北京師範大學
BEIJING NORMAL UNIVERSITY

unesco
Institute for Information Technologies in Education

Global Smart Education Conference 2021

Smart Learning and Futures of Education

18 - 20 August 2021

Synthesis Report

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.

Published in 2021 by Beijing Normal University, Changping Campus, Manjing Road, Shahe, Changping District, Beijing, China

Coordinator: ZENG Haijun, MIAO Miao, QIN Zhaohong

Designed and printed by Beijing Normal University

Printed in China

Be in awe of education, for it shapes the soul of human,

Be cautious to technologies, for its adoption has to be effective,

Be entangled with Smart, for the uncertainty tends to be increasing,

Be serious to academies, for the true research needs evidence.

--- HUANG Ronghuai March 20th, 2017

Acknowledgements

This synthesis report has been developed by the Organizing Committee of Global Smart Education Conference, drawing on the Global Smart Education Conference 2021 (GSE2021) held at Beijing Normal University (BNU) and simultaneously online from 18 to 20 August 2021.

We would like to thank the co-chairs of GSE2021, Mr CHENG Jianping, the Secretary of the Party Committee of BNU, and Mr ZHAO Qinping, Academician of the Chinese Academy of Engineering. Thanks also to the co-chairs of the program committee of GSE2021, Mr ZHOU Zuoyu, the Vice President of BNU, Mr ZHAN Tao, the Director of the Institute for Information Technologies in Education (UNESCO IITE), and Mr HUANG Ronghuai, the Co-Dean of Smart Learning Institute of BNU. Special thanks to Mr CHEN Guangju, the Deputy Director of the Council of BNU, for providing consultation and advice, Mr Fengchun MIAO, the Chief of the Unit for Technology and Artificial Intelligence in Education at UNESCO, for inviting speakers and sharing experiences of organizing an international conference, Mr LIU Dejian, the Co-Dean of Smart Learning Institute of BNU, for offering great support.

We extend sincere gratitude to Ms Natalia Amelina, Chief of the Unit of Teacher Professional Development and Networking at UNESCO IITE, Mr ZHU Xudong, Dean of Faculty of Education of BNU, Ms SONG Shanping, Executive Chairman of China Institute of Education and Social Development, and Ms XIN Tao, Executive Deputy Director of Collaborative Innovation Center of Assessment for Basic Education Quality.

Gratitude is also extended to the speakers, moderators, and participants from across the globe, including representatives from governments and international organizations, as well as academic experts and industry practitioners in the field of smart education.

We appreciate the support and guidance from the Department of Science, Technology and Informatization of Ministry of Education of the P.R.C, the National Commission of the P.R.C for UNESCO, the Department of International Cooperation and Exchanges of the Ministry of Education of the P.R.C, and China Center for International People-to-People Exchange Ministry of Education of the P.R.C, etc.

We benefit from the inputs of all the partners, including UNESCO International Research and Training Centre for Rural Education, UNESCO International Centre for Higher Education Innovation, Arab League Educational, Cultural and Scientific Organization, National Research University Higher School of Economics in Russia, Centre for Research and Development in Learning of Nanyang Technological University in Singapore, The International Society for Technology in Education, Commonwealth of Learning, Southeast Asian Ministers of Education Organization, State Key Laboratory of Virtual Reality Technology and Systems, National Engineering Research Center of Educational Big Data, National and Local Joint Engineering Laboratory for Internet Education Data Learning Analysis Technology, and National Engineering Research Center of Robot Visual Perception and Control.

We are also grateful to enterprise, media and supported partners, including Elernity, China Mobile, iFLYTEK, Huawei, UNISEDU, Alibaba Cloud, Tencent Education, XuetangX, People.cn, Xinhuanet, China Education Daily, China Daily, China Youth Daily, Guangming Daily, DingTalk, Tecent News, Bai Jiahao, Bilibili, 101PPT, Yinuo Translation Co., Ltd, Xinshitong, and Jieyi Photograph, etc.

Finally, we would like to express our sincere thanks to the colleagues from the International Communication Group, Advocacy Group, Secretarial Group, Technical Group, and Financial Group of the Organizing Committee of GSE2021.

Organizer

北京師範大學
BEIJING NORMAL UNIVERSITY

Co-organizer

unesco
Institute for Information Technologies in Education

Hosts

北京师范大学智慧学习研究院
Smart Learning Institute of Beijing Normal University

教育部教育信息化战略研究基地（北京）
EDUCATIONAL INFORMATIZATION STRATEGY RESEARCH BASE, MINISTRY OF EDUCATION, P.R.C

中国教育与社会发展研究院
CHINA INSTITUTE OF EDUCATION AND SOCIAL DEVELOPMENT

中国基础教育质量监测协同创新中心
Collaborative Innovation Center of Assessment for Basic Education Quality

CIT National Engineering Laboratory for Cyberlearning and Intelligent Technology

Table of contents

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 2021 (GSE2021) in conjunction with international organizations, universities and research institutions on 18th-20th August 2021. The theme of this conference is “Smart Learning and Futures of Education”. GSE2021 is organized by Beijing Normal University, co-organized by UNESCO Institute for Information Technologies in Education, and jointly hosted by the National Engineering Research Center of Cyberlearning and Intelligent Technology, China Institute of Education and Social Development, Collaborative Innovation Centre of Assessment for Basic Education Quality, Smart Learning Institute of Beijing Normal University, Educational Informatization Strategy Research Base of the Ministry of Education (Beijing), etc.

GSE2021 featured by 9 thematic forums. They are the Opening Ceremony & Forum on AI and Futures of Education, Forum on Smart Education and Digital Resources. Forum on The New Ecology of Regional Smart Education, Forum on Smart Village and Ecological Civilization, Forum on AI and Social Governance, Forum on Big Data in Education and Learning Analytics, Forum on Open Educational Practices and Teachers’ Capacity Building, Forum on Smart Education Empowered by 5G Technology, High-Level Dialogue on New Normal and Sustainable Development for 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 150 Chinese and overseas speakers attended our conference. GSE2021 provided three participant modes, namely, live streaming, main venue and ZOOM meeting. The live streaming of the GSE2021 was watched by more than 5,000,000 viewers.

GSE2021 released the Joint Project on Rethinking and Redesigning National Smart Education Strategy, Project of Teacher Capacity Building with AI and Digital Technologies: E-library for Teachers, Global Competition on Design for Future Education Registration Notice, “Campus for Children” Information Platform, Evaluation Report on Educational Mobile Application - Evaluation Platform, and A Cloud Platform for Test and Analysis of Cyberlearning Products. The book *An Overview of Education Development in the Arab Region: Insights and Recommendations Towards Sustainable Development Goals (SDG)* and the Promotion Ceremony of China Mobile Smart Education Products were also released.

Finally, we are pleased to announce that the Global Smart Education Conference 2022 will be held on August 18th - 20th, 2022. We are already looking forward to next year together, and having the opportunity to connect with our friends again.

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

Held on 18-20 August 2021, this Global Smart Education Conference 2021, which is the focus of this report, involved 148 speakers from 22 countries, including experts from international organizations, academic institutions, and private sectors. The conference included 9 thematic forums and took a hybrid mode with online and onsite sessions. International research outcomes and platforms were released during the event. The conference was also live-streamed and watched by 5 million viewers. The in-depth discussions on Intelligent Technologies Shaping Futures of Education, Intelligent Technologies Promoting Educational Equity and Balance, Coordinated Development of Global Smart Education Strategy, and The New Normal of "Internet + Education" in the Post-Pandemic Era were conducted, which explored the future pathof smart education with an international perspective. This series of forums has aimed to become a sustainable platform to promote knowledge sharing and the achievement of international agreements in the field of smart education.

Intelligent Technologies Shaping Futures of Education

The structure of education may be reshaped due to the advance in intelligent technologies. Future education will be sustained by the space of physics, society, and information, while the teaching and learning mode and school's operating rules will change accordingly as well. In the future, the human-machine collaboration will be a universal form of education that can be applied to various fields and diverse circumstances. To release more transformative power of Smart Education in the global context, the following questions need to be considered: (1) how to formulate policies that effectively promote the development of smart education? (2) how to enable intelligent technologies to empower education and then accelerate the formation of new types of teaching and learning models?

Intelligent Technologies Promoting Educational Equity and Balance

Educational equity is an important guarantee in protecting people's rights and preparing individuals with opportunities to promote free and comprehensive development. Technologies are normally regarded to have critical impacts not only on achieving improving education but on offering solutions for inequity and inadequate education. Technologies such as Artificial Intelligence, 5G, and VR/AR/MR have been employed in curriculums generally in recent years, while these technologies still have ample

margin for improvement in teaching content, methods as well as mode. Therefore, how to generalize high-quality educational resources to remote and impoverished areas through the integration of the Internet and intelligent technologies in a rapid, efficient, and economical way, and to meet the needs of personalized education require further discussions.

Coordinated Development of a Global Smart Education Strategy

The emerging technologies featured by 5G, Artificial Intelligence, Big Data, and Cloud Computing provide approaches to promote economic growth and guide the building of a global educational model. To promote the sustainable development of regional smart education, on the one hand, we should focus on the digital level of curriculums and the informatization of educational resources. On the other hand, the national-level technologic framework for smart education, smart education index, smart learning public services, and technology and standard of smart campus should also be valued to clarify the national-level smart educational strategy, cultivating students' lifelong learning competency to realize the continuous driving force of technology in leading intelligent transformation and development of education.

The New Normal of "Internet + Education" in the Post-Pandemic Era

In the wake of COVID-19, "Internet + Education" has become a critical part of school education. The hybrid model of in-person learning with online learning as a supplement has also been generated. "Internet + Education" not only provides us with ways to solve current educational problems, but also supports the education system by measures like promoting the sharing of educational resources, bridging educational gaps, and solving individualization problems. With the help of information technology, a novel educational service model has formed with its features of multi-participation, the combination of online and offline models, as well as integration of curricular and extracurricular services. These all promote science and technology to serve the educational industry and make it thrive with inclusive and equitable quality.

Forum Structure

The Global Smart Education Conference 2021 was structured around the following 9 thematic forums:

- **AI and Futures of Education**

  This forum highlighted the issues on Internet+education, technology-supported education, computers in smart education and futures of smart education. The Joint Project on *Rethinking and Redesigning National Smart Education Strategy and Global Competition on Design for Future Education Registration Notice 2021* were released.

- **Smart Education and Digital Resources**

  This forum highlighted the issues on the integration and development of information technology and education in the digital era, and provided guidance and suggestions for teachers' growth. A panel discussion on *How Smart Education and Digital Resources are Changing the Futures of Education* was also conducted to talk about the ways digital materials support teachers and students. The project of *E-library for Teachers-Teacher Capacity Building with AI and Digital Technologies* was released.

- **New Ecology of Regional Smart Education**

  This forum conducted in-depth discussions on the construction of smart education demonstration zones in several provinces in China, regional education informatization

and the Construction and Prospect of Smart Education in Construction of Educational New Infrastructure were also conducted for a close look at China's path toward smart education.

- **Smart Village and Ecological Civilization**

  This forum highlighted the issues on building smart (regional) communities, rural sustainability supported by smart technologies and rural school management. Speakers from China, Thailand, Pakistan, Philippines and Bhutan shared specific practices of smart rural development and sustainability from their contexts.

- **AI and Social Governance**

  This forum highlighted the issues on cutting-edge technologies of AI, social computing in the ternary sector, balanced urban and rural education, and intergenerational fairness of intelligent applications. The "Campus for Children" Information Platform was released. A panel discussion on *Exploring AI and Social Governance in China* was also conducted.

- **Big Data in Education and Learning Analytics**

  This forum highlighted the issues on big data in education management, data-driven education evaluation, interactive behavior analysis of online education discourse, data-intensive research and paradigm change, etc. Insights on AI/data-supported precision teaching and individualized learning were also shared.

- **Open Educational Practices and Teachers' Capacity Building**

  This forum shared insightful perspectives on open educational resources and open educational practice toward quality teaching and learning. A book on *An Overview of Education Development in the Arab Region: Insights and Recommendations Towards Sustainable Development Goals (SDG)* was released.

- **Smart Education Empowered by 5G Technology**

  This forum highlighted the issues on new education infrastructure, application of 5G technology in smart education, 5G technology-supported smart evaluation, and the development of education informatization and education modernization in different regions. The Promotion Ceremony of China Mobile Smart Education Products was held.

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

  Speakers from China, Russia, UK, Thailand, USA, Singapore and UNESCO were invited to conduct in-depth discussions on the New Normal and Sustainable Development for Education, involving issues such as the development of high-quality education, learning during COVID-19, the role of technologies and data in sustainability.

Opening Speeches

Speakers at the opening ceremony spoke about how to empower education with technology and the development of smart education for a sustainable future. They are **Ms Stefania Giannini**, the UNESCO Assistant Director-General for Education; **Professor ZHAO Qinping**, the Academician of the Chinese Academy of Engineering; **Professor DONG Qi**, President of Beijing Normal University; **Mr LEI Chaozi**, the Director of the Department of Science, Technology and Informatization; and **Mr QIN Changwei**, Secretary-General of the Chinese National Commission for UNESCO.

Ms Stefania Giannini, UNESCO Assistant Director-General for Education, made the opening remarks from the view of the effective and equitable usage of technologies, which has taken center stage in education policy debates. She said "From the perspective of UNESCO, the design and usage of technology should be in the service of people, to enhance human capacity, to protect human rights, and to ensure sustainable development, which is also the core values promoted by The Recommendation on the Ethics of Artificial Intelligence, to be adopted by the UNESCO General Conference in November 2021. Smart learning and the future of education come with major ethical responsibilities. Cooperating with partners, UNESCO is committed to a more balanced regulation that supports public governance".

MODERATOR

Prof. ZHOU Zuoyu
Vice President, Beijing Normal University, China

SPEAKERS

Ms Stefania Giannini
UNESCO Assistant Director-General for Education

Prof. ZHAO Qinping
Academician of Chinese Academy of Engineering

Prof. DONG Qi
President, Beijing Normal University, China

Mr LEI Chaozi
Director of the Department of Science, Technology and Informatization

H.E. Mr Azat Atayew
Vice Minister of Education, Turkmenistan

Mr QIN Changwei
Secretary-General of the Chinese National Commission for UNESCO

Mr ZHAO Qinping, an Academician of the Chinese Academy of Engineering, stated that as one of the supporting technologies of smart education, virtual reality has made the teaching environment more intelligent and the teaching process more visualized, as well as spawned new teaching and learning models. Experimental teaching based on virtual simulation has become

a typical teaching model supported by intelligent technology. As the ultimate approach to education, the integration of VR, AI, and 5G will have a transformational impact on future education. He hoped that people can create a new field for future education by promoting the construction of VR infrastructures and developing a digital twin.

Faced with new situations and problems, the Chinese government has released a series of policy documents to actively develop smart education, highlight the needs to construct a high-quality education system, and support and lead the modernization of education with information technology and AI. **Professor DONG Qi**, President of Beijing Normal University, stated that intelligent technology had brought us into a new era. The integration of AI and the Internet with education will reshape the future of education. He added that BNU is willing to cooperate more extensively with the global scientific and educational communities to promote equality and balanced development in education and advance all round development and individualized growth of people, as such that high-quality education can benefit more people and contribute to the common well-being of mankind.

In 2019, the Ministry of Education of China initiated the project "Demonstration Zone for Smart Education," with 18 regions across the country have been approved to launch it. This move aims to enhance the integration of smart technology and education and spawn in-depth and systemic changes in education. **Mr LEI Chaozi**, Director of the Department of Science, Technology, and Informatization of the Ministry of Education, emphasized that the essence of smart education is to educate and guide students to "have ambitious goals, acquire noble virtues, become eminent persons and assume great responsibilities" and enable them to assume the crucial task of national revitalization. He stated: Smart education should continuously transform and upgrade through exploration and practices. Therefore, it is necessary to promote the construction of new educational infrastructures in networks, platforms, resources, campus life, application, and security, create an environment that strongly supports educational innovation and high-quality educational development, provide more flexible and individualized services, improve education governance capabilities in the AI era, and enhance the overall development of smart education.

China is the world's largest education provider and ranks in the upper-middle range across the globe in terms of educational development. Sharing lessons learned in educational reform and development and contributing Chinese wisdom and solutions to the globe is not only the expectation of the international community but also the responsibility of China as a major country that aims to promote the building of a community with a shared future for mankind. **Mr QIN Changwei**, Secretary-General of the Chinese National Commission for UNESCO, stated that China would actively promote the implementation of the Education 2030 Agenda, become more deeply involved in global educational governance, dedicate meticulous efforts to building multilateral platforms for international educational collaboration, and contribute to advancing educational development in the AI era.

Joint Project on Rethinking and Redesigning National Smart Education Strategy

On August 20, 2020, the 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 coordination.

Due to the huge blow of COVID-19 outbreak to 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 to 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 to the futures of education and exploring the solutions of infusing ICT into education 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 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 the 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 techniques of smart campus. It aims to provide recommendations on the technical architecture of smart campus and solutions for the smart campus construction.

Each sub-project will be led by at least two organizations with collaborative research with more partners and the countries with typical situations will be chosen for case analysis. Prof. Huang appealed for the participation of other relevant units, research institutes and academic organizations as collaborative partners.

As the Secretariat of the project, SLIBNU has been engaged in research on smart education and published several papers and books on smart education. During COVID-19 outbreak, SLIBNU also worked with UNESCO IITE and other international institutions in finalizing and releasing a series of handbooks that have been translated into diverse languages and promoted around the world, covering "handbook on facilitating flexible learning", "guidance on active

learning at home", "guidance on flexible learning", "guidance on open educational practices", "guidance on personal data and privacy protection", etc. Meanwhile, SLIBNU held quite a few international conferences such as US-China Smart Education Conference in search of the latest research outcomes and development trends in smart education. It is expected that smart education will play a vital role in society with uncertainties, in the multipolar world and in the age of intelligence.

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 blockchain 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, a 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 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 for 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 4 (SDG4) and Education 2030 proposed by UNESCO.

The successful launch of the Joint Project on Rethinking and Redesigning National Smart Education Strategy will further advance the research and development of smart education worldwide and open a new chapter for the development of global smart education.

2021 Global Competition on Design for Future Education Registration Notice

Hosted by Beijing Normal University, the 2021 Global Competition on Design for Future Education (GCD4FE) is scheduled to be held from June to November 2021. The registration channel will be open from June 1st. With the theme of "Inclusive Education", the competition is divided into two categories, for college students and for primary and secondary school teachers around the world, to conduct the online competition and case-studies collection in the form of "Cloud Design". It is hoped that creative ideas on future education will be gathered from global teachers and students in different schools and fields to better cope with the uncertainties and challenges in the future and explore innovative solutions for quality education for all.

Competition Themes: This competition aims to provide solutions that can help to achieve inclusive education. The main themes of the competition are:

Education in crisis: To overcome challenges, such as crises and natural disasters, new solutions should be designed to improve distance education for everyone, ensuring equity education during unexpected situations.

Personalized education: Students differ in their characteristics, so they behave differently while learning. Therefore, it is important to design solutions that can cater to the different needs of learners, and provide personalized learning according to each student profile.

Special education: Several students with special needs are now being excluded from the learning process, due to several reasons, including a lack of assistive technologies, and accessible learning platforms and resources. Therefore, it is important to design solutions for students with special needs.

Rural education: Several students in rural areas are dropping out of school due to several reasons, including poverty, long distance between their home and school, and lack of quality learning/teaching resources. Therefore, it is necessary to design effective learning and teaching solutions to facilitate the educational process in rural areas.

Competition Introduction: Since its launch in 2018, co-hosted by Beijing Normal University and world-renowned organizations and universities, Global Competition on Design for Future Education has been successfully held for 3 consecutive years, and it has received wide attention and warm responses from participants worldwide. The competition in 2018 was held in Beijing, in which over 50 students from more than 10 universities in China participated and completed their design projects about the future of education through teamwork. The competition in 2019 was held simultaneously in China, Serbia and Tunisia, with nearly 1,000 participants registered in the three countries. In China, the number of participants covered more than 10 vocational colleges and 31 universities in 16 provinces and cities. In 2020, the competition was carried out online through the form of “Cloud Design” for the first time, with a total of 537 college students from 157 colleges and universities in 13 countries and regions and 28 provinces in China enrolled. The 2021 competition will continue to offer an interactive opportunity for interdisciplinary and global communication to further rethink, reflect and reshape the future of education.

AI and Futures of Education

Smart Education, as an important part of the smart society, should be based on the current situation while also providing support for the new era. It means that education should be human-oriented and pay attention to the cultivation, rather than simply the materials and teaching process. Two of the core topics of this conference were "how to promote technological progress with high-quality education and innovative talents to support and lead sustainable development" and "how to empower education with technology, reduce students' burden, and improve students' learning ability". The experts put forward their views from different perspectives.

Professor CHEN Li, Vice President of Beijing Normal University, mainly elaborated on the connotation of "Internet + Education" and required efforts to promote its innovation. She stated: The Internet has become the third space for education and teaching, and "Internet + education" is the starting point for educational reforms brought about by informatization as well as a new move to update educational concepts, reform educational models, and promote educational innovation and development to promote "Internet + education," we should focus the following six efforts: constructing an online educational space, leveraging the value of educational data, exploring new models for practices integrating online and offline education, regularizing new forms of online education, promoting reform of education systems and mechanisms, and updating educational and teaching concepts.

As the initiator of the Program for International Student Assessment (PISA), **Mr Andreas Schleicher**, Director for Education and Skills,

MODERATOR

Mr CHEN Guangju
Vice President, Beijing Normal University, China

Mr JIAO Hao
Director of Overseas Science Research Cooperation Office, Beijing Normal University, China

---

SPEAKERS

Prof. CHEN Li
Vice President, Beijing Normal University, China

Mr Andreas Schleicher
Director for Education and Skills, OECD

Mr Wushour Silamu
Academician of the Chinese Academy of Engineering

Ms Asha S. Kanwar
Chairman & CEO, COL

Mr SUN Maosong
A Foreign Member of the European Academy of Sciences

Mr XU Wenwei
Director of Board and President, Institute of Strategic Research, Huawei

Mr LIU Geng
General Manager, China Mobile (Chengdu) ICT. Co., Ltd.

Mr Simon L.K. Leung
Vice Chairman & Executive Director, NetDragon Websoft Holdings Limited

Organization for Economic Cooperation and Development (OECD), has been committed to improving educational quality and equality. He believed the COVID-19 pandemic had brought digital technology from the margin to the center in the field of education. Technology not only diversifies teaching methods, but also empowers students with more skills. Intelligent data, assisting robots, blockchain, and some other technologies have great potential in intelligent diagnosis, personalized learning, and intelligent evaluation. “Only when students want to learn, manage themselves with the correct method and get the hang of learning strategies can technology play an effective role," Schleicher said.

Mr Wushour Silamu, an Academician of the Chinese Academy of Engineering, attended the Forum on Artificial Intelligence and the Future of Education and delivered a report entitled "Smart Education Governance and New Models." He believed that in the future, smart education will be improved from two aspects: Intelligently providing teaching content and creating AI courses to improve the reserve of teachers based on the accumulation of scenario data and research findings acquired with high-quality teaching methods, as well as image recognition, speech recognition, and adaptive technology; understanding the individual needs of each student, and enabling personalized learning based on intelligent technologies (e.g., knowledge graphs), global big data of students and correlation analysis models, and data on students' basic information and behaviors.

Ms Asha S. Kanwar, Chairman, and CEO of the Commonwealth of Learning (COL) proposed that smart education should highlight five Es, namely, enjoyable, engaging, efficient, effective, and ethical. Smart education must enable high-quality teaching and learning, and ensure that students can benefit from and apply what they have learned, earn a living, and deal with the uncertainty of the future.

Mr SUN Maosong, a foreign member of the European Academy of Sciences and Professor at Tsinghua University, believed artificial intelligence oriented towards online education and teaching should establish a social network or even a nationwide online space, and explore and construct machine learning algorithms based on educational big data and large-scale knowledge graphs for curriculum to thoroughly establish correlations between courses, digital literature libraries, and digital book libraries, provide technological support for cross-language education, construct VR, AR, and virtual laboratories, and build smart teaching assistants and the AI ethics for teaching based on what is mentioned above.

Mr XU Wenwei, Director of Board and President of the Institute of Strategic Research, Huawei, believed the essence of smart education is to cultivate children's innovation and practical ability, ensure students' physical and mental health, reduce family burden and anxiety, and achieve educational equity. Facing the future, experienced teaching will be shifted to digital-supported teaching, one-size-fits-all learning will be shifted to personalized learning, resources will be sent intelligently rather than manually search, and the focus of management will shift from school to regional integration.

Mr LIU Geng, General Manager of China Mobile (Chengdu) ICT. Co., Ltd, believed the role of 5G in promoting smart education is reflected in three aspects: new facilities, new applications and new ecology. China Mobile provides high-speed, stable, green, secure, manageable and controllable cloud-network integrated infrastructure services, helping campus networks transform from discrete and fragmented networks to converged and unified networks. With the support of new infrastructure, it is time to promote the deep integration of technology and education scenarios, and empower the transformation of teaching mode, classroom form and learners' cognitive mode.

Mr Simon L.K. Leung, Vice Chairman and Executive Director of NetDragon Websoft Holdings Limited, highlighted blockchain for education. He shared several advantages of blockchain, such as highly scalable network architecture to host the ever-growing studentand educator community, adhering to country-specific user data privacy requirements, leveraging proven encryption tech, etc. He introduced the eLMTree's Ecosystem. The Initial use cases lay the groundwork for token economy enabling equitable access to robust marketplace of educational content and services. Under the proposed blockchain-enabled model, individual owns their data; users enable specific profile indicators to be shared, with access rights auditable on network; users receive tokens based on sponsored content viewed and surveys completed.

AI and Futures of Education
Key takeaways

- The talent shortage is a bottleneck that needs to be solved urgently in the development of China's virtual reality industry. To meet the needs of the virtual reality industry application and industrial development, it is necessary to establish a multi-level and multi-type professional talent training and its system, carry out interdisciplinary and school-enterprise collaborative talent training, vigorously cultivate multidisciplinary talents, and do a good job in talent reserve for future virtual reality education teaching and research.
- We should pay attention not only to "teaching", but also to "education". The development of smart education should be people-oriented, pay close attention to the changes in psychological conditions, adaptability and deep needs brought by the application of intelligent technology to teachers and learners, and create an educational atmosphere with humanistic care to promote the healthy development of smart education.
- New generation of information technologies such as deep learning, big data and virtual reality is used to build learner-centered smart education environment and a new and more personalized education model.
- To give full play to the revolutionary impact of information technology on education development, we should actively explore new models of education governance and talent training under the conditions of "Internet +" and "artificial intelligence +", and accelerate the innovative development of smart education.
- New educational policy should be shaped by experimenting and ground-breaking schools where innovative teaching and learning in digital environments take place.
- MOOCs are an effective means to solve the problem of educational equity. It has five basic characteristics:
    - the knowledge points, knowledge organization mode and learning mode with "short video (10 minutes) + interactive exercises" as the basic teaching unit;
    - instant feedback from interactive exercises;
    - personalized services based on learning big data;
    - social networks to interact and communicate;
    - weekly organized course. On the other hand, MOOCs still have shortcomings. For example, the intelligent scoring methods of subjective questions are insufficient. Teacher-student interaction on MOOC platforms is not enough.

Smart Education and Digital Resources

The construction of digital education resources is the foundation for carrying out informationized and networked education. Under the background of the era of big data, with the gradual penetration and integration of information technology into the field of education, the importance of digital educational resources continues to increase, and a new form of future teaching materials is gradually bred. The deepening integration of information and communication technology (ICT) and artificial intelligence (AI) with digital resources not only promotes the construction of visual learning resources and promotes global knowledge sharing and co-learning, but also provides an impetus for supporting teachers' continuous growth and teaching ability improvement in the era of smart learning.

Mr Getachew Engida, Former Deputy-Director General of UNESCO, believed sustainability calls for innovation, which comes from systematic thinking, new ways of working and ever-changing technologies for complex problem-solving. He noted that the realization of the 2030 Agenda for Sustainable Development has a long way to go, which requires innovative cooperation mechanisms and initiatives, and the international community to join hands to jointly release the great power of science and technology and innovation.

Mr XIONG Li, CEO of NetDragon, pointed out that with the wide application of information technology in the field of education, the importance of digital educational resources has been increasing and has become a key element of educational development. Many countries, including China, are vigorously promoting the development and utilization of digital education resources. To accelerate resource production,

MODERATOR

Mr CHEN Emil
Vice Dean, Smart Learning Institute of Beijing Normal University; Vice President of NetDragon

Ms Natalia Amelina
Senior National Project Officer in Education; Chief of the Unit of Teacher Professional Development and Networking, UNESCO IITE

SPEAKERS

Mr Getachew Engida
Former Deputy-Director General of UNESCO

Mr XIONG Li
CEO of NetDragon

Prof. Christopher Dede
Harvard University

Mr Joseph South
Chief Learning Officer, ISTE

Mr Sanjaya Mishra
Education Specialist, COL

Prof. Isak Froumin
Head & Professor, HSE Institute of Education, Russia

ROUNDTABLE SPEAKERS

Mr Jorge Cauz
CEO, Encyclopaedia Britannica Group

Ms Leana Li
Editorial Director, Humanities and Social Sciences, Regional Director for Books of Springer Nature

Mr Masaaki Isozu
President & CEO, Sony Global Education, Inc.

Mr Danimir Mandic
Dean, Faculty of Teacher Education, University of Belgrade

Mr ZHANG Ze
Deputy Editor-in-Chief, Higher Education Press

Mr QIAN Feifei
Head of Sales, LEGO Education in China

Mr John Collick
Head, International Education Strategy for NetDragon

NetDragon launched a global digital education resource production base last year to carry out resource R&D and production, and deliver high-quality resources to more countries.

Professor Christopher Dede from Harvard University gave a presentation on *Designing Education to Achieve Intelligence Augmentation (IA) via Artificial Intelligence (AI)*, and shared his views on the current status of the application of AI in education. He introduced a coordinated suite of AI technologies based on the functional roles of human teachers, including Content Tutors, Question Answering Teaching Assistant, Virtual Laboratory Research Assistant, Literature Review Research Assistant, Formative Assessment Assistant and Social Networking Assistant. He also talked about how new technologies are helping education during the pandemic. AI can help find patterns in large datasets of student behaviors, simulate authentic behavior by virtual humans and assess performance-based outcomes to support personalization.

Mr Joseph South, Chief Learning Officer of International Society for Technology in Education (ISTE), delivered a speech *on Smart Education Framework: Three Leverage Points for National Leaders to Modernize the Digital Learning Eco-system*. He stated that Smart Education Framework has three leverage points: Transformative Teaching and Learning Enabled through Technology; Digital Learning Environments Conducive to Smart Education; and Forward-Thinking Governance and Policy Initiatives. He shared new lessons learned during COVID-19, including building a resilient system, bridging the digital gap and interoperability of education software.

Mr Sanjaya Mishra, Education Specialist of Commonwealth of Learning, gave a presentation on *Smart Education: A Policy Perspective.* He believed that it is very important for all people to have access to quality education, and it is necessary to formulate policies for smart education. For smart education, he listed several policy areas for consideration, including organization and management, human resource development, equity and inclusion, infrastructure and connectivity, curriculum development, teaching and learning, etc.

Professor Isak Froumin, Head and Professor of HSE Institute of Education, talked about *Smart School: Different Ways to Different Models*. Based on his experience in Russia, he shared construction ideas for different models of smart schools, providing a reference for the digital transformation of global education. Based on the data, he concluded that what people need to pay attention to about the data-driven personalized support for schools is the usage of ICT by teachers and students, which is the most important area for improvement. He also believed real home-school collaboration is crucial for start of more student-centred and personalized teaching.

Panel Discussion: Futures of Education and Technology-Digital Resources and Futures of Teaching and Learning

In the panel discussion, speakers discussed how smart education and digital resources could change the futures of education, including **Mr Jorge Cauz**, CEO of Encyclopaedia Britannica Group; **Ms Leana Li**, Editorial Director Humanities and Social Sciences, Regional Director for Books of Springer Nature; **Mr Masaaki Isozu**, President and CEO of Sony Global Education, Inc.; **Mr Danimir Mandic**, Dean at Faculty of Teacher Education of University of Belgrade; **Mr ZHANG Ze**, Deputy Editor-in-Chief of Higher Education Press; **Mr QIAN Feifei**, Head of Sales at LEGO Education in China; and **Mr John Collick**, Head of International Education Strategy for NetDragon.

Participants in the panel discussion shared opinions on various issues, including how the new emerging technologies help transform education, what will be the forms of textbooks for future educators and learners, what is the core of creating creative and intelligent future schools based on the co-existence of AI and human being, how will blockchain become the future of maintaining and managing transcript and high-security data in education, what are the new teaching approaches and educational sets that can encourage STEAM education, how digital teaching material assist in reaching the underage learners, how can the integration of information and communication technologies in classrooms and the creation of distance education systems promote equity and balance in the post-pandemic era, what are the major determinants hindering highly efficient digitalization of teaching resources, etc.

Some key points arising from these issues are:

- One of the most important aspects of being in the digital education space is not the habit that knowledge is, but the amount of data that the technology yields. It allows us to build ever more evolving products at a faster pace. It also provides great accountability for the learning environment, so the teacher has more information to react to have better remedies.
- The future for textbooks needs to be digital, agile and accessible seamlessly both across the world and across devices and languages.
- For the future textbook, what we're going to do is try the best to catch up with the technological development and the research community. The students need to prepare themselves for the future to come.
- It is also up to the policymakers what is made available for students or researcher communities to access the international pool of knowledge on the internet.
- All men should be able to achieve reality. It will become most effective when the students themselves are using XR to construct knowledge and to construct landscapes worlds in which to symbolically embed their learning.
- For education equity, it is very important to increase the internal and external motivation of students and pupils. We have to find out what kind of complex evaluation or student work will be appropriate to develop new methods, forms, and new education or technology.
- Issues on time investment and capital investment by companies, somehow, hinder the development of digital resources.

Furthermore, teachers don't have the relevant internal driving force for the development of digital education resources. Finally, there is no good model to finance the various kinds of investment in digital resources. The sustainable development mode for digital education resources has not been formed.

Teacher Capacity Building with AI and Digital Technologies: E-library for Teachers

About the project

Teachers are essential to the achievement of Education 2030 and SDG4 in ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. Meanwhile,teaching becomes an ever-challenging professional area in the digital age, as proven once again by the COVID-19 pandemic. To meet the educational needs of different countries, UNESCO IITE and NetDragon (China) jointly initiated the project “Teacher Capacity Building with AI and Digital Technologies: E-library for Teachers”. It was officially released at Global Smart Education Conference 2021 (GSE 2021) in Beijing, China on August 18, 2021.

The Project will develop open educational resources in various languages, including English, Russian and Arabic. Around 100,000 educators in Africa, Asia, Eastern Europe, the Middle East, and the CIS will benefit from educational training, interactive communication, and resource construction. In addition, global and regional partnerships will be built in selected countries, enterprises, and educational organizations to empower teachers in quality and equitable education.

The supporting partners

Since its launch in March 2021, many partners have gravitated toward this Project. As of this release at the Forum on Smart Education and Digital Resources of GSE 2021, it has attracted official partners, including the education departments of Serbia, Thailand, and Tunisia, organizations such as the Commonwealth of Learning (COL), Arab League Educational, Cultural and Scientific Organization (ALECSO), and Go-Lab Initiative, and companies such as Autodesk. The Project will start with resource sharing and expand its cooperation with international organizations and enterprises and draw more partners for quality services to teachers and learners around the world.

In the online project release video, a representative of the Serbian Ministry of Education expressed his support for the project and highlighted its importance to the educational community. Professor Danimir Mandic from the University of Belgrade "AI, VR, and physics simulation are emerging technologies well utilized in education. Therefore, Serbia needs well-trained teachers and a sophisticatedly designed E-library for Teachers. This is very important for teachers and students in Serbia". Zhan Tao, Director of UNESCO IITE, and Xiong Li, CEO of NetDragon, also expressed their strong support for the establishment of the E-library for Teachers. "Faced with COVID-19, we are more convinced than ever that digital education is the future and will benefit all learners."

The current situation

Last year to accelerate this cause, NetDragon launched the construction of a global digital educational resource production base in Fuzhou, Fujian. The aspiration was to unite more enterprises on the value chain for resource R&D and production and let more countries enjoy high-quality fruits. UNESCO IITE and NetDragon will further strengthen their cooperation on the Project to support quality teaching and provide a better lifelong learning model for teachers and learners worldwide.

See https://iite.unesco.org/news/e-library-for-teachers/

Smart Education and Digital Resources
Key takeaways

- Building a solid knowledge base, starts, first and foremost, with ensuring the provision of quality education for all. In this connection, the international community must provide normative and operational capacity-building support to countries in developing inclusive, quality education systems that promote lifelong learning for all.

- To address the challenge of the skill shortage and mismatches between the companies that are seeking and what most universities are producing, we must support partnerships between academia and industry in the field of converging technologies to reorient academia towards problem-solving and remove the barriers between disciplines that currently hinder innovation.

- For the futures of education, new technologies such as big data, artificial intelligence, and virtual reality will be used to better realize "personalized teaching", more respect for the needs of learners, and develop in the direction of the "3E", that is more effective, efficient, and entertaining.

- Digital technology is reshaping the education system today. It is a lesson learned from the COVID-19. We are never so confused as to the date that education will go digital for everyone while teachers must be the first to be empowered by modern technologies, including digital technology and online technology.

- Technology is at the service of all humans. We must deliver and utilize it whenever it is used, whenever it is required, whenever it is demanded, and whenever it is better developed.

- The publisher has the obligation to deliver better content, better instruction of frameworks and various assessments.

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.

Regional Demonstration of Smart Education

The Regional Demonstration of Smart Education is a pioneering exploration of smart education in China, which is closely related to accelerating the modernization of education and building educational power. **Mr REN Changshan**, Dean of Education Information Technology and Network Security Division, Department of Science, Technology and Informatization, Ministry of Education of P.R.C, highlighted the Construction of Regional Demonstration Zones. He introduced the exploration of environment, model, service and governance in each demonstration zone since the Ministry of Education launched the "Smart Education Demonstration Zone" project in 2019. Such work has effectively promoted the innovation and development of regional smart education.

Professor WANG Zhuzhu from Central China Normal University delivered a speech on Exploration and Practice of Smart Education. She has been working in the field of education for

MODERATOR

Mr WU Fati
Director, Engineering Research Center of Digital Learning and Public Service in Education, Ministry of Education, P.R.C

Mr LI Yushun
Faculty of Education, Beijing Normal University, China

Prof. GUO Jiong
Vice Director, Educational Informatization Strategy Research Base (North-west), China

SPEAKERS

H.E. Mr ZHONG Denghua
Dean, Education Information Technology and Network Security Division, Department of Science, Technology and Informatization, Ministry of Education, P.R.C

Prof. WANG Zhuzhu
Central China Normal University

Prof. WU Di
Executive Deputy Director, Educational Informatization Strategy Research Base, Ministry of Education, P. R. C

Mr CAI Jile
Associate Editor, China Education Daily

Mr LONG Guoying
Deputy Mayor, Nanchang of Jiangxi Province, China

Mr YING Ruoping
Senior Inspector, Education Department of Hunan Province, China

Mr WANG Shaolong
Deputy Director, Xingqing District Education Bureau, China

Mr ZHOU Lin
Vice Director, Education Committee of Dongcheng District of Beijing, China

Mr LIN Ping
Senior Researcher, Guangzhou Education Bureau, China

Ms WU Yinghui
Dean, Haidian Institute of Education Sciences of Beijing, China

Mr KONG Fanchao
Vice Director, Hexi District Education Bureau of Tianjin, China

Mr GONG Weidong
Vice Principal, Shenzhen Senior High School Group, China

Mr CHEN Yonghong
Vice President, Unisplendour Corporation Limited (UNIS)

Mr LIU Gang
Director, Alibaba Cloud E-learning

Mr HU Longgen
Vice General-Manager, Department of Government and Enterprise Educational Business in China, Huawei

PANEL DISCUSSION SPEAKERS

Mr LI Ming
Director, Yuncheng Municipal Education Bureau, Shanxi Province, China

Ms MIU Yaqin
Vice Director, Changsha Municipal Education Bureau, Hunan Province, China

Mr ZHANG Shuanglong
Vice Director, Public Service Bureau of Xiong'an New Area, Hebei Province, China

Mr MA Tao
Head, Smart Education, Municipal Education Bureau, Hubei Province, China

Mr AI Wei
Researcher, Hubei Institute of Education Science, China

Ms AO Jing
Director, Office of Smart Education Promotion of Wuhou District, Chengdu, Sichuan Province, China

Mr XIE Weimin
Director, Nanchang Municipal Education Bureau, Jiangxi Province, China

Mr YE Shuwen
Vice Director, Chenghua District Education Bureau, Chengdu City, Sichuan Province, China

Mr HOU Yuandong
Director, Wenzhou Educational Technology Center, China

Mr LIU Xiuyuan
Vice Director, Qingdao Educational Equipment and Information Technology Center, China

Mr HUANG Jiatao
Vice Director, Yichang Education Information Technology Center, Hubei Province, China

Mr XU Jian
Vice Director, Educational Information Strategy Research Base (Central China)

many years. She summarized the development process, main paths, characteristics and main progress of smart education in China, and elaborated on six relationships that need to be handled in the promotion of smart education construction, namely, "the relationship between regional development and school development, the relationship between students' personal terminal use and online learning space, the relationship between teaching mode reform and learning space expansion, the relationship between data acquisition, presentation and use, the relationship between technology application and technology ethics and the relationship between technology and people.

Mr CAI Jile, Associate Editor of China Education Daily, introduced the focuses of education informatization dissemination from four aspects,namely, validity, humanity, sharpness and freshness. "Validity" highlights media integration and adheres to a rigorous and scientific attitude. The content is in-depth and instructive. "Humanity" strengthens people-centered news and pays special attention to the main body of educators, leaders of education administrative departments, school principals, and front-line teachers. "Sharpness" emphasizes topic selection and planning. It also pays attention to observing society and problem-oriented breakthrough. "Freshness" adheres to the front line and observes and analyzes with a comprehensive, dialectical and objective vision. It also has the courage to face the pain points of the development of education informatization and is good at making suggestions.

Rethinking the Construction of Regional Smart Education

Mr LONG Guoying, Deputy Mayor of Nanchang of Jiangxi Province, gave a presentation on *Promoting Educationl Evaluation Reform with Smart Recruitment as Breakthrough*. She introduced the situation of regional smart education in Nanchang. Smart enrollment empowers education decision-making and evaluation as the breakthrough point. Smart examination drives comprehensive quality evaluation as the application point. Smart operation improves education supervision and evaluation as the expansion point, with the aim to solve the problem of Nanchang's education evaluation reform.

Mr YING Ruoping, Senior Inspector in the Education Department of Hunan Province, talked about the practice and experience of Education Informatization 2.0 in Hunan province. He introduced the practical exploration of Hunan as a pilot province of national education informatization 2.0 in tackling basic difficulties, integrating and innovating application. It solves development shortcomings, forms work highlights, and improves the development level. To realize digital transformation and upgrading, we adhere to a development model that featured open development and systematic exploration, integrated development and the building of an ecological sharing system, and innovative development.

Mr WANG Shaolong, Deputy Director of Xingqing District Education Bureau, talked about the “Internet + education” mode in Xingqing Demonstration Zone of Ningxia Hui autonomous region. A UGBS cooperation model with "Internet +" is established. "U" refers to universities (providing intellectual support such as scientific research services and product research and development). "G" refers to the government (providing platform services such as platform building and policy guidelines). "B" refers to enterprise (building environments such as facilities and equipment and technical support). "S" refers to school (integrating applications such as teaching services and integrative development). This mechanism is supported by informatization experts from Ningxia Artificial Intelligence Education Research Institute of Central China Normal University. The Education Department of the autonomous region and the Xingqing Government has built a platform for the future university, introduced excellent Internet enterprises to invest in equipment and technical services for free, and promoted the deep integration and development of "Internet + education" in schools through centralized services from universities, governments and enterprises.

Mr ZHOU Lin, Vice Director of Education Committee of Dongcheng District of Beijing, introduced the development path of smart education in Dongcheng district. In recent years, Dongcheng district has been trying to explore how to use smart education to help improve the level of regional education. In the second half of 2020, it focused on "data-driven teaching and learning reform" and launched the "Data Brain" project, which has completed the organization and analysis of nearly 300 types of historical data in stock. As of the first half of 2021, 81 units in Dongcheng district have opened the smart campus platform, and 40 units have implemented the full application and promotion of smart campus.

Mr LIN Ping, Senior Researcher of Guangzhou Education Bureau, introduced construction of smart education from several aspects, including carrying out smart training and artificial intelligence education to improve the information literacy of teachers and students; carrying out teaching reform for all subjects to explore new teaching models; establishing a smart evaluation system with Guangzhou characteristics to carry out comprehensive quality evaluation of students. The aim is to solve the major and difficult problems of education reform and promote the high-quality development of education in Guangzhou in the future.

Ms WU Yinghui, Dean of Haidian Institute of Education Sciences of Beijing, introduced the construction and development of the smart education demonstration zone in Haidian District from the aspects of building smart classrooms, resource platforms, live broadcast platforms and artificial intelligence laboratories, which effectively promoted the deep integration of teaching and learning. For example, Haidian district organizes schools and front-line teachers to use resources in the practice of new teaching and learning models of information integration, guides the change and development of teaching and learning models, and evaluates the process of teaching and learning to promote the iteration of resources. The district also builds a teacher cyberspace that gathers teachers from various schools by the principle of a real-name system, and restores real education, teaching, teaching and research, and scientific research scenarios.

Mr KONG Fanchao, Vice Director of Hexi District Education Bureau of Tianjin, focused on Smart Education and Smart Future in Tianjin. Hexi District in Tianjin has carried out a preliminary exploration of smart education from six aspects, including the policy system, target system, supply system, teaching system, curriculum system and sharing system. The future construction of the

smart education demonstration zone will comprehensively promote not only the reform of teaching methods and the intelligence and modernization of education governance, but also the reform of assessment methods, focusing on formative assessments, value-added assessments and comprehensive evaluation.

Mr GONG Weidong, Vice Principal of Shenzhen Senior High School Group, introduced the Welkin school (a cloud school) in Shenzhen. He demonstrated eight smart scenarios such as live interactive classroom, ubiquitous personalized learning, and multi-teacher training and research in Shenzhen Cloud School, which will complete the process of teaching, learning, and research, and form a new form of education and teaching.

Smart Education Advanced by New Educational Infrastructure

Professor WU Di, Executive Deputy Director of Educational Informatization Strategy Research Base, Ministry of Education of P. R. C, analyzed and interpreted the new education infrastructure policy recently proposed by China. He pointed out six key construction directions based on introducing the background and policy of the new education infrastructure. He also demonstrated how the new education infrastructure supports the construction of a new smart education ecology with the cases from Wuhan, Changsha, Nanchang, Yinchuan and others. He believed, during the 14th Five-Year Plan period, the construction of new education infrastructure must be the basic support for building a high-quality education system, which is of great significance for integrating new technologies, expanding new momentum, creating new supply, expanding new demand, and promoting digital transformation.

Mr CHEN Yonghong, Vice President of Unisplendour Corporation Limited (UNIS), gave a detailed presentation on UNIS's construction of new education infrastructure. UNIS has built a smart education platform based on "chip-cloud-network-edge-end", and created localized smart education equipment from chip to cloud, integrating software and hardware, to support the development of China's new education infrastructure. Under the double-reduction policy, with the help of education information technology, UNIS aims to reduce the burden on students, empower teachers, help to improve the quality and efficiency of classrooms, and meet the educational needs of students at different levels. UNIS will not only introduce more education informatization products to the classroom to improve classroom efficiency and help improve teaching quality and efficiency, but also improve the quality of school teaching and service level, meet students' after-school service needs, standardize off-campus training institutions, reduce family education expenses and parents' burdens, and allow students to learn better.

Mr LIU Gang, Director of Alibaba Cloud E-learning, demonstrated Alibaba Cloud's exploration and practice in digital infrastructure from the aspects of trusted security, platform system, innovative applications, digital resources, and smart campus. Its DingTalk Platform could be regarded as a digital infrastructure promoting innovative practices. Take digital resources as an example, with digital teaching aids and supporting digital resources, DingTalk promotes the supply-side structural reform of digital resources and provides services such as course assistance, resources and tools.

Mr HU Longgen, Vice General-Manager of Department of Government and Enterprise Educational Business in China, Huawei, shared the construction and experience of Huawei Smart Education Demonstration Zone. He introduced the "Five Ones" support system for HUAWEI cloud and network terminals in detail to explain the coordinated development of smart education

according to local conditions. He believed the development of smart education is inseparable from the support of theory, from the exploration of practice. Huawei looked forward to more people participating in the construction of smart education.

Panel Discussion 1: How to Promote the High-Quality Development of Education with Construction of Smart Education

Since the launch of the "Smart Education Demonstration Zone" project, the exploration and practice of smart education have been rising day by day, setting off a new vision and new realm of deep integration and development of education informatization. More and more excellent practices and achievements have emerged in the architecture and foundation generation of regional smart education, new technology empowerment, application ecological development, design of mechanism innovation, collaborative culture creation, key business integration, process reconstruction and reengineering, talent training innovation, etc., which has greatly promoted the new process of modernizing education according to aptitude and personality development, accumulated advanced experience and excellent cases that can be promoted, and provided valuable wealth for supporting and leading educational modernization with education informatization.

In the morning panel discussion, we would like to perceive and share this process with you, focus on the current theme of education development, and explore how to promote the high-quality development of education with smart education. Participants in this panel discussion include **Mr LI Ming**, Director of Yuncheng Municipal Education Bureau, Shanxi Province; **Ms MIU Yaqin**, Vice Director of Changsha Municipal Education Bureau, Hunan Province; **Mr ZHANG Shuanglong**, Vice Director of the Public Service Bureau of Xiong'an New Area, Hebei Province; **Mr MA Tao**, Head of Smart Education, Municipal Education Bureau, Hubei Province; **Mr AI Wei**, Researcher of Hubei Institute of Education Science; and **Ms AO Jing**, Director of Office of Smart Education Promotion of Wuhou District, Chengdu, Sichuan Province.

Participants in the panel discussion shared opinions on the following four issues:

- The value of regional smart education in promoting the high-quality development of China's education in connection with the construction of demonstration zones
- How to rely on the construction of regional smart education to implement and support the realization of the "double-reduction" policy
- How to leverage the advantages of the work at demonstration zone to implement the online teaching of "undisruptive learning"
- How to carry out the improvement of teachers' information literacy to train teaching and research talents, chief information officers (CIOs) and other talents needed for the development of smart education

Selected discussions from the first issue

- The city of Yuncheng adheres to the principle of high-quality education and the concept of "Internet + education" platform, and strives to build a new regional education system for the future. The city's education has achieved high-quality and rapid development. Firstly, environmental construction is the foundation to realize the interconnection of regional, urban-rural

and inter-school networks. Secondly, platform support is the key to the establishment of city and county education cloud space, municipal education cloud space, achieving the collection, exchange and sharing of county-level resource information. Thirdly, high-quality resource supply is the core to optimize the quality of resource supply. Finally, integrated application innovation is where to make a breakthrough.

- The city of Changsha takes smart education as the starting point to promote the all-round reform of education and teaching governance services. The digital transformation of education is promoted through informatization-supported talent training system and the reform of public education service system, improving the quality of talent training as a whole.

Selected discussions from the second issue

- In Wuhou district of the city of Chengdu, the characteristics of Smart Classroom are concluded as context immersion, group exploration, confident expression and technology empowerment. One of the highlights of the practice of smart education is the connection of the physical resources of the campus to enrich students' extracurricular learning scenes. At the same time, a comprehensive education base of the water transport park has been built outside the campus, including five major functional areas (national defense, science and technology, labor, health and aesthetics), creating personalized learning spaces and opportunities for students in Wuhou district on weekends and holidays. It truly promotes the comprehensive and personalized growth of children.

- Relying on the construction of regional smart education, the city of Yuncheng mainly promotes the implementation of double-reduction from four aspects. The first is accurate analysis and adaptive teaching. The second is to vigorously promote blended learning methods to realize students' independent switching between learning scenarios inside and outside the school, and virtual and real ones. The third is the training mode of innovative talents. The fourth is to build a bridge for home-school co-education.

Selected discussions from the third issue

- During COVID-19, the city of Wuhan immediately launched the air classrooms on Wuhan Education Cloud, explored the deep integration of information technologyand education, and started online teaching. The situation of online teaching in Wuhan: the municipal level provides policy guarantees and action guidelines, establishes a four-level teaching promotion system with city-level overall planning, district-based, school implementation, and class implementation. It also establishes a city-level research and judgment mechanism, an air classroom review and inspection system. Relying on cloud video interactive technology and the application of teaching and research, the air classrooms are comprehensively upgraded in 2021 to provide services for relevant teachers and students in the city.

Selected discussions from the final issue

- For education administrative cadres and principals, Xiong'an New District in Hebei province has adopted the way of "going out" to learn in advanced areas since 2019 to enhance information literacy and smart education management capabilities. Some ways of teacher training are as follows: trainings were conducted county by county

and school by school. In a series of training organized by new districts, counties and schools, well-known experts were hired to improve teachers' information literacy. In addition, the existing platform will be used to strengthen online teaching and research activities, such as the establishment of 50 master teacher studios, and the launch of online after-school activities, so that teachers (among the best teachers) in the new district can demonstrate their information literacy and ability in the context of smart education.

- The improvement of teachers' information literacy is carried out from three levels. At the first level, the division of responsibilities is clear, and the communication between superiors and subordinates is ensured. At the second level, the CIO system must be selected and trained. Strict requirements for personnel recruitment are set and the trainings are also strengthened. The third level is the unity of people and things.

Panel Discussion 2: The Prospect of Smart Education in Construction of Educational New Infrastructure

Recently, the Ministry of Education and other six departments issued the "Guiding Opinions on Promoting the Construction of New Education Infrastructure and Building a High-quality Education Support System". It is well-known that "new education infrastructure" is an important part of the China's new infrastructure, a driving force for educational reform in the information age, and a strategic measure to accelerate the modernization of education and build a strong country in education. Therefore, at the afternoon panel discussion, we would like to discuss the construction and prospect of smart education in the context of new education infrastructure. Participants in this panel discussion include **Mr XIE Weimin**, Director of Nanchang Municipal Education Bureau, Jiangxi Province; **Mr YE Shuwen**, Vice Director of Chenghua District Education Bureau, Chengdu City, Sichuan Province; **Mr HOU Yuandong**, Director of Wenzhou Educational Technology Center; **Mr LIU Xiuyuan**, Vice Director of Qingdao Educational Equipment and Information Technology Center; **Mr HUANG Jiatao**, Vice Director of Yichang Education Information Technology Center, Hubei Province; and **Mr XU Jian**, Vice Director of Educational Information Strategy Research Base (Central China).

Participants in the panel discussion shared opinions on the following four issues:

- How to better promote the construction and development of regional smart education with the support of a "new education infrastructure" policy
- How to make full use of the achievements of the new generation of information technology and new infrastructure construction in modern education governance, and what are the attempts and explorations
- How the demonstration zones rely on information technology to solve the problem of "after school time", and what are the initiatives
- What measures have been adopted to implement the relevant policy requirements of the Ministry of Education in the process of promoting the construction of regional smart education demonstration zones

Selected discussions from the first issue

- The city of Nanchang actively builds an efficient, safe and stable education "new infrastructure" system through the "six major constructions". The first is to

The city of Nanchang actively builds an efficient, safe and stable education "new infrastructure" system through the "six major constructions". The first is to promote the construction of an education private network featuring "5G + optical fiber". The second is to promote the construction of a platform ecosystem featuring "cloud service and application". The third is to promote the construction of high-quality digital resources featuring "VR teaching resources". The fourth is to promote the standardization of smart campuses featuring "district-school integration". The fifth is to promote the construction of innovative applications featuring "smart homework". The last is to promote the construction of network security prevention featuring "active defense".

- In the city of Qingdao, the first is to optimize and improve Qingdao's education network because Qingdao has built a fiber-optic education network that reaches all schools. The second is to deeply build the Internet to form a big platform. Qingdao has built an Internet + education platform called Qingdao Education E Platform, which has fully integrated the decentralized information system of schools and interconnected with Qingdao public security, health, civil affairs, housing and other platforms. The third is to further focus on classroom teaching, develop intelligent teaching tools, gather and share high-quality resources, build a free online teaching system, and provide free online learning support for all teachers and students.

Selected discussions from the second issue

- Chenghua district in the city of Chengdu uses the achievements of a new generation of information technology and new infrastructure construction to promote the modernization of regional education governance. The main idea is to make full use of information technology and education big data analysis, such as integrating education cloud platform through the integration of school, teacher, student behavior data, and cooperating with Chenghua givernment through the integration of data resources from government, schools, enterprises and others. A new system of data-driven modern education governance will be established, providing scientific and effective ways and paths for modern governance.

- In the city of Wenzhou, Big Data was established in 2017. It also started 151 R&D data engineering projects. By 2020, on this basis, Wenzhou has built the Wenzhou Education Cloud Digital Brain. In 2021, the digital reform of Zhejiang Province has allowed Wenzhou Education Digital Brain to be implemented as soon as possible, so the application and governance end of Wenzhou Education Brain have been recently launched. Wenzhou Education Digital Brain is based on Wenzhou City Brain. Because it has achieved multi-department, cross-business data collaboration, Wenzhou City Brain can provide data support for ordinary people and education decision-makers. Therefore, on this basis, the entire system built by the digitalization of education in Wenzhou is called 1+3+X. 1 refers to one data center, 3 refers to one governance service center, one resource digital service center, and one future service center.

Selected discussions from the third issue

- Chenghua district of the city of Chengdu, the first is to improve the quality and efficiency of the school. Only by

continuously improving the quality of school education and teaching, promoting the all-round development of students, and meeting the expectations of parents can we fundamentally implement the double-reduction policy. The second is to use information technology to comprehensively and accurately analyze students' learning performances, optimize students' homework design, do a good job in personalized guidance, comprehensively reduce the total amount and duration of students' homework, and reduce students' excessive homework burden. The third is to further strengthen and standardize the off-campus training market.

- In the follow-up work promotion process, we can use some of our advanced technologies, such as big data, artificial intelligence, etc., to provide more accurate data services for our after-school through technical means. After we are equipped with the ability to accurately understand the curriculum, institutions and participants outside the school through data and technology, we can better provide more targeted, personalized, or smart services for teachers, students and parents with the double-reduction policy.

Selected discussions from the final issue

- In the process of education informatization practice, the city of Yichang has explored a set of institutional systems called "one regulation and three systems". That is five-year plan of Yichang education informatization (regulation) and the three institutional systems of fund guarantee, team building, supervision and assessment. Specifically, combined with the real situation of Yichang, experts in education informatization in colleges and universities, experts in smart city construction, education managers in cities and counties and representatives of front-line backbone teachers are hired to jointly develop education informatization development plans.

- The city of Nanchang has adopted the following four measures: monitoring the working mechanism, assuring capital investment, focusing on propaganda and paying attention to network security.

New Ecology of Regional Smart Education
Key takeaways

- The construction tasks of the "Smart Education Demonstration Zone" are conducted in six dimensions. Firstly, in terms of information literacy, with curriculum and practice as the core idea, pathways and mechanisms should be built for the comprehensive improvement of information literacy of teachers and students. Secondly, in terms of deep integration, new teaching models should be explored to promote the deep integration of information technology and education as well as teaching practice. Thirdly, in terms of accurate assessment, the learning process data are used to improve the accuracy of students' comprehensive quality evaluation. Fourthly, in terms of teaching services, personalized teaching with data interconnection and integration should be constructed to support service environment. Fifthly, in terms of resource supply, collaborative innovation mechanism should be adopted to improve regional education resource supply and service capabilities. Lastly, in terms of governance level, new technologies such as AI and big data should be used to improve modern education governance capabilities.

- The launch of new education infrastructure will help accelerate the construction of a new ecosystem of education in the intelligent era, including the ecosystem of educational intellectual resource services and ubiquitous and lifelong learning.

- The construction of new education infrastructure is of great significance. On the one hand, the new education infrastructure can strongly support the construction of a high-quality education system. The results of education informatization development in recent years, especially during the pandemic, highlight the important role of infrastructure. On the other hand, as an important application scenario of new infrastructure, education is of great significance for integrating new technologies, expanding new momentum, creating new supply, expanding new demand, and promoting digital transformation.

- Building the new ecology of smart education should first accelerate the closed loop of data and leverage the value of education data. Then, the classroom services should be supported to promote deep integration and application. Next is to focus on adaptive teaching to accelerate the reform of the learning system. Lastly, the promotion of outcomes should be attached with great importance to developing benchmarking demonstration projects.

- The mechanisms to strengthen and ensure the sustainable development of smart education are concluded in the following 5 aspects: (1) led by the vice mayor and coordinated by all departments of the city; (2) funds raising through multiple channels to ensure funding investment; (3) strengthen top-level design and policy support; (4) led by well-known experts to support professional development; (5) strengthen exchanges and learning, and popularize advanced experience.

- The construction of education informatization focuses on the classroom teaching needs of primary and secondary schools, promotes the intelligent improvement of classroom teaching mode, and meets the improvement needs of teaching application systems. Through the dual-teacher classroom teaching system, small-sized classes and remote teaching are carried out in the form of combining on-site and online teaching. The teaching process is recorded and uploaded to the resource platform to form a recycling of teaching resources and achieve high-quality resource sharing.

Smart Village and Ecological Civilization

This forum focuses on rural development and sustainability. By sharing cutting-edge theories and successful cases, the forum discusses the cross-border integration of rural development and wisdom, as well as strategies and programs to promote rural revitalization and sustainable development during the COVID-19 pandemic. A network for strengthening partnerships and an initiative for establishing a center of excellence for rural revitalization and education were also launched.

In his opening speech, **Professor Muhammad Yunus**, Chairman of Yunus Center AIT, believed education is a basic project for mankind to face the future. What kind of education we pass on to the next generation will create what kind of world. Education fosters students' creative thinking, and creative thinking can support students to create a better world. If education is going in the wrong direction, then we will create a world out of order, and humanity may suffer as a result. We are very pleased to see the establishment of a center of excellence for rural revitalization and education, which will bring more value and contribution to the whole society, and also help us nurture the next generation of leaders, creating a safer, fairer and more inclusive world.

Professor ZHOU Zuoyu, Vice President of Beijing Normal University, pointed out that one of the key factors for China's success is the Chinese government's strong commitment to poverty eradication, which is also a key pillar for sustainable development. The rapid development of quality education is crucial to poverty eradication. Playing a leading role in teacher education in China, Beijing Normal University has long been concerned about rural

MODERATOR

Ms ZENG Xiaodong
Executive Director, UNESCO INRULED

Ms LIU Jing
Director, Office for International Exchange and Collaboration, Beijing Normal University, China

SPEAKERS

Mr Muhammad Yunus
Chairman of Yunus Center AIT

Mr ZHOU Zuoyu
Vice President, Beijing Normal University, China

Ms Ethel Agnes P Valenzuela
Director, SEAMEO

Mr ZHU Xudong
Dean, Faculty of Education, Beijing Normal University, China

Mr Faiz H. Shah
Director, Yunus Center AIT

Mr Suriyan Vichitlekarn
Executive Director, Mekong Institute, Thailand

Ms XU Xiuli
Professor, China Agricultural University

Ms Suleeporn Bunbongkarn Choopavang
Director, Foreign Affairs Department, Chaipattana Foundation, Thailand

Mr Sukich Udindu
Director, SEAMEO Regional Centre for Sufficiency Economy Philosophy for Sustainability

Ms Analiza C. Diaz
Science Research Specialist, Philippine Council for Agriculture, Aquatic and Natural Resources, Research and Development (PCAARRD)

Ms LU Yao
Deputy Director, ASEAN-China Education and Training Center, Yunnan Agricultural University, China

Mr Ghaffar Ali
Associate Professor, Shenzhen University, China

Mr Jackson Dukpa
Founder, Global Village Connections (GVC)

Ms Aashiyana Adhikari
Research Associate, Centre for South Asian Studies, Nepal

Mr YANG Zanbo
Principal, Dian Nan Middle School, China

education, and has jointly supported the *International Research and Training Center for Rural Education* with UNESCO to carry out targeted research and education for rural transformation projects. It has been proven that China's implementation of solid and effective education reforms is the foundation for poverty eradication through education and skill development.

Ms Ethel Agnes P Valenzuela, Director of SEAMEO Secretariat, noted that the world is undergoing technological change and becoming more and more dependent on technology. Southeast Asian countries are using technology in the field of education. Smart education and learning in Southeast Asia can provide borderless education and learning opportunities, and can also enable us to reduce costs and integrate various platforms. At the same time, it can be seen that smart cities are also emerging in the entire Southeast Asian countries. To better meet the challenges posed by growing urban populations, governments in Southeast Asia adopt technology and digital solutions. SEAMEO, its 26 sub-centers and 11 member countries participate in it. Eight associate members and seven affiliates also work together to ensure better policies are implemented on smart education.

Professor ZHU Xudong, Dean of the Faculty of Education from Beijing Normal University, believed smart villages are essentially data-driven villages, including but not limited to rural government affairs, commerce and services, which support the Internet to promote the construction of digital village governance systems. Smart village driven by digital village is the spatial model concept of the rural village, which adapts to the development of future villages. It is a new model of cross-border integration that is innovative, could be implemented, and takes a leading and exemplary role. The new model can effectively promote rural revitalization.

As the representative of Yunus, **Mr Faiz H. Shah**, the Director of Yunus Center AIT, believed smart communities need smart leaders. In detail, he suggested 3 ways. The first way is to understand ecological civilization from the digital age perspective to close the gap in understanding

what IS smart. The second way is to map the learning needs of rural communities to revitalize them. The third way is to create tiered practical learning models that prepare smart leaders. He also introduced "The Yunus Masters" - a trans-disciplinary program delivered in hybrid mode - that integrated the training of Business Development & Practice targeted to smart leaders.

As the representative of Yunus, **Mr Faiz H. Shah**, the Director of Yunus Center AIT, believed smart communities need smart leaders. In detail, he suggested 3 ways. The first way is to understand ecological civilization from the digital age perspective to close the gap in understanding what IS smart. The second way is to map the learning needs of rural communities to revitalize them. The third way is to create tiered practical learning models that prepare smart leaders. He also introduced "The Yunus Masters" - a trans-disciplinary program delivered in hybrid mode - that integrated the training of Business Development & Practice targeted to smart leaders.

Mr Suriyan Vichitlekarn, Executive Director of Mekong Institute, introduced the Capacity Development and Lancang Mekong Cooperation, Smart Rural Communities, Smart Cities, Smart Industries, Smart Regional Community. He also shared Mekong Institute's approach and contribution to regional cooperation and integration. He believed capacity development is evolving and should be integrated into regional cooperation and integration processes.

Professor XU Xiuli from China Agricultural University introduced international development cooperation and economic and technical cooperation among developing countries from "importing" to "going out". By summarizing the experience of the "Small Technology, Big Harvest" project, she suggested that future project design should pay attention to the formation of local working teams, strengthening capacity building, infrastructure construction, technology sharing, strengthening mechanism construction, carrying out learning-oriented monitoring and evaluation, and promoting the construction of diffusion mechanisms.

Ms Suleeporn Bunbongkarn Choopavang, Director of the Foreign Affairs Department of the Chaipattana Foundation, Thailand, delivered a speech on The “New Theory” Farming System for Rural Development and Sustainability in Thailand and Beyond. She introduced the "New Theory" farming system. The first stage of the "New Theory" is to enable farmers to become self-reliant. The second stage is to encourage farmers to work together by forming groups or cooperatives.

Panel Discussion: Smart Rural Development and Sustainability

Mr Sukich Udindu, Director of SEAMEO Regional Centre for Sufficiency Economy Philosophy for Sustainability, introduced the "Village Living Lab", which can be used to research a lot of ideas and let students experiment with their ideas. He also shared his view on the "Sufficiency Economy Philosophy". It is a new thinking focused on self-reliance. In the village living lab, it means "Start where you are, Use what you have, and Do what you can".

Ms Analiza C. Diaz, Science Research Specialist from Philippine Council for Agriculture, Aquatic and Natural Resources, Research and Development (PCAARRD), introduced a study on understanding farmers' willingness to adopt mobile applications, which aimed to fill the gap and help the government achieve SDGs, help bamboo farmers cope with COVID-19, increase their income/livelihood conditions, and improve management of bamboo resources. She concluded that for farmers and other sectors, the adoption of mobile app technology could be a new marketing strategy, as it will allow them to expand their market reach. The overall willingness to adopt the app is affected by the simplicity of the user interface.

Ms LU Yao, Deputy Director of ASEAN-China Education and Training Center, Yunnan Agricultural University, believed digital agriculture is a network that has realized the transformation of traditional agriculture. She introduced the flower industry and pointed out that digital technology can help us save 50% of losses in the processing process, reduce transportation costs by 30%, reduce 24-hour transaction time, and improve the freshness of flowers by 30%. The government and enterprises have cooperated to establish the first digital flower overall industry chain platform, which has promoted the rapid development of Kaiyuan digital agriculture and can better combine production and market conditions.

Mr Ghaffar Ali, Associate Professor from Shenzhen University, China, gave a presentation on China Pakistan Economic Corridor and Prospects of Food Industry in Pakistan. He believed value addition of agricultural commodities can be enhanced by strengthening the existing cooperative model, carrying out skill development campaigns in rural areas, providing credit facilities (easy and less costly), and engaging rural youth.

As the founder of the Global Village Connections (GVC), **Mr Jackson Dukpa** delivered a speech on Global Village Connections Initiative – the Way Forward for a Better World. He introduced GVC's objectives, domains, 12 thematic projects, etc. He highlighted three immediate priorities, namely, global food security, climate change, the implementation of smart waste management.

Ms Aashiyana Adhikari, Research Associate of the Centre for South Asian Studies, Nepal, introduced gender inequality in South Asia and the connection between women and rural development. She believed, in many rural areas, women are actually responsible for household food security, but women's contribution to rural production or food security is largely ignored, especially at the macro policy level. Their contribution is not well considered in agriculture or rural development reform. Policymakers can better promote gender equality and empower women when making decisions, and need to invest more in girls' education.

Mr YANG Zanbo, Principal of Dian Nan Middle School at Xiongan New District, China, shared his view on Understanding Rural Schools Management: Insights Inspired by Dian Nan Middle School. He pointed out that the school has gradually changed the development of rural schools by strengthening teacher management to deepen informatization, carrying out in-depth home visit activities, implementing the mentoring system for home visits and improving family education. He noted that, in the future, we should seize the opportunity of smart education and deepen home-school co-education.

Smart Village and Ecological Civilization
Key takeaways

- Modern and digital technology, if properly adopted, promises a transformative impact in agriculture from farm production to marketing. Increased investments in technologies like mobile apps are made to help smallholder farmers yield far-reaching benefits long after the pandemic has passed.

- Smart education is not only about technology but also approaches, investment and partnerships for inclusive development.

- Several methods are summarized on how to promote the development of rural schools. For example, it is suggested to enhance the sense of identity of parents, students and the masses with the school. Another is to seize the opportunity of developing smart education in the region, integrate informatization into moral education, teaching methods and classroom and teacher management.

- With different social systems, economic levels and cultural conditions, the strategies and paths of rural modernization in various countries must be different. Developing a rural revitalization strategy suitable for the national conditions is of great significance for achieving diversified sustainable development. It also provides a richer perspective on international exchanges and mutual construction.

- The Accelerated Transforming of the Global Landscape has three stages. The first stage is Globalization - consolidating economic interests across diverse geographies. The second stage is Urbanization - transition to cities because of economic opportunities and infrastructure. The third stage is Digitalization - instant information transfer leading to lightning-speed transactions.

- Smart social business leaders can be developed through digital learning communities. They will be equipped with the ability to spearhead rural revitalization. Three factors are suggested to be considered for training Smart Rural Leaders for the Digital Age: (1) Enterprise-led Development & Ecological Civilization. Wealth creation and social development go hand-in-hand to revitalize rural communities; (2) Socia/ Business as Social Anchor. Social business boosts creativity and resilience, and also channels giving; (3) Adaptive & Innovative Options. Learning communities promote social business to open new opportunities.

AI and Social Governance

Artificial intelligence is the high-end achievement and wisdom of human scientific and technological development. As a strategic technology leading the future, artificial intelligence is not far from us. It is not only applied at the technology or research and development level, but also developed into an indispensable infrastructure for the future. The specific scope of AI governance should be the formulation and implementation of AI ethical norms for management and implementation, as well as the establishment and implementation of specific mechanisms such as maintenance, supervision, and accountability under the standards of AI ethics. Society has entered into the era of artificial intelligence, and calls for a new governance concept and form.

Mr CHEN Guangju, Vice Director of the University Council of Beijing Normal University, noted that the integrated application of intelligent technology in education and teaching is the need of the new era. With the new model of "artificial intelligence + social governance", it is essential to guide the development of artificial intelligence norms, promote data sharing, improve data quality, and formulate technical application specifications that conform to data security and data ethics.

Mr WANG Yaonan, an Academician of the Chinese Academy of Engineering, elaborated on the trend of intelligent technology, application cases, new needs of society, and the next development of AI around the topic "AI's Innovative Empowerment of Social Applications". He believed that the development of AI can be divided into three categories: data, computing power, and hardware. With the support of these three elements, AI will become a lot more useful, play an important role in various fields, promote

MODERATOR

Mr LI Wen
Director, Office of Think Tank Management, Neijing Normal University, China

Mr CHEN Guangju
Vice Director, University Council of Beijing Normal University, China

Mr LV Peng
Professor, Central South University, China

SPEAKERS

Mr CHEN Guangju
Vice Director, University Council of Beijing Normal University, China

Mr WANG Yaonan
Academician of the Chinese Academy of Engineering

Mr LIU Ting
Director, Faculty of Computer Science and Technology, Harbin Institute of Technology, China

Mr TANG Yayang
Secretary, Party Committee, Hunan University of Science and Technology, China

Ms TONG Lili
Vice Director, Educational Informatization Strategy Research Base (Beijing)

Mr GAO Yue
Professor, University of Surrey, UK

Mr Tore Hoel
Researcher, Oslo Metropolitan University, Norway

Mr SHU Huaying
Professor, Beijing University of Posts and Telecommunication, China

Mr WU Shuilong
Professor, Beijing Institute of Technology, China

Mr LEI Mingyu
Director, Technology and Standards Research Institute, China Academy of Information and Communication Technology, China

Mr LV Mingjie
Senior Researcher, Research Centre for AI Social Experiment of ZhiJiang Lab, China

Mr WANG Bin
CEO, Beijing Yundiantang Tech Co., LTD, China

the development of smart education and create a better future for education.

Mr LIU Ting, Director of the Faculty of Computer Science and Technology of Harbin Institute of Technology, delivered a speech on *Three-Dimensional Space: a Case-study of Social Media Observation and Prediction*. The report focuses on exploring the synergy between the three core elements of matter, spirit and information, hoping to allocate material space and guide spiritual space through information space, and use affective computing technology to make social media observations based on ternary space, carry out social media prediction based on consumption mining technology, and carry out precise governance by social computing means.

Mr TANG Yayang, Secretary of the Party Committee and Professor at Hunan University of Science and Technology, analyzed the current governance dilemma of smart rural education in terms of concepts, basic conditions and resource supply. He proposed four specific paths to promote the development of smart rural education. The first is to change the concept, based on the global vision and the second centenary development goal to achieve rural revitalization. The second is to strengthen infrastructure construction and achieve interconnection. The third is to strengthen the supply of teachers and teaching resources. The fourth is to create a system, humanism, economy and natural environment for smart rural education, and strive to build a new form of rural education.

Ms TONG Lili, Vice Director of Educational Informatization Strategy Research Base (Beijing), focused on the *Improvement of Intergenerational Equity of Smart Education Applications with the Optimization of Algorithm*. She analyzed the new situation of AI education governance from the international, national and industry levels. She also introduced the application of intergenerational equity brought by algorithm optimization with several cases such as top algorithm, unsupervised learning algorithm, and domain adaptive algorithm, and put forward the specific direction of the next step of educational intelligent technology based on social needs and technical dilemmas to promote educational equity, improve education quality, optimize education governance, and consolidate the software and hardware and technical foundation.

Professor GAO Yue from the University of Surrey believed the mature application of 5G technology in various industries and the integration and collaboration of 6G wireless technology with artificial intelligence, big data, VR, XR and other

technologies will make it possible to create an interconnected teaching environment and improve the teaching experience.

Mr Tore Hoel, Researcher from Oslo Metropolitan University, highlighted how to ensure the privacy of AI education applications and clarify the boundaries of information use. He suggested that the entire life cycle of AI should be operated and maintained, and a good ethical environment for AI education and application should be established to further improve its reliability and safety.

Panel Discussion: Approach to Artificial Intelligence and Social Governance

It is proposed by experts to strengthen legislation and supervision, consolidate the underlying infrastructure construction, establish boundary awareness as well as brake mechanisms, fault-tolerant mechanisms, distribution mechanisms and dual-mode mechanisms.

Professor SHU Huaying from Beijing University of Posts and Telecommunication talked about the development path for the future. At the national level, it is suggested to give loose space for innovative development. Relevant departments should intervene in advance, and synchronize the study of the laws, regulations, and the order of development (advocating, guiding, standardizing). Education is an important guarantee for future technological and AI development.

Professor WU Shuilong from the Beijing Institute of Technology noted that there are more and more applications and research of artificial intelligence in the field of marketing, such as the use of big data to gain insight into consumer portraits, to understand why consumers buy and how to buy from the perspective of marketing strategy. Artificial intelligence technology is applied to improve the efficiency of observing consumer behavior.

Mr LEI Mingyu, Director of Technology and Standards Research Institute of China Academy of Information and Communication Technology, suggested that we must be good at using new technologies. But new problems may arise during the application process. Changes in dimensions and scenes will bring us different experiences. We need to upgrade our production efficiency and make structured adjustments toward more orderly and efficient social development.

Mr LV Mingjie, Senior Researcher of the Research Centre for AI Social Experiment of ZhiJiang Lab, gave an idea of governance while developing. Understanding the boundaries of AI applications is of vital importance. Such awareness depends on education - users and educators should be their judgments on AI. The breaking point from technology development to industrial application should also be aware.

Mr WANG Bin, CEO of Beijing Yundiantang Tech Co., LTD, believed the original purpose of informatization was to solve the problem of improving labor productivity and reducing people's labor intensity. But in the process of practice, labor productivity was improved while intensity was increased, which is a paradox. Regarding AI, he predicted that AI will bring both benefits and troubles to people.

Release of “Campus for Children” Information Platform

Educational Informatization Strategy Research Base (Beijing) introduced the "Campus for Children" information platform. The platform is designed and developed to implement the three positioning of the Beijing Research Base by the Ministry of Education. The construction of the information platform completes in 2021. More than 1,000 campus-level service platforms completed in 2022. And the development of the decision-making support platform of the ministry

and commission will complete in 2023. At present, the 1.0 information platform has five sections, namely, "Regional Dynamics", "Smart School Affairs", "Smart Classroom", "Tool Classroom" and "AI Example". It provides ministry and regional policy dynamics for nearly 5,000 schools in more than 30 counties and also for the "Three Districts and Three States" Principal Information Leadership Training Course of the Ministry of Education in eight provinces. It encourages front-line campuses to share school-based activity information, and has initially built a campus-level "Internet + Education" public service platform.

AI and Social Governance Key takeaways

- In the field of smart education, artificial intelligence is accelerating the reform of talent training models, promoting the transformation of teaching models from knowledge transfer to knowledge construction, and alleviating the problem of teacher shortage and uneven resource allocation in poverty-stricken areas.
- A new generation of artificial intelligence technology is developing in depth. One is to break through the key neck technology in the field of integrated circuit characteristic processes and packaging and testing, and the other is to promote new models and new formats of manufacturing industries such as network collaboration, intelligent production, personalized customization, and service-oriented manufacturing through AI software.
- Great attention should be paid to teachers' information literacy. "If there are only good hardware facilities and teaching content, there is a lack of teachers with certain information literacy. This cannot be said to be the true smart education."
- When carrying out after-school services, local schools do not know what after-school services students are interested in. Therefore, research on major libraries was conducted to algorithmically analyze students' borrowing lists and borrowing hours through big data technology, which helped to infer which course content students will be interested in. The school further selects the content that meets the academic plans in the areas of students' interests, and organizes a variety of after-school service activities, effectively achieving the transformation from teaching-centered to learning-centered.

Big Data in Education and Learning Analytics

In the "Internet+" era, teaching and learning supported by technology are becoming more normalized. Important changes are taking place in the laws of human cognition, teaching interaction, and knowledge production and evolution. Learning analysis that evaluates the learning process, discovers patterns of learners' behavior habits, predicts learners' responses, and provides timely feedback is increasingly valued. The "fascinating" part of learning analysis lies in the ability to intervene more directly in educational behavior, which provides a new research paradigm for understanding the laws of education and teaching and exploring personalized learning.

Mr WU Xiaoru, President of iFLYTEK, highlighted the "double-reduction policy" and "new curriculum standard, new curriculum reform" that were currently the heated issues in the society. He emphasized the in-depth integration of artificial intelligence, educational big data and social concerns, including guiding teachers in teaching through big data and learning analytics to provide students with layered and even personalized homework. Based on the data of students' behavior in various learning contexts, data analysis is used to point out the knowledge points and weaknesses of each student's learning to reduce their ineffective and inefficient homework time, reduce burden, and let them learn better.

Mr Kinshuk, Dean of the College of Information of the University of North Texas, delivered a speech on *Enhancing Learning through Analytics*. He believed, in the new era featured by learning for everyone and personalized learning, there will be a new learning trend to understand the advantages and performances of each learner, so that individual students can realize their needs

MODERATOR

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

Ms LI Shuang
Associate Professor, Beijing Normal University, China

SPEAKERS

Mr WU Xiaoru
President, iFLYTEK

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

Mr WANG Shijing
Vice President, iFLYTEK

Mr ZHANG Peng
Director, Center of Educational Management Information, Ministry of Education, P.R.C

Mr ZHENG Qinhua
Deputy Director, National Engineering Research Center of Cyberlearning and Intelligent Technology

Mr LIU Nvsanya
Executive Vice-director, National Engineering Laboratory for Technology of Big Data Applications in Education

Mr CAO Yunbo
Chief Scientist, Tencent Intelligent Platform

Ms LIANG Jing
Partner, Squirrel AI

Ms ZHANG Jingjing
Professor, Beijing Normal University, China

and achieve better results. Therefore, he proposed a smart learning analysis method, through records and real-time observation information, to understand students' abilities, preferences and literacy, analyze which type of teacher guidance students need to achieve goals, etc., and finally understand the learning process of students.

Mr ZHANG Peng, Director of the Center of Educational Management Information of the Ministry of Education, China, gave a presentation on *the Application and Development of Big Data in Education Management.* He started with the introduction of the application status of big data in education management; then, he expounded on the application practice and exploration of "big data in education management" in serving government decision-making, education industry, education poverty alleviation and foreign education research, etc. He further proposed that, in the future, it is necessary to build a "data brain" in the education industry, do a good job in the new model of national education management decision-making service, and apply services such as big data in education management and education identity integration.

Mr ZHENG Qinhua, Deputy Director of the National Engineering Research Center of Cyberlearning and Intelligent Technology, talked about *Data-driven Educational Evaluation*. He analyzed the new requirements for the development of educational evaluation from the perspective of changing education evaluation system. He introduced "an agile modeling" model supported by human-machine augmented intelligence, based on which he believed data-driven education evaluation should be based on intelligent literacy in the era of human-computer collaboration. It should also follow the continuous iterative process of on-site observation and data collection, multimodal data cleaning and aggregation, intelligent literacy evaluation and modeling, and finally form evaluation results that support learner development.

Mr LIU Nvsanya, Executive Vice-director of the National Engineering Laboratory for Technology of Big Data Applications in Education, shared his opinion on *Analysis of Interactive Discourse Behavior in Online Education*. He believed, with the widespread popularity of online learning platforms represented by MOOCs, the massive interactive data generated by different learning groups brings opportunities to understand the swarm learning theory. A key issue that needs to be solved in the development of large-scale online education is "how to accurately detect the interaction behavior and discourse content of learning groups and conduct joint modeling and analysis".

Professor ZHANG Jingjing from Beijing Normal University focused on *Data-Intensive Research and Paradigm Transformation*. She advocated for contextualizing learning outside of the lab and exploring the nature of learning through experimental derivation. She proposed a complex network framework for learning from data-intensive education research and revealed a new paradigm of big data in education. She believed a more inclusive method of conducting data-intensive research is to apply a mix of abductive, inductive, and deductive approaches to deepen our understanding of "phenomena".

Mr WANG Shijing, Vice President of iFLYTEK, highlighted *Artificial Intelligence-Enhanced*

Individualized Learning. He believed the breakthrough of AI technology is needed to reduce the burden on teachers and students and realize adaptive teaching. He also introduced the latest AI technology progress and typical application cases, and iFLYTEK's education practice and philosophy from precision teaching and personalized learning.

Mr CAO Yunbo, Chief Scientist of Tencent Intelligent Platform, focused on *the Application of AI in Big Data and Precision Teaching of K-12 Education*. He introduced the application of AI technology in education scenarios with Tencent's education solutions. Tencent can provide accurate teaching based on big data, and realize data-driven processes of "teaching, learning, examination, evaluation, and management", thereby improving teachers' teaching efficiency and students' learning effectiveness.

Ms LIANG Jing, Partner of Squirrel AI, explored the solution of *How can AI SaaS Platform Help the Public School System to Reduce Burden and Increase Efficiency* in the context of the double-reduction policy. The platform is built based on big data, AI algorithms, an intelligent adaptive learning engine and other technical and theoretical support, with the goal of adaptive teaching and personalized precision learning. It is featured by four kinds of applications (precise assessment, personalized homework, precise teaching/research, and precise management), covers three major teaching scenarios (pre-class, in-class, after-class), and serves five major stakeholders (teachers, students, parents, school administrators, and regional administrators). The platform provides multi-dimensional and comprehensive smart education solutions for "teaching, learning, assessment, evaluation, research and management".

Big Data in Education and Learning Analytics
Key takeaways

- Data-driven is a process of continuous iteration of theory and technology. It is necessary to design theoretical models based on needs, collect data to carry out intelligent analysis accordingly, form literacy indicators and algorithms, and achieve the goal of data-driven education evaluation.
- Relying on artificial intelligence technology and algorithm models, the education data resource pool can provide data 'brainpower' support for the Ministry of Education, provide comprehensive data services for teachers and students in schools, and promote the construction of a new model of education governance that "uses" numbers to think, make decision and practice.
- The Analysis Report on Classroom Behavior can explain and record the key phrases of the teaching process, and collect and retain the content in a real-time manner. Data is automatically collected, analyzed and stored in the cloud. Classroom events are aggregated to the background and presented sequentially on the time axis in the cloud. The Classroom Interaction Report can collect procedural learning data in the classroom and analyze students' daily learning performances from multiple dimensions.

- Development-oriented evaluation is not a simple value judgment for students, but interventions for teaching, resources, environment, facilities, etc. It aims to provide evaluation results and guidance for better development.

- Learning in a variety of contexts includes more formal learning in classrooms and informal learning at home and among peers. The goal of learning science is to better understand the cognitive and social processes that produce the most effective learning, and to use this knowledge to redesign classroom activities and other learning contexts to allow learners to learn more deeply and effectively.

- With education big data management, an education identity authentication and application service system is built, covering all levels of educational institutions, all types of schools, and all students and teachers. It provides users with personal privacy protection and legally effective cryptographic of digital identity in the fields of the comprehensive reform of education evaluation system, smart education, etc., realizes the trusted authentication and secure sharing of educational digital identity across campuses, regions, systems, and industries, and supports the high-quality development of education informatization.

Open Educational Practices and Teachers' Capacity Building

In November 2019, UNESCO announced Recommendation on OER to support the development and sharing of openly licensed learning and teaching materials, benefiting students, teachers and researchers worldwide. However, several educational challenges appeared during the COVID-19. New effective pedagogical approaches are required to keep learners motivated and engaged during this long period of online learning. At this time, several researchers suggested the use of Open Educational Practices (OEP) and Resources (OER) to reduce the time and cost of preparing quality-learning resources, as well as provide engaging and interactive educational experiences. However, there were few opportunities for teachers to jointly develop a meaningful professional identity of knowledge and competence with OER - and hence to become productive with OER. To facilitate international cooperation in this field and explore the competencies of teachers to support OEP and OER adoption, we hold this forum.

Mr Mohamed Jemni, Director of ICT at ALECSO, introduced the "Smart Learning" Joint Lab between ALECSO and Smart Learning Institute of BNU, including the achievement of a study on "Current State of Open Educational Resources in the Arab Region: An investigation from 22 countries" and others. ALECSO is pursuing the creation and adoption of OER in a two-part process: The first part involves cooperation with regional and international organizations, awareness-raising and capacity-building activities, along with the development of manuals and guidelines concerning the use, development, and

MODERATOR

Ms ZHANG Xiangling
Lecturer, Beijing Institute of Education, China

Mr Ahmed Tlili
Associate Professor, Beijing Normal University, China

SPEAKERS

Ms Ebba Ossiannilsson
OER Chair, ICDE

Mr Mohamed Jemni
Director of ICT, ALECSO

Mr LI Song
Vice President, Open University of China

Ms ZOU Xianlian
Principal, Chongqing Xingyuan Primary School, China

Ms Saida Affouneh
Deputy President, Digitalization and E-Learning at An-Najah National University, Palestinian

Mr Ramesh Sharma
Associate Professor, Ambedkar University Delhi, India

Ms Diana Andone
Director, E-Learning Center of the Politehnica University of Timisoara, Romania

Mr Rory McGreal
Professor, Athabasca University, Canada

Ms HU Jiayi
Associate Professor, Beijing Institute of Education, China

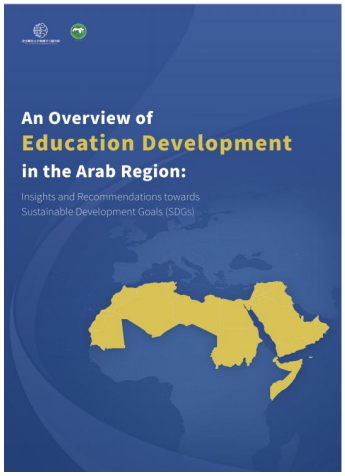
sharing of OERs. The second part consists of the establishment of the ALECSO OER hub to allow Arab countries to share, develop and disseminate OERs, and thus to facilitate access to these resources and their exchange at a large scale.

Ms Ebba Ossiannilsson, OER Chair at International Council for Open and Distance Education (ICDE), introduced a series of research work related to open education practice in ICDE. She noted that ICDE works by The 2019 UNESCO Recommendation on Open Educational Resources (OER) from all five areas of action, including capacity building; developing supportive policy; effective, inclusive and equitable access to quality OER; nurturing the creation of sustainability models for OER; fostering and facilitating international cooperation. She believed both the suggestions and monitoring and summarization of the relevant activities are important to better implement this initiative.

An Overview of Education Development in the Arab Region: Insights and Recommendations Towards Sustainable Development Goals (SDG)

The Smart Learning Institute of Beijing Normal University (SLIBNU) and the Arab League Educational, Cultural and Scientific Organization (ALECSO) have been working closely to promote collaboration between China and the Arab region. SLIBNU thrives to promote the quality of education and enhance the integration between education and ICT, both in China and globally. ALECSO, as the inter-government organization between the 22 Arab countries, has been endeavoring to conduct and coordinate projects related to educational, cultural, scientific and ICT fields in the Arad region and beyond.

Sharing the same vision in enhancing education development, ALECSO and SLIBNU developed the Open Interactive Database (OID), an interactive map that shows detailed statistics about the 22 countries in the Arab region in the field of education, culture, science, ICT, economy, etc. Based on the data from the OID and other sources, a book titled An overview of education development in the Arab region: Insights and recommendation towards Sustainable Development Goals (SDG) were written. The book discusses the education development at primary, secondary and higher education levels in the Arab region. Important issues such as education access and inclusiveness were highlighted. The findings of the book reveal that Arab countries had made important progress in increasing educational opportunities. This book could help to achieve the Sustainable Development Goals put forward by United Nation in the Arab region. It could also provide insights for policymakers, researchers, and educators who are interested in education development in the Arab region. We hope that this book could promote further research and cooperation between China and the Arab region in the field of education.



Mr LI Song, Vice President of the *Open University of China, delivered a speech on Open Education Informatization Construction: One Road, One Network, One Platform*. He shared in detail the background and goals of the open education informatization construction of the Open University of China, as well as the overall architecture of one road, one network and one platform. In detail, the "road" refers to the information superhighway, creating an "environmental community" where everyone can learn everywhere. The "network" refers to the learning network - a service platform that gathers, integrates and shares high-quality educational resources for lifelong learning for all. The "platform" refers to the education management service platform, which integrates and shares management resources to form a collaborative and efficient "service and management community" for education and teaching.

Ms ZOU Xianlian, Principal of Chongqing Xingyuan Primary School, gave a presentation on *OMO 5S Action in Developing a New School Ecosystem*. It was discussed in four aspects: "What," "Why," "How," and "How did it go?" The four aspects were further explained with practical actions of Xingyuan Primary School. For example, Xingyuan Primary School has dived deep into OMO smart education that merges families, the school and society. Through the 5S action, which is smart learning of pupils, smart research of teachers, smart company of parents, smart management of the school and smart interaction with society, we develop a new school ecosystem to facilitate the transformation of the overall school paradigm.

Ms HU Jiayi, Associate Professor from the Beijing Institute of Education, analyzed the specific objectives and strategies of the EU's Digital Education Action Plan proposed in January 2018, focusing on improving citizens' digital skills, using digital technologies to promote education and teaching, and using digital technologies to improve the status of education. The enlightenment of the action plan for China's education informatization was also shared. For example, it is suggested to enrich and perfect the connotation of citizen's information literacy, to strengthen technical ethics and sustainable development education in school curricula, to promote diversified production of digital education resources and establish a sharing mechanism, to support tailored learning methods and achieve in-depth integration of technology and education, and to make better use of big data for education innovation and education reform in China.

Ms Saida Affouneh, Deputy President of Digitalization and E-Learning at An-Najah National University, Palestinian, shared the case of open education practice in Palestine during the COVID-19. She listed several challenges in open education practice, including the lack of open education practice ability of teachers, the need for training their digital technology awareness, how to manage classes in a virtual space, the problems of online ethical issues (privacy protection), the weak infrastructure, etc. But she believed open education practices will gain new development soon.

Mr Ramesh Sharma, Associate Professor from Ambedkar University Delhi, India, shared the practical cases of open education in India. He believed only a strong ICT infrastructure can promote OER, and OER should be adapted to different local contexts. Also, open data, open resources and open platforms can provide opportunities for disadvantaged students.

Ms Diana Andone, Director of the e-Learning Center of the Politehnica University of Timisoara, Romania, shared her opinions on Renewable Assignments as Open Education Practices for Students. She noted that open education practices have a positive effect on promoting student learning, enhancing students' ability to identify, access, learn, analyze, and apply

knowledge, as well as enhancing students' skills and developing their professional abilities.

Professor Rory McGreal from Athabasca University, Canada, focused on the use of OER as a way to support SDG4, ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. He also gave very important recommendations, including strengthening the ability training of teachers to adapt, modify and reuse OER, providing professional incentives for teachers to participate in open practice, and enforcing open licenses of local course creation, etc.

Open Educational Practices and Teachers' Capacity Building Key takeaways

- The adoption of innovative learning approaches can create a second learning opportunity for those who cannot attend physical classrooms. For example, Online-Merge-Offline (OMO) as a learning approach merging both the physical and online environments, can give students a more engaging and authentic learning experience.

- We're in a new era of limitless possibilities where pure offline has passed out of existence. In the midst of this, we need to break through the barriers of time and space to constantly explore, discover and reshape the aspects of rebuilding the structure and process of teaching, adjoint data generation, regrouping of teaching materials, extension of course resources and definition of dual-teacher roles to return to the essence of education, i.e. teach in accordance of aptitude, benefit both teachers and pupils and involve multiple stakeholders, as well as to realize a more individualized, more targeted and smarter educational vision.

- Smart education is not only about connected to advanced equipment and platforms or associated with fancy technology. True smart education is the same as labor education, physical education, and art education. Education is still the key, which aims for the development and achievement of people. It should contain essential wisdom concerning spaces, technology, thinking, management and teaching and learning methods. This is a kind of normalized learning paradigm matched with the smart new era. It needs systematic progress and overall planning instead of the so-called characteristic construction. All these, fundamentally rely on the wisdom of people.

- Smart school construction needs to get rid of the "fancy yet useless" facade and step out of the "emphasizing on hardware but not application" cycle. We should be wary of it becoming an accomplice in forging exam-oriented education. It ought to follow the rules of education and return to its nature of education, reaching the core of curriculum to transform methods of teaching and learning.

Smart Education Empowered by 5G Technology

With the development of science and technology, education and technology have shown a two-way empowerment trend of shaping the future. With the characteristics of adaptability, self-evolution and interaction, 5G and intelligent technology enrich the connotation of teaching environment, teaching content and teaching mode, and provide a more powerful impetus for the transformation of education and the reconstruction of education ecology.

Mr WEI Bing, Vice General-Manager of the Department of Government and Enterprise Affairs, China Mobile (Chengdu) ICT.Co., Ltd., noted that the development of smart education has put forward new challenges for talent training in the new era. He proposed it is necessary to make full efforts to improve the infrastructure level for building "new environments" for talent training, actively carry out information application innovation to support the "new model" of talent training, contribute to the balanced development of education and provide "new services" for inclusive cultivation. China Mobile will take the construction of the education network as the starting point, take the 5G smart education demonstration zone and practice community as the forefront position, encourage technological innovation to tackle tough problems and help build a high-quality talent training system.

Mr ZHANG Quan, Head of the Teaching and Equipment Information Office in the Department of Basic Education, Ministry of Education, shared his thoughts on education informatization and 5G-enabled smart education. He believed the use of 5G technology to innovatively transform teaching and learning methods, evaluation methods, education governance, etc. is a major

MODERATOR

Ms LI Baoping
Co-director, National Engineering Laboratory for Cyber-learning and Intelligent Technology

Ms ZHUANG Rongxia
Associate Professor, Beijing Normal University, China

SPEAKERS

Mr WEI Bing
Vice General-Manager, Department of Government and Enterprise Affairs, China Mobile (Chengdu) ICT.Co., Ltd.

Mr ZHANG Quan
Head, Teaching and Equipment Information Office, Department of Basic Education, Ministry of Education, P.R.C

Mr XU Lin
President & Chief-editor, China Educational Magazine, National Center for Educational Technology

Mr ZHAO Lijun
Vice General Manager, China Mobile (Chengdu) ICT.Co., Ltd.

Mr YU Shengquan
Director & Professor, China Mobile Joint Laboratory, Ministry of Education, P.R.C

Mr Demetrios Sampson
Professor, University of Piraeus, Greece

Mr WANG Yunwu
Vice Director, Educational Informationization Engineering Technology Research Center

Mr Tom Poole
Global Key Account Director of Bett portfolio

Mr XIN Tao
Deputy Director, National Assessment Center for Education Quality, Ministry of Education, P.R.C

Ms Nikoleta Giannoutsou
Scientific Project Officer & SELFIE Project Lead, Joint Research Centre, European Commission

Mr KONG Lingkai
Vice General Manager, Educational Product Centre, China Mobile (Chengdu) ICT.Co., Ltd.

issue facing smart education. Cutting-edge technologies such as 5G have a decisive impact on the ecosystem of smart education. All stakeholders in the education ecosystem should make full use of cutting-edge technologies such as 5G to improve capability and efficiency and jointly build smart education supported by 5G technology.

Mr XU Lin, President and Chief-editor of China Educational Magazine, National Center for Educational Technology, believed 5G is one of the important components of "new infrastructure construction". It is necessary to deepen the integration and application of "new infrastructure" such as 5G in the field of higher education, comprehensively promote the reform and innovation of education and teaching, and accelerate the development of education modernization. At the same time, people should empower smart education with "new infrastructure", promote the high-quality development of education, and explore the innovative path of smart education.

Mr ZHAO Lijun, Vice General Manager of China Mobile (Chengdu) ICT.Co., Ltd., introduced the experience of the company in actively gathering resources from all parties, promoting the deep integration of 5G and the education industry, and continuously upgrading China Mobile's 5G smart education product system. He pointed out that under the premise of 5G and other new-generation information technology deeply empowering education, smart education will achieve high-quality development, and education informatization 2.0 will also achieve breakthroughs.

Competences and Assessment in A 5G Empowered Smart Education: The Role of the Human Factor. Her report explored how 5G technology can empower education in areas such as personalized learning and analyzed the role that teachers, school leaders, and governments can play. She pointed out that digital citizens in the new era need digital competencies and digital technologies to stimulate the transformative power of technology for education. She also explains an assessment tool-SELFIE. This tool takes the school as the whole object, examines and promotes the effective teaching and learning of the school through technological innovation and application from the perspective of multiple stakeholders. It helps the school achieve the sustainable development of the integration of information technology and education.

Professor Demetrios Sampson from the University of Piraeus, Greece gave a presentation

on *Digital Smart Citizenship Education in the Post Pandemic Era*. He pointed out that with the development of social technology and the changing educational landscape, educational institutions are facing challenges in terms of learning objectives, methods and evaluation methods. From the perspective of smart city construction, he emphasized that smart citizens are the core of any smart city ecosystem. The digital capabilities of smart citizens are key to supporting the sustainable development of smart cities.

Professor WANG Yunwu, Vice Director of the Educational Informationization Engineering Technology Research Center, talked about The Emergence of the Sixth Educational Revolution in Human Educational History Promoted by 5G Technology. He pointed out that 5G technology has three major technical characteristics: ultra-high speed, ultra-large connection, and ultra-low latency, which can accelerate the transformation of social development and profoundly change human society. Education in the 5G era will pay more attention to "the two-way empowerment of technology and education", and thus give birth to the sixth educational revolution in the history of human education-smart education.

Mr Tom Poole, Global Key Account Director of Bett portfolio, introduced *Smart Education Technologies and Their Implementation and Use in UK* and concluded that smart education technology can bring dynamic learning experiences to learners, improve learning efficiency, and achieve personalized learning. He believed the use of 5G technology can improve connectivity and allow students to connect more closely to the world. The application of artificial intelligence technology can put students at the center of the learning process and promote personalized learning.

Integrating Resources to Achieve Inclusive Education

Mr KONG Lingkai, Vice General Manager of Educational Product Centre, China Mobile (Chengdu) ICT.Co., Ltd., shared China Mobile's education product system, including "5G education network + one unified integration platform + six key applications". Relying on its cloud-network advantages, China Mobile provides fast, stable, green, secure, manageable and controllable cloud-network integrated infrastructure services based on "5G cloud-Netcom", and is committed to improving campus network quality. At present, the "Education Integration Platform" has completed the landing of 31 provinces, providing intelligent, efficient and open one-stop services for the region through the empowerment of technology platform, data platform and business platform. It also provides a scientific basis for decision-making through regional big data. At the same time, China Mobile closely follows the policy traction and has created standard products such as smart campus, "three classrooms", after-school services, home-school co-education, smart sports, and cloud examination rooms, and continues to provide better campus education information services.

Smart Education Empowered by 5G Technology
Key takeaways

- The discussion on "smart technologies in education and beyond" highlights both the transformational powers of technology and the importance of the human factors. Specifically, efficient, useful and socially acceptable use of smart technologies is envisaged to take place in a hybrid space where the powers of human and machine intelligence are paired and where control over important decisions is handed to humans.

- 5G technology has great potential to promote educational reform in the following ten aspects: accelerating the development of live education culture, reshaping the education ecosystem, upgrading the smart education environment (e.g. double gigabit, OMO smart campus, smart interconnected classroom), meeting multi-scenario learning needs, innovating education and teaching forms, improving the service level of smart education, promoting the balanced development of urban and rural education and supporting the modernization of education governance.

- The new generation of smart campus, also known as online and offline converged smart campus (OMO smart campus), refers to the intelligent interconnection of media, technology, platform, resources, data, people and things under the support of ultra-high-speed multi-network integration such as 5G, WiFi6, and intelligent Internet (AIoT). It supports highly integrated online and offline services, intelligent data visualization analysis and decision-making as well as a variety of new resource forms and education forms. It also provides smart education services with high experience and high satisfaction.

- Smart education is the future development direction of the education sector, but continuing to promote smart education faces structural difficulties. The core of promoting education informatization should be transformed from focusing on platform construction and resource construction to service construction.

- Education information systems must adapt to dynamic, changeable and contextualized education businesses. Universal software for unified processes is difficult to meet the needs of different schools and teachers in personalized education scenarios. What schools need is a flexible, reconfigurable and user-centered education service system.

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

Today, education sectors around the world are actively responding to the impact of the COVID-19 and exploring new education methods. The "Internet + education" has become an important part of school education. The combination of online and offline education models has become the new normal of education. "Internet + education" not only provides us with new ways to solve current education problems, but also provides important support in sharing educational resources, bridging the education gap, and solving problems such as education personalization. Sustainable Development Goal 4 advocates for ensuring inclusive and quality education for all and promoting lifelong learning. We must ensure better education resources and people's right to education in the post-pandemic era.

Mr Alexey Lubkov, Rector of Moscow Pedagogical State University, Russia, believed digital technologies can diversify teaching content, making it more attractive to modern young people through the use of virtual reality, various types of visualization and interactivity. But we must not only see the positive aspects of digital technology, but also be prepared for its negative impacts. Digital technology is prone to distort the aspirations of the younger generation to pursue lofty traditional values, so we cannot lack the values, worldview and educational outlook with humanity, kindness and justice as the highest interests. It is necessary to supplement "educating people" in the field of digital education.

Professor ZHONG Binlin, a Member of the National Advisory Council on Education, focused

MODERATOR

Mr WU Yujun
Dean, Office of International Exchange and Cooperation, Beijing Normal University, China

Mr DOU Fei
Director, Office of Science and Technology, Beijing Normal University, China

---

SPEAKERS

Mr Alexey Lubkov
Rector, Moscow Pedagogical State University, Russia

Mr ZHONG Binlin
Professor, Member of the National Advisory Council on Education

Mr GAN Chee Lip
Nanyang Technological University, Singapore

Ms Satoko Yano
Programme Specialist, Section of Education Policy, UNESCO

Mr YANG Xinbin
President & Professor, Shenzhen Polytechnic, China

Mr Omer Rana
College Dean, International, School of Computer Science and Informatics, Cardiff University, UK

Ms Carolyn Penstein Rose
Professor, Carnegie Mellon University, USA

Ms Siriwan Suebnukarn
Vice-Rector, Research and Innovation, Thammasat University, Thailand

Ms Ann-Therese Ndong-Jatta
Former Director, UNESCO Regional Office in Eastern Africa

Mr ZHOU Wei
Engineer, National Engineering Laboratory for Cyberlearning and Intelligent Technology, China

Mr CHEN Guangju
Vice Director, University Council of Beijing Normal University, China

on the relationship between smart education and the development of high-quality education. He noted that smart education can not only promote educational equity and quality improvement, but also transform the traditional learning process and method. He believed that changing the concept of education and teaching is an important precursor to deepening reform and improving quality. It is also suggested to promote the professional development of teachers, innovate teaching management mechanisms and student management mechanisms, and improve the quality assurance system of education in schools.

Mr Omer Rana, College Dean of International, School of Computer Science and Informatics, Cardiff University, UK, talked about the lessons learned from COVID-19. From his experience, online education has become the new normal and promoted the development of online teaching tools. He used cases and a wealth of data to introduce students' acceptance of the new teaching method, and further reflected on the feasibility and necessity of online courses.

Ms Ann-Therese Ndong-Jatta, Former Director of the UNESCO Regional Office in Eastern Africa, emphasized that, when talking about the futures of education, people cannot ignore the impact of new/emerging technologies and smart technologies. She believed ensuring education opportunities and technology for all can enhance access, quality, relevance and the attainment of SDG4. Emerging technologies are important to inform education policies and implement strategies and plans. If adequately funded, government and rural communities together bring knowledge from research findings and policies (that government would enact) to be able to mobilize the necessary resources.

Clinical training was one of the most challenging areas of education during the pandemic as access to apprenticeships in complex settings is extremely limited. **Ms Siriwan Suebnukarn**, Vice-Rector for Research and Innovation at Thammasat University, Thailand, introduced Intelligence Clinical Training System, which can supplement training sessions by expert clinical instructors. It aims to provide an experience that captures the tutor's essential role in facilitating problem-based learning groups. Its generated feedback can help students to focus on group discussion, promote open discussion, deflect uneducated guessing, avoid jumping critical steps, address incomplete information and consult experts in the group.

After the pandemic, learning has gradually returned to normal, but there are also new changes. **Professor Carolyn Penstein Rose** from Carnegie Mellon University pointed out that advances in technology have made learning more flexible (e.g. face-to-face, online). Educators and learners need to adapt to this. She mainly discussed the use of artificial intelligence technology to support agile learning in the new normal, and emphasized the importance of human communication and interaction to achieve deep learning and listening.

Mr YANG Xinbin, President and Professor of Shenzhen Polytechnic, believed the development of vocational education must put the integration of industry and education in a prominent and important position. He shared 9 consensuses for building a college of featured industries in the new era, including carrying out Party-building activities to extend the campus ideological and political network, developing professional standards and curriculum standards, building teachers' teams, setting up R&D centers to enhance the capabilities of different-sized enterprises, developing high-end certification to help enterprises solidify their technological advantages, carrying out innovation and entrepreneurship education, and expanding overseas markets.

Mr GAN Chee Lip from Nanyang Technological University introduced the university's Education Plan 2025, which aims to prepare graduates for the Industry 4.0 era and beyond. The Education Plan 2025 has made many improvements in the curriculum. He emphasized the development of students' 3C abilities, namely, Character, Competence and Cognitive Agility, which are covered in the interdisciplinary curriculum and experiential & collaborative learning. They are important skills for preparing students for the future.

Ms Satoko Yano, Programme Specialist of the Section of Education Policy at UNESCO, introduced the EMIS (Education Management Information System). EMIS helps to ensure that governments continue to manage comprehensive and accurate monitoring of learning for all. The education data and indicators help to monitor and respond to changing situations on time, which plays a key role in developing a sustainable new normal. She also pointed out that the pandemic has highlighted the shortcomings and challenges of education management information systems.

Evaluation Report on Educational Mobile Application & Evaluation Platform

The National Engineering Research Center of Cyberlearning and Intelligent Technology issued a *2021 Report of Test and Analysis in the Cyberlearning Product in China and A Cloud Platform for Test and Analysis of Cyberlearning Products.*

In 2021, the project team joined hands with Southwest University, Yangzhou University, Bohai University and NetDragon to establish a joint laboratory for the evaluation and analysis of Internet educational products. It evaluates and analyzes 60 typical educational apps by focusing on the combination of manual evaluation, machine evaluation and public opinion analysis. The analysis is conducted from seven dimensions,namely, platform support, personal privacy and data security, Internet learning cognition, functional testing and product maturity, content adaptability, user experience and social evaluation.

The research will help the government strengthen the supervision and governance of educational apps, provide support for schools to select high-quality education practices, support students' independent learning, help parents purchase appropriate educational app products, help researchers expand educational app research, help enterprises upgrade educational app products, and create a healthy, orderly and safe online space and learning environment for teachers and students.

The *2021 Report of Test and Analysis in the Cyberlearning Product in China* provides five suggestions:

- strengthen the quality supervision and monitoring of educational APPs, and establish a regular registration and dynamic withdrawal mechanism for educational Apps;

- strengthen the quality supervision and monitoring of educational APPs, and establish a regular registration and dynamic withdrawal mechanism for educational Apps;

- accelerate the development of a quality standard system for educational apps, and strengthen the pilot-scale promotion of high-quality educational apps;Indicators of smart education at the 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;

- improve the online education public service system and educate App enterprises to improve their self-discipline;

- strengthen copyright and intellectual property protection of educational apps; and

- establish an education App big data early warning and disposal platform to enhance personal privacy and data security awareness.

A Cloud Platform for Test and Analysis of Cyberlearning Products

Introduction:

For educational product developers, users (schools, parents and students), researchers and managers of regulatory departments. Methods for test and analysis can be integrated within the cloud computing architecture, which can improve the efficiency in test and analysis of educational products. Scale, survey, data analysis tools and automated testing utilities are provided for instruction test, adaptation test, safety test and etc. Services for assessment, grading, and early warning will be provided. Different types of reports will be built for covering mainstream Chinese educational products, including preschool education, basic education, higher education, language training and etc.

Main functions:

- Useful tools and utilities: Help customize tests precisely, agilely and rapidly. It will greatly reduce the threshold of required skills to test and analyze educational applications.

- Full lifecycle workflow: Manage the whole life cycle of test activities such as requests for testing, formulation of plans, initial evaluation, rectification, retesting, preparation of reports, etc.

- Quality standard management: Quality standards of cyberlearning products are built-in for supporting tests and analyses of educational applications.

- Data-driven forecasting and alert: Accumulated data from tests and analyses of different kinds of educational applications, an early-warning system based on big data can be developed.

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

- Smart education refers to the innovative integration of intelligent technology and education, the innovative application of artificial intelligence, big data, virtual reality and Internet of Things and other technologies in the field of education, and the advanced form and new direction of educational innovation and development in the intelligent era.

- The integration of information technology and education can break through the limitations of learning time and space, facilitate students' personalized online learning, share high-quality classroom resources, promote equity, and build a learning society. The development of information technology brings opportunities for integrating online and offline teaching, reforming traditional teaching methods and means, promoting students' independent learning and cooperative learning, which enhances teaching quality and efficiency.

- Smart education subverts the traditional learning process and method. Human knowledge transfer has changed from traditional one-way transmission to multi-directional interactive transmission. It has also changed teachers' roles from knowledge transmitters to designers and tutors who support students in the context of multiple interactions, forming a new type of "learning partner" relationship.

- Education Management Information System (EMIS) needs to be tailored to local contexts. The future EMIS will be complex, but the user experience should be simple. It is also recommended to coordinate finances among development partners and within the government ministries responsible for education on EMIS at the country level.

- The integration of industry and education is the engine of high-quality economic development, and it must be placed in a prominent and important position in the development of vocational education. Both schools and enterprises have interest demands (e.g. curriculum resources that meet the needs of cutting-edge technology of enterprises). Only by finding a resonance point between the interests can the development path be chosen correctly.

Concluding Comments and Follow up actions

MODERATOR

Mr ZHAN Tao
Director, UNESCO IITE

SPEAKERS

Mr DING Lianpu
Director, China Center for International People-to-People Exchange, Ministry of Education, P.R.C

Mr Mohamed Ould Amar
Director-General, ALECSO

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

Mr ZENG Haijun
Vice Dean, Smart Learning Institute of Beijing Normal University, China

In recent years, the rapid development of the mobile Internet has continuously spawned new formats and models. Various mobile Internet applications have flourished. **Mr JIA Baoguo**, Vice Director of APP Governance, Ministry of Industry and Information Technology, China, noted that the Ministry of Industry and Information Technology attaches great importance to the regulation and governance of APP, and guides the healthy development of the mobile Internet industry by issuing a series of specifications. In the special rectification action, we continue to increase the discovery, exposure and disposal of violations, and continuously take measures (e.g. public announcement, APP removal) for enterprises and apps that refuse to rectify, have recurring problems, and evade inspection. We strive to create a safe, healthy and clean APP application environment for the general public. In addition, we adhere to the combination of performance management, organize third-party inspection, unite the strength of all parties in the industry, and actively use artificial intelligence, big data and other technologies to carry out analysis, which has played an important role in the smooth development of the special rectification action. APP governance involves multiple subjects and phrases. It is a long-term and complex work that needs to be persisted in for a long time. The Ministry of Industry and Information Technology is willing to work with colleagues in various industries and fields to jointly create a healthier, orderly and safe cyberspace.

Today's world is in a changing situation full of uncertainty. **Mr DING Lianpu**, Director of China Center for International People-to-People Exchange, Ministry of Education, believed people-to-people exchanges, together with political mutual trust and economic and trade cooperation, constitute the three pillars of promoting world peace and development, and play an indispensable and important role in promoting the enhancement of trust and people-to-people ties around the world. He proposed to integrate the people-to-people exchange concepts into all fields of foreign exchanges, especially into international exchanges on the development of smart education, including people-centered concepts, openness and equality, respect and inclusiveness, exchanges and mutual construction, win-win cooperation, upholding the correct concept of perseverance and sustainable development. It aims to promote friendly and cooperative relations among all countries in the world.

Mr Mohamed Ould Amar, Director-General of the Arab League Educational, Cultural and Scientific Organization (ALECSO), believed the use of ICT for the development of education in the Arab world is one of the core priorities and focus areas. ALECSO is keenly aware that new technologies do offer significant benefits and advantages to advance the education sector, and prepare future generations to move forward and step into the Knowledge Society. ALECSO has been working during the past few years on a Smart Learning Development Project in the Arab world. ALECSO and SLI-BNU conducted many cooperations on projects, experimental studies, research papers, etc. to raise the public's awareness of ICT. Joint outputs such as books and manuals on online learning were released in response to the interruption of education during COVID-19.

Mr ZENG Haijun, Vice Dean of Smart Learning Institute of Beijing Normal University, on behalf of Professor HUANG Ronghuai, Co-Dean of Smart Learning Institute of Beijing Normal University, concluded the spotlights of GSE2021 with "five numbers" and "five keywords".

The "five numbers":

- "9": **Nine forums**. GSE2021 shows concerns not only on the future of education, sustainable development of education, and the new normal of education at the macro level, but also on the relationship between education and technology.

- "6": **Six outcomes/activities**. It includes phased progress of the Joint Project on Rethinking and Redesigning National Smart Education Strategy, the Project of E-library for Teachers, the 2021 Report of Test and Analysis in the Cyberlearning Product in China, A Cloud Platform for Test and Analysis of Cyberlearning Products, An Overview of Education Development in the Arab Region: Insights and Recommendations Towards Sustainable Development Goals (SDG), Registration Notice of 2021 Global Competition on Design for Future Education.

- "3": **Three participant modes**. It includes live streaming, main venues and ZOOM meetings.

- "48": **Forty-eight foreign speakers** participated in GSE2021.

- "100": **One-hundred domestic speakers** participated in GSE2021.

The "five key words":

- **The futures of education**. How do we develop the futures of education in an uncertain world? How technology and education are integrated to ensure equity and inclusive education?

- **Smart education**. The understanding, experiences and solutions of smart education were shared by both international and domestic speakers. The domestic speakers were the front-line personnel from 18 smart education demonstration zones of the Ministry of Education in China.

- **Education governance**. In many reports, speakers had a consensus on human-centered technology applications. Because challenges may arise during the application process of technology, it is necessary to think about how to adopt a good governance model and how to comply with ethics and other issues.

- **Sustainable development of education**. How to promote sustainable development in the coming post-pandemic era?

- **Cooperation and gratitude**. GSE2021 expresses sincere thanks to all the on-site and online speakers, partners, participants and colleagues for organizing the conference.

Mr ZHAN Tao, Director of the UNESCO Institute for Information Technologies in Education (UNESCO IITE), believed the futures of education will be led by smart education. Technology-empowered smart education can facilitate education systems and support teachers and students. At the same time, smart education is not an easy mission but with many challenges. This is why we gather here and talk about the importance of many essential issues, such as how to achieve a fair and inclusive education, how to protect personal data and privacy, etc. To achieve this mission, we have to cooperate. That is the development of smart education needs joint efforts all over the world to provide methods and solutions. A shared vision for a better future for the next generation is our ultimate goal.

Appendix: Concept note

Background

Currently, as emerging technologies, such as Artificial Intelligence, Big Data, 5G, VR/AR/MR, and the Internet of Things, integrate with other technologies unprecedentedly, human society approaches a threshold of a new round of transformation. In this situation, smart society, as a more advanced social pattern in comparison with the agricultural society, industrial society, and information society, may arrive soon. This trend will fundamentally transform the way we live, work, and learn. Human-machine collaboration, cross-industry integration, as well as co-creation and sharing, may become a new series of characteristics embedded in people's life.

The social transformation of the intelligence era generates new demands on future education. In response to these demands, major countries and international organizations all over the world are exploring new paths and approaches to accelerate the process of talent cultivation to adapt to the intelligence age. 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 (SDG4)". In 2019, UNESCO launched the Futures of Education Initiative. The plural form of

"Futures" emphasizes on multiple dimensions to the future and appeal to reimagine how education and knowledge can shape the future of humanity in a context of complexity, uncertainty, and precarity. In 2019 and 2020, to better overcome the challenges of the intelligence age, UNESCO and the Ministry of Education of the People's Republic of China jointly organized two International Conferences on Artificial Intelligence and Education, discussing the future development of global education. It released the first international consensus on AI and Education, *the Beijing Consensus*, which provided useful suggestions for promoting the innovative integration of technologies and education as well as the implementation of SDG4.

The mission of education is to enlighten people's cultivating innovative talents and supplying the country's economic and social development with talent support and intellectual guarantee. In face of the new situation, a series of strategies and policies have been proposed by the Chinese government, including *China's Education Modernization 2035 plan, the New Generation Artificial Intelligence Development Plan, the AI Innovation Action Plan for Institutions of Higher Education, Education Informatization 2.0 Action Plan*, which emphasize the importance of developing Smart Education. In addition, t*he 14th Five-Year Plan (2021-25) for Economic and Social Development and the Long-Range Objectives Through the Year 2035* also stresses the need to build a high-quality educational system and further points out that Smart Education should be specifically employed in the application scenarios of the digital economy, which clarified the direction for educational innovation in the future. As a high-end form of Information and Communications Technology (ICT) in education, Smart Education is committed to setting up smart learning environments, exploring new models of teaching, and building a modern educational system. As of 2021, the Ministry of Education of China has selected 20 regions as Smart Education Pilot Zones, expecting to expedite the exploration of a new model, new method, and new path to transform education through intelligent technologies.

Beijing Normal University (BNU) is a comprehensive and research-intensive university which leads the way in the theoretical innovation and practical exploration of Smart Education. From 2016 to 2020, Beijing Normal University, together with international organizations and universities have held five Smart Education Conferences consecutively and released a series of smart-education-related reports. In 2020, BNU and its international partners also launched a Joint Project on Rethinking and Redesigning National Smart Education Strategy, generating enormous influences in the field of Smart Education globally. Especially during the pandemic, Smart Learning Institute (SLI) and National Engineering Laboratory for Cyberlearning and Intelligent Technology (CITlab) have been seeking educational solutions under special circumstances. Specifically, they worked with UNESCO, finalizing and publishing a series of handbooks which comprise *Handbook on Facilitating Flexible Learning During Educational Disruption: The Chinese Experience in Maintaining Undisrupted Learning in COVID-19 Outbreak*，*Ensuring Effective Distance Learning under COVID-19 School Closures: Guidance for Teachers as well as AI and Education: Guidance for Policy-makers*. A variety of learning strategies and practical experience adopted in China have been collected in these handbooks, which provided institutions with feasible recommendations in minimalizing disruption and ensuring continuity of course delivery during the pandemic. Furthermore, they also elaborated challenges in applying Artificial Intelligence to achieve SDG4 and supplied policymakers with practical advice to the formulation of regulations.

Technology empowers education, and education adds value to economic and social development in return. Smart Education, as an important part of the smart society, should be based on the current situation while also provides support for the new era. It means that education should be human-oriented and pay attention to the cultivation, rather than simply the materials and teaching process. With a focus on identifying the promise of futures of education, Beijing Normal University, with the approval from the

Ministry of Education, will collaborate with international organizations and other higher education institutions to organize the 2021 Global Smart Education Conference on 18-20 August this year. The aims of the conference lie in three areas: 1) To further understand the latest achievements and development trends in Smart Education, facilitating the innovative integration of intelligent technologies and education. 2) To gather global resources and strength in Smart Education to provide recommendations for narrowing long-standing equity gaps and promoting personalized growth for all. 3) To set up international platforms for educational research, exchange, and cooperation and contribute to the establishment of a community with a shared future for mankind. With the theme of Smart Learning and Futures of Education, the conference sincerely invites policymakers, experts, scholars, researchers, teachers and students, business representatives and media to contribute to the development of Smart Education.

Themes

1.Intelligent Technologies Shaping Futures of Education

The structure of education may be reshaped due to the advance of intelligent technologies. Future education will be sustained by the space of physics, society, and information, while the teaching and learning mode and school's operating rules will change accordingly as well. In the future, human-machine collaboration will be a universal form of education that can be applied to various fields and diverse circumstances. To release more transformative power of Smart Education in the global context, the following questions need to be considered:1) how to formulate policies that effectively promote the development of Smart Education. 2) How to enable intelligent technologies to empower education and then accelerate the formation of new types of teaching and learning models.

2.Intelligent Technologies Promoting Educational Equity and Balance

Educational equity is an important guarantee in protecting people's rights and preparing individuals with opportunities to promote free and comprehensive development. Technologies are normally regarded to have critical impacts not only on achieving improving education but on offering solutions for inequity and inadequate education. Technologies such as Artificial Intelligence, 5G, and VR/AR/MR have been employed in curriculums generally in recent years, while these technologies still have ample margin for improvement in teaching content, methods as well as mode. Therefore, how to generalize high-quality educational resources to remote and impoverished areas through the integration of the Internet and intelligent technologies in a rapid, efficient, and economical way, and to meet the needs of personalized education require further discussions.

3.Coordinated Development of Global Smart Education Strategy

The emerging technologies featured by 5G, Artificial Intelligence, Big Data, and Cloud Computing not only provide approaches in promoting economic growth but guidance in building a global educational model. In an effort to the sustainable development of regional Smart Education, on the one hand, we should focus on the digital level of curriculums and the informatization of educational resources. On the other hand, the national-level technologic framework for Smart Education, smart education index, smart learning public services, and technology and standard of smart campus should also be valued to clarify the national-level smart educational strategy, cultivating students' lifelong learning competency to realize the continuous driving force of technology in leading intelligent transformation and development of education.

4. The New Normal of "Internet + Education" in the Post-Pandemic Era

In the wake of COVID -19, Internet + Education has become a critical part of school education. It not only provides us with ways to solve current educational problems, but also supports the education system. With the help of information technology, a novel educational service model has formed with its features of multi-participation, the combination of online and offline models, as well as integration of curricular and extracurricular services. These all promote science and technology to serve the educational industry and make it thrive with inclusive and equitable quality.

Organizations

Organizer

- Beijing Normal University (BNU)

Co-organizer

- UNESCO Institute for Information Technologies in Education (UNESCO IITE)

Hosts

- National Engineering Laboratory for Cyberlearning and Intelligent Technology (CITlab)
- China Institute of Education and Social Development (CIESD)
- Collaborative Innovation Centre of Assessment for Basic Education Quality
- Smart Learning Institute of Beijing Normal University (SLIBNU)
- Educational Informatization Strategy Research Base (Beijing), Ministry of Education, China

Partners

- UNESCO International Research and Training Centre for Rural Education
- International Centre for Higher Education Innovation under the auspices of UNESCO
- Arab League Educational, Cultural and Scientific Organization
- National Research University Higher School of Economics, Russia
- Centre for Research and Development in Learning, Nanyang Technological University, Singapore
- International Society for Technology in Education
- Commonwealth of Learning
- Southeast Asian Ministers of Education Organization
- State Key Laboratory of Virtual Reality Technology and Systems, China
- National Engineering Laboratory for Educational Big Data, China
- National Engineering Laboratory for Robot Visual Perception and Control Technology
- National and Local Joint Engineering Laboratory for Internet Education Data Learning Analysis Technology, China

Sponsor

- International Association of Smart Learning Environments

Conference Agenda

Due to the COVID-19 pandemic, the Global Smart Education Conference 2021 will take a hybrid format which consists of online sessions and face-to-face sessions.

Date: 18-20 August 2021

Venue: Changping Campus of Beijing Normal University

Online Session: Zoom Meetings

Live Stream: people.cn

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

<table>
<tr><th>Date</th><th>09:00-12:00</th><th>14:30-18:00</th><th>19:00-22:00</th></tr>
<tr><td>18th August 2021 (Wednesday)</td><td></td><td>Opening Session & Forum on AI and Futures of Education</td><td>Forum on Smart Education and Digital Resources</td></tr>
<tr><td rowspan="2">19th August 2021 (Thursday)</td><td colspan="2">Forum on The New Ecology of Regional Smart Education</td><td>Forum on Open Educational Practices and Teachers' Capacity Building</td></tr>
<tr><td>Forum on AI and Social Governance</td><td>Forum on Big Data in Education and Learning Analytics</td><td>Forum on Smart Village and Ecological Civilization</td></tr>
<tr><td>20th August 2021 (Friday)</td><td>Forum on Smart Education Empowered by 5G Technology</td><td>High-Level Dialogue on New Normal and Sustainable Development for Education & Closing Session</td><td></td></tr>
</table>

Contact Information

Official Website: http://gse.bnu.edu.cn

E-mail: gse@bnu.edu.cn

Tel: 0086-010-58807264

Address: 12 F, Block A, Jingshi Technology Building, No.12 Xueyuan South Road, Haidian District, Beijing

Postcode: 100082

北京師範大學
BEIJING NORMAL UNIVERSITY

unesco
Institute for Information Technologies in Education

Global Smart Education Conference 2021

Smart Learning and Futures of Education

Synthesis Report

The Global Smart Education Conference 2021, held on August 18-20, explored the theme 'Smart Learning and Futures of Education'. This publication is a synthesis of the key discussions, focusing on how intelligent technologies shaping futures of education and promoting educational equity and balance, coordinated development of a global smart education strategy, the new normal of "Internet + Education" in the post-pandemic era.

Stay in touch

Global Smart Education Conference
http://gse.bnu.edu.cn

National Engineering Research Centre of Cyberlearning and Intelligent Technology