination to shape a greater future. It is anticipated that the research institute and more collaborative partners will bring new ideas, creativity, and forms to this year's competition, living up to the expectations of the new era.

**Professor CHEN Guangju**, Vice-Director of the University Council of Beijing Normal University, introduced the background, format, and themes of the Global Competition on Design for Future Education. Inspired by online teaching during the pandemic, the competition will be held online from September to December 2020, based on the concept of "cloud design." The competition will focus on education design in four areas: education under crisis, personalized education, special education, and rural education.

**Mr Omer Rana**, Dean of International for the Physical Sciences and Engineering College of Cardiff University, believed the key idea of design thinking is bringing together the learner and the design process in combination. The purpose on problem-based learning and innovation is a key aspect of this competition. And this will enable us to work globally on solving the global challenges

such as climate change and poverty.

Mr Dieter Wilhelm Trau, Dean of School of Engineering and Technology, Asian Institute of Technology, stated that the COVID-19 pandemic is a big challenge for AIT. It first moved to fully online mode; and from the 2020 fall semester, it

moved to hybrid mode. AIT reinvented instruction, adapted processes and outfitted the classrooms with technologies. He pointed out three guiding principles: continuing AIT's mission in quality education, no delay in education for students, and uncompromised education quality.

## Smart Learning and the Futures of Education

### Key takeaways

- Online education can promote equity and improvement in the quality of education. Internet-based teaching models, such as crowdfunding courses, flipped classrooms, micro-courses, and blended learning, have emerged and become practical. These models can overcome the limitations of time and space, allowing students and learners to engage in personalized online learning and access high-quality course resources. They can also expand the coverage of quality educational resources, creating favorable conditions for promoting educational equity and building a learning society
- Online education has changed the way people acquire knowledge and the channels through which knowledge is transmitted. In terms of its impact on schools, it first involves a transformation in the role of teachers. In the context of knowledge transmission evolving from a unidirectional approach to multidirectional interactive exchanges, teachers are transitioning from being knowledge providers to becoming designers, guides, and organizers of student learning activities.
- In the field of school education, we need to leverage technology and ensure that we keep pace with the times even when schools are closed. We can utilize different platforms to accommodate various functionalities. When schools reopen, we need to consider how to integrate online and offline elements, making technology an infrastructure for learning solutions that seamlessly combine technological content with human interaction. We aspire to establish business-oriented education based on schools, ensuring that students can learn effectively in any suitable location. Even in the time of school closures, effective assessment methods are necessary to develop sound instructional frameworks.
- Educational changes in today's era always exceed our imagination. If we lack a deep understanding of the smart era and cling to traditional educational thinking and practices without embracing innovation, it will become the biggest obstacle to the future development of education. Only by following the innovative path of personalized, differentiated, smart, and individualized education can we truly unleash and harness the inherent characteristics and advantages of human nature, and align ourselves with the wave of intelligence.

## Appendix: Concept note

# Global Smart Education Conference 2020

## AI and Futures of Education

20 - 22 August 2020

## Synthesis Report

### Background

Today, the new round of scientific and technological revolution and industrial transformation is an irresistible trend, and it has sped up the conversion of scientific research paradigms and social governance model. On the one hand, emerging technologies such as the Internet, Artificial Intelligence (AI), Big Data, Cloud Computing, the Internet of Things (IoT) and Virtual Reality (VR) are changing people's way of thinking and living. On the other hand, these technologies can also lead to unprecedented technology ethic issues and significant risks, many uncertainties are shaping our future. Countries including the United States, the United Kingdom, Japan have successively published AI development strategies, ranging from policy plan, industry layout to industry exploration, so as to enhance the integration of intelligent technologies with every area, actively prevent the negative impacts of AI and focus on developing “trustworthy” AI.

Education, aiming at enlightening people, should not only carry forward the spirit and culture of mankind, but also cultivate innovative individuals oriented to the future. The United Nations' 2030 Agenda for Sustainable Development (2016) has put forward the idea of “ensuring inclusive and equitable

quality education to promote lifelong learning opportunities (LLO) for all (SDGs-4)”. To provide extensive insight into educational development for countries across the globe, UNESCO has released reports on the futures of education in succession, including *Learning to Be: The world of education today and tomorrow* (1972), *Learning: The Treasure Within* (1996), *Rethinking Education: Towards a global common good?* (2015). In 2019, UNESCO launched the Futures of Education initiative which looks into the education in 2050 and beyond, attempting to reimagine how education and knowledge can shape the future of humanity in a context of increasing complexity, uncertainty and precarity.

The Chinese government has also published the New Generation Artificial Intelligence Development Plan, Innovative Action Plan for Artificial Intelligence in Colleges and Universities, Education Informatization 2.0 Action Plan, China Education Modernization 2035 Framework so as to provide guidance, objectives and methods for the application of AI in education. The Ministry of Education has selected 10 regions for establishing Smart Education Demonstration Zones, expecting to expedite the exploration of new model, new method and new path to transform education through ICT and intelligent technologies. In recent years, smart education has received increasing attention all over the world. Smart education refers to an educational system with high-quality learning experience, highly adaptable learning content and high teaching efficiency that is provided by schools, regions or countries. As a high-end form of ICT in education, smart education is committed to setting up smart learning environment, exploring new models of learning and teaching, building modern educational system. With the support of information technologies, such as AI, futures of education will open a new chapter in smart education.

Since the beginning of 2020, quite a few schools have adopted online teaching due to the spread of COVID-19 pandemic across the world. After the outbreak, China’s Ministry of Education has launched an initiative “Disrupted Classes, Undisrupted Learning” to integrate high-quality educational resources at school, city, province and country level in order to realize home study of 270 million students through distance education. During the pandemic, the National Engineering Laboratory for Cyberlearning and Intelligent Technology (CIT) and Smart Learning Institute of Beijing Normal University (SLIBNU) have carried out policy consultation, academic research, program research and development, etc., and jointly worked with UNESCO Institute for Information Technologies in Education (IITE) in finalizing and publishing a series of handbooks, covering flexible learning and online education, which helped share Chinese experience and explore new forms of the futures of education with worst-hit regions of the COVID-19.

From 2016 to 2019, Beijing Normal University, jointly with University of North Texas and other institutions have held 4 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. Smart education is expected to play an important role in the society with uncertainties, multipolar world and the intelligence era. 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 under special circumstances, set up international platforms for educational research, exchange and cooperation, press ahead the building of “a community of shared future in cyberspace”, Beijing Normal University, with the approval from the Ministry of Education, will collaborate with international organizations and other Higher Education Institutions (HEIs) to hold the 2020 Global Smart Education Conference on August this year.

## Objectives

This conference is to pool global resources and strength in smart education, forge high-end platforms for exchange and cooperation, facilitate innovative integration of intelligent technologies and education and promote equity in education and personalized growth. With a focus on the shared future for mankind in the intelligence era, it also aims at seeking diverse approaches and possibilities for smart education to promote human development.

## Themes

### 1. New forms of futures of education fostered by AI

As futures of education will be sustained jointly by physical space, social relations and cyberspace, the smart space of human-machines integration may lay the foundation for future schools and Big Data in education will drive the restructuring of educational evaluation system. The unexpected COVID-19 outbreak has indeed sped up the education informatization and intelligentization. There has been a new trend for schools to remove the educational barriers and achieve mutual openness. In addition, the futures of education will be embedded in daily life so that learning can be carried out by anyone anywhere and anytime. Therefore, how to launch massive social experiments on AI in education, formulate efficient policies to fuel the development of AI in education, push forward the formation of new models of learning and teaching, enhance the cultivation of AI-related talents are the prioritized issues in smart education development.

### 2. Promoting educational equity and human development with intelligent technologies (Artificial Intelligence and 5G)

In the intelligence era, the development of education will be targeted at a more equitable standard with higher quality and will attach more importance to the inclusion in education. Intelligent technologies such as AI, Big Data, VR, block chain and 5G will present vital solutions to the issues of education equality. Therefore, the extensive application of intelligent technologies to educational reform and development, as well as the empowerment of teachers, students and administrators, are of great significance in cultivating students' innovation capacity and spirit of cooperation and facilitating personalized and sustainable development for people.

### 3. Achievements and trends of smart village and smart education development

Intelligence is a new production factor of smart society. The basic starting point of smart society is to meet the people's growing requirements for a better life. Based on modern advanced Internet technology, smart village aims to improve farmers' living standards, establish a smart culture and industrial value system, and create a multi-functional business environment. At the same time, the development of smart education will help smart rural areas to access more equitable and high-quality education. In recent years, with the efforts of local governments, smart villages and smart education have some achievement. We need discuss and explore how to further promote them.

### 4. Opportunities and challenges brought by COVID-19 outbreak to global education

The large-scale online education, adopted by millions of students worldwide during the pandemic, is unprecedented in human history. What we are going through may be the biggest program for information infrastructure upgradation, a training program for teachers and students to enhance information literacy, the largest global social experiment for ICT in education and a movement for open educational resources. Governments, schools, experts and enterprises can make concerted

efforts in response to the blow and impacts of COVID-19 outbreak and seize the opportunities presented by this crisis, so that the development of education informatization can be advanced to a new level.

## Organizations

According to the Approval of Hosting 2020 Global Smart Education Conference ((2020) No. 161), the 2020 Global Smart Education Conference has been officially approved by Department of International Cooperation and Exchanges of Ministry of Education, China.

The conference intends to invite Department of Science and Technology of Ministry of Education, National Commission of the People's Republic of China (Chinese NatCom) for UNESCO, and China Center for International People-to-People Exchange (CCIPE), etc. for guidance.

### Hosts

- Beijing Normal University (BNU)

### Organizers

- National Engineering Laboratory for Cyberlearning and Intelligent Technology (CIT)
- Collaborative Innovation Center of Assessment for Basic Education Quality
- China Institute of Education and Social Development
- Smart Learning Institute of Beijing Normal University (SLIBNU)

### Partners

- Arab League Educational, Cultural and Scientific Organization (ALECSO)
- Cardiff University, UK
- Centre for Research and Development in Learning, Nanyang Technological University, Singapore
- Commonwealth of Learning (COL)
- International Association of Smart Learning Environments (IASLE)
- International Society for Technology in Education (ISTE)
- National and Local Joint Engineering Laboratory for Internet Education Data Learning Analysis Technology, China
- National Engineering Laboratory for Educational Big Data, China
- National Research University Higher School of Economics (HSE), Russia
- State Key Laboratory of Virtual Reality Technology and Systems, China
- UNESCO Institute for Information Technologies in Education (IITE)
- UNESCO International Center for Higher Education Innovation (ICHEI)
- UNESCO International Institute for Capacity Building for Africa (IICBA)
- UNESCO International Research and Training Centre for Rural Education (INRULED)
- University of Memphis, USA

### Supporting Enterprises

China Mobile, Elernity, iFLYTEK, Huawei, Tencent, Baidu, Lenovo, Toutiao, XuetangX, Alibaba DingTalk

## Conference Agenda

Due to COVID-19 outbreak, 2020 Global Smart Education Conference will be held both online and offline, including opening ceremony, 12 forums, and closing ceremony.

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

Date	09:00-12:00	14:30-17:30	19:00-22:00
<b>20th August 2020 (Thursday)</b>		Opening Ceremony & Forum on AI and the Futures of Education	Forum on the Futures of Education and Teachers' Capacity Building
<b>21st August 2020 (Friday)</b>	Forum on Smart Education in 5G era	Forum on Governance and Social Perspective for AI Forum on AI and big data in Education	Forum on K12 Education in the Age of Intelligence Forum on Open Educational Resources for Inclusive Education
<b>20th August 2020 (Saturday)</b>	Forum on the New Ecology of Regional Smart Education Forum on Smart Village and Smart Social Development	Forum on International Science Education Forum on ICT Promoting the Innovation and Development of Higher Education	Forum on Smart Learning and the Futures of Education & Closing Ceremony

## Contact Information

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北京師範大學  
BEIJING NORMAL UNIVERSITY



# Global Smart Education Conference 2020

## Smart Learning and Futures of Education

### Synthesis Report

The Global Smart Education Conference 2020, held on August 20-22, explored the theme 'AI and Futures of Education'. This publication is a synthesis of the key discussions, focusing on the transformative power of artificial intelligence (AI) and emerging technologies in education, and examining various topics such as smart classrooms, teacher capacity building, education in 5G era, governance and social perspectives for AI, AI and big data in education, etc. It aims to provide insights into the potential of AI and technology to shape the future of education, foster inclusive learning environments, and promote global educational equity.

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