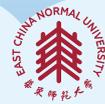




Online and Open Education in Shanghai

Emergency Response and Innovative Practice during COVID-19 Pandemic



Online and Open Education in Shanghai: Emergency Response and Innovative Practice during COVID-19 Pandemic

Published in 2020

by the UNESCO Institute for Information Technologies in Education

8 Kedrova St. (Bldg. 3), 117292 Moscow, Russian Federation

© UNESCO IITE 2020



This publication is available in Open Access under the Attribution-ShareAlike 3.0 IGO (CC-BY-SA 3.0 IGO) license (<http://creativecommons.org/licenses/by-sa/3.0/igo/>). By using the content of this publication, the users accept to be bound by the terms of use of the UNESCO Open Access Repository (<http://en.unesco.org/open-access/terms-use-ccbysa-en>).

The designations employed and the presentation of material throughout this publication do not imply the expression of any opinion whatsoever on the part of UNESCO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The ideas and opinions expressed in this publication are those of the authors; they are not necessarily those of UNESCO and do not commit the Organization.

Cover photo: © Graphic Design (cover) – SOU

Online and Open Education in Shanghai:
Emergency Response and Innovative Practice during COVID-19 Pandemic

June 2020

Institute for Information Technologies in Education, UNESCO
Shanghai Open University
East China Normal University

Preface

Shanghai is a large metropolis in China with a population of over 24 million, including about 2.2 million students at different levels and millions of learners in informal and formal education institutions. When the COVID-19 pandemic hit the city, all schools, universities, and various training and learning centers in Shanghai were forced to close for the first time. The city was like all other cities in China and worldwide, shifting from face-to-face learning to home-based online learning as the only option. As a member of the UNESCO Global Network of Learning Cities and a metropolis with a dramatically developing economy and technology, Shanghai has established an outstanding online and open educational system that covers different levels of education. Nevertheless, the COVID-19 pandemic brought unprecedented challenges and huge pressure related to the prevention of learning disruption in this large city with substantial differences and diversified demands in education across its urban and suburban districts.

This Report aims to document the emergency response and innovative experience accumulated by Shanghai in protecting students' safety and ensuring that learning is uninterrupted during this challenging period. The aim is to describe the immediate and systematic actions of the local government, the innovative and inspiring practices of teachers, students, parents and education administrators, and the active and passionate engagement of the public, both learners and learning supporters. The most dynamic parts of this Report are the 18 case study examples collected from the different educational categories of preschool education, primary and secondary education, higher education, vocational education, and technical training, and formal and informal learning for parents, the elderly and the public. It is a tiny part of Shanghai's experience in combating the pandemic. However, these examples reflect the collective yet individualized approach in different situations and for different groups of learners, including rural areas, students with special needs, and psychological issues in the times when classes disrupted.

The UNESCO Institute for Information Technologies in Education (IITE) drafted the Report in partnership with Shanghai Open University (SOU) and East China Normal University (ECNU). It presents an overview and summary of emergency response and actions taken by local government, schools, universities, and public engagement, focusing on different levels of education. The impact of the COVID-19 pandemic on education extrapolated to outline lessons learned and recommendations for enhancing the resilience of education in the future from experts' perspectives.

As the world is still in the pandemic crisis, we hope that this Report would be helpful to municipal authorities and all other education stakeholders, including administrators, school and university teachers, students, parents, and general public, facing similar challenges all over the world. We hope that the innovative experience and lessons learned in Shanghai will promote online and open education when the pandemic is over and contribute to the development of more resilient education systems.

On behalf of the UNESCO IITE, I would like to thank the Chinese National Commission for UNESCO and Shanghai Municipal Government for their kind support to the preparation of this Report. Our sincere thanks and appreciation go to the two partner universities, Shanghai Open University (SOU) and East China Normal University (ECNU), for their passionate engagement and excellent contribution. Most parts of this Report have been accomplished by the two teams, the SOU team with leadership of Professor Wen Yuan, the President of the University, and the professional team of Professor Xiaoqing Gu at ECNU. We are also very thankful to the teachers, students, school and university leadership who have inspired us with their innovative experience and helped us collect first-hand materials for the case studies. Without their contribution, this Report could not have been completed in such a short time.



Dr. Tao Zhan,

Director

UNESCO Institute for Information Technologies in Education

Acknowledgment

We would like to thank the following individuals and organizations for their valuable contributions to this publication:

Shanghai Open University

Shanghai Engineering Research Center of Open Distance Education of Shanghai Open University.

East China Normal University

Shanghai Engineering Research Center of Digital Education Equipment of East China Normal University.

Authors

Professor Hong Wang, Professor Jun Xiao, Ms. Mengying Cao, Associate Professor Chen Yang, Professor Songhua Wang, Associate Professor Haihong Peng, Associate Professor Jun Fan, Mr. Yongjin Guo, SOU, China

Professor Xiaoqing Gu, Dr. Yanyan Sun, Dr. Hua Du, ECNU, China

Dr. Li Yuan, Centre for Educational Technology, Interoperability and Standards (Cetis) / Wolearn, UK

Dr. Svetlana Knyazeva, Dr. Natalia Amelina, Mr. Denis Kapelyushnik, UNESCO IITE, Russia.

Case Study Material Supporters

Introduction section: Zhihui Wei, Xiaojuan Yu, Shanghai Open University

Preschool Education Section: Aiming Li, Yiye Ying, Shanghai Open University; Hongmei Mao, Preschool Education Information Department of Shanghai Education Commission Information Center; Yi Xin, Shanghai preschool education network; Tianlei Li, Shanghai Education TV Station; Sujing Zhu, Bing Xu, Yu Zhang, Soong Ching Ling Kindergarten.

Basic Education Section: Bin Xu, Education Bureau of Jinshan District; Educational Department of Shanghai Municipal Government; Education Bureau of Zunyi; Jun Shen, Qiangwei Primary School; Ping Jin, Jinshan No. 2 Experimental Primary School; Qin Zhang, Dong Li Feng Mei Kang Jian School; Professor Fei Zan, East China Normal University; Weilan, Wang, Shanghai Xuhui Special Education Guidance Center; Yan Li, Education Bureau of Pudong District; Yonghong He, Education Bureau of Minhang District; Yuanyuan Yao, Shanghai Teacher Training Center at SMEC; Yue Zhu, Qibao High School; Xiaoyan Shi, Yuannan Middle School; Xiaodong Chen, Education Bureau of Xuhui District; Weibin Xu, Ziqun Qi, Zhoupu Yucai School.

Higher Education Section: NYU Shanghai; Hua Liu, Lingxu Yu, Shanghai Open University; East China Normal University.

Vocational Education Section: Lei Meng, Yanyun Zhong, Zhenzhi Zhai, Shanghai Open University.

Lifelong Education Section: Haizhen, Ding, Shanghai Changning District Community College; Huanxin Zheng, Zhihua Liang, Hongbin Jia, Shanghai Open University; Min Wang, Shanghai University for the Elderly.

Contributor for Translation and Revision:

Dr.Stephen Powell, Manchester Metropolitan University, U.K.

Last but not least, we would also like to thank the following persons/schools for their contribution in the Report

Lamei Wang, Minjun Ji, Shanghai Open University; Yingzi Gu, Huan Wang, Shanghai Experimental Kindergarten; Baoqi Shen, Shanghai Songyin Middle School; Changhong Qiao, Minhang High School of Science and Technology affiliated to ECUST; Chaoqun Huang, You Ai Experimental Middle School affiliated to Minhang Education Institute ; Cuiying Sun, Jinshan Zhujing No. 2 Primary School ; Jibiao Guo, Shanghai Qibao No. 2 Middle School; Ping Teng, Shanghai Gao An Road Primary School; Qian Fang, Shanghai Fushan Foreign Language Primary School; Suhua Peng, Shanghai Luoxing Middle School; Shengchun Wang, Nanyang Middle School; Tao Jin, Shanghai Jianshan Middle School; Xuefeng He, Minhang Experimental Primary School; Yong Chen, Shanghai World Foreign Language Middle School; Zhengmin Wang, Shanghai No.2 Secondary School.

Contents

Preface	1
Acknowledgment	3
Chapter 1. Shanghai in Action to Ensure Education Continuity	6
1.1 Policy and strategies to ensure the “Disrupted Classes, Undisrupted Learning” in Shanghai	6
1.2 Responses from different levels of education in Shanghai	10
1.3 Innovative educational programs for the public	12
Chapter 2. Preschool Education: Online and TV Programs Supporting Parents and Children Home Learning	13
Best Practice Case Studies	15
Case 1. High-Quality Online Resources for Preschools	15
Case 2. Flagship Children Programs on Television	17
Case 3. Special Online Courses for Parents	18
Case 4. Online Learning Community for Parents	20
Chapter 3. Basic Education: Individualized Solutions for Different Levels and Groups of Students	22
Best Practice Case Studies	23
Case 1: Excellent Online Courses from Best Teachers	23
Case 2: Supporting Students in Need	25
Case 3. Online Training for Teachers in Undeveloped Provinces	27
Case 4: Supporting Students with Special Needs	29
Case 5: Innovative Remote Learning in Schools	31
Chapter 4. Vocational Education: Scaling up Online Practical Training for Students and Professionals	35
Best Practice Case Studies	36
Case 1: Integrating Different Resources to Support Online Learning	36
Case 2: Innovative Online Labs and Online Practice Training	38
Case 3. Online Business Training and Professional Development	41
Chapter 5. Higher Education: Leading Changes in Online Education for College Students	43
Best Practice Case Studies	44
Case 1. Flexible Online Learning for Graduate Students	44
Case 2: Flexible Use of Online Platforms and Tools to Reach Students Globally	46
Case 3: Online Innovation and Entrepreneurship Training Camp	48
Chapter 6. Lifelong Learning: Online Learning Community and Flexible Learning for the Public	50
Best Practice Case Studies	50
Case 1: Building an Online Learning Society	50
Case 2: Radio Class in Mobile Cabin Hospitals	53
Case 3: Flexible Learning for Elderly	55
Chapter 7. Challenges and Future Impact	57
7.1 Major challenges in the online and open education in Shanghai	57
7.2 Future Impact	60
References	63

Chapter 1.

Shanghai in Action to Ensure Education Continuity

Shanghai is the largest city in China, with a population of more than 24 million. It is considered the nation's leader in education. More than 1.43 million primary and secondary school students, 100,000 secondary vocational students, and over 700,000 higher education students had to switch to online learning during the COVID-19 pandemic (Shanghai Municipal Education Commission, 2020). Guided by the Chinese Ministry of Education, the Shanghai Municipal Education Commission maintains a relatively high autonomy for developing localised policies, implementation, and financing strategies, and setting specific targets. The Commission takes the primary responsibility for the financing and provision of affiliated branches of higher education. Local educational authorities in the districts (in urban areas) and counties (in rural areas) are responsible for the financing and provision of preprimary education, the nine-year basic education, and senior secondary education. Although on the whole, the Shanghai education system is considered to be an advanced one, there are still issues to address in areas, such as equitable access to education, uniformly high quality of education and a digital divide between schools and districts that can aggravate digital exclusion.

Moving teaching for this large number of students from campus-based face-to-face to home-based online learning has been a significant challenge. Universities, schools, educators, and parents have had to develop new approaches to support students' learning, organize online teaching and identifying useful and exciting online resources, and provide online support for students studying at home.

1.1 Policy and strategies to ensure the “Disrupted Classes, Undisrupted Learning” in Shanghai

Schools and universities have been closed in China to prevent the spread of the COVID-19 virus since January 2020. Chinese Ministry of Education launched an initiative entitled “Disrupted Classes, Undisrupted Learning” (Huang et al., 2020). In response to the COVID-19 pandemic, the Shanghai Municipal Education Commission (SMEC) issued the "Notice on Effective Prevention and Control against COVID-19 in Schools" on January 23rd, 2020. This notice stated that the management of education activities should be strengthened during the pandemic, and plans should be developed to mitigate the worst effects of educational institutions' closure and ban on physical attendance. Shanghai's education efforts to contain the pandemic are shown on the time axis in Figure 1.

Timeline of the Shanghai's efforts in education sector to contain the pandemic

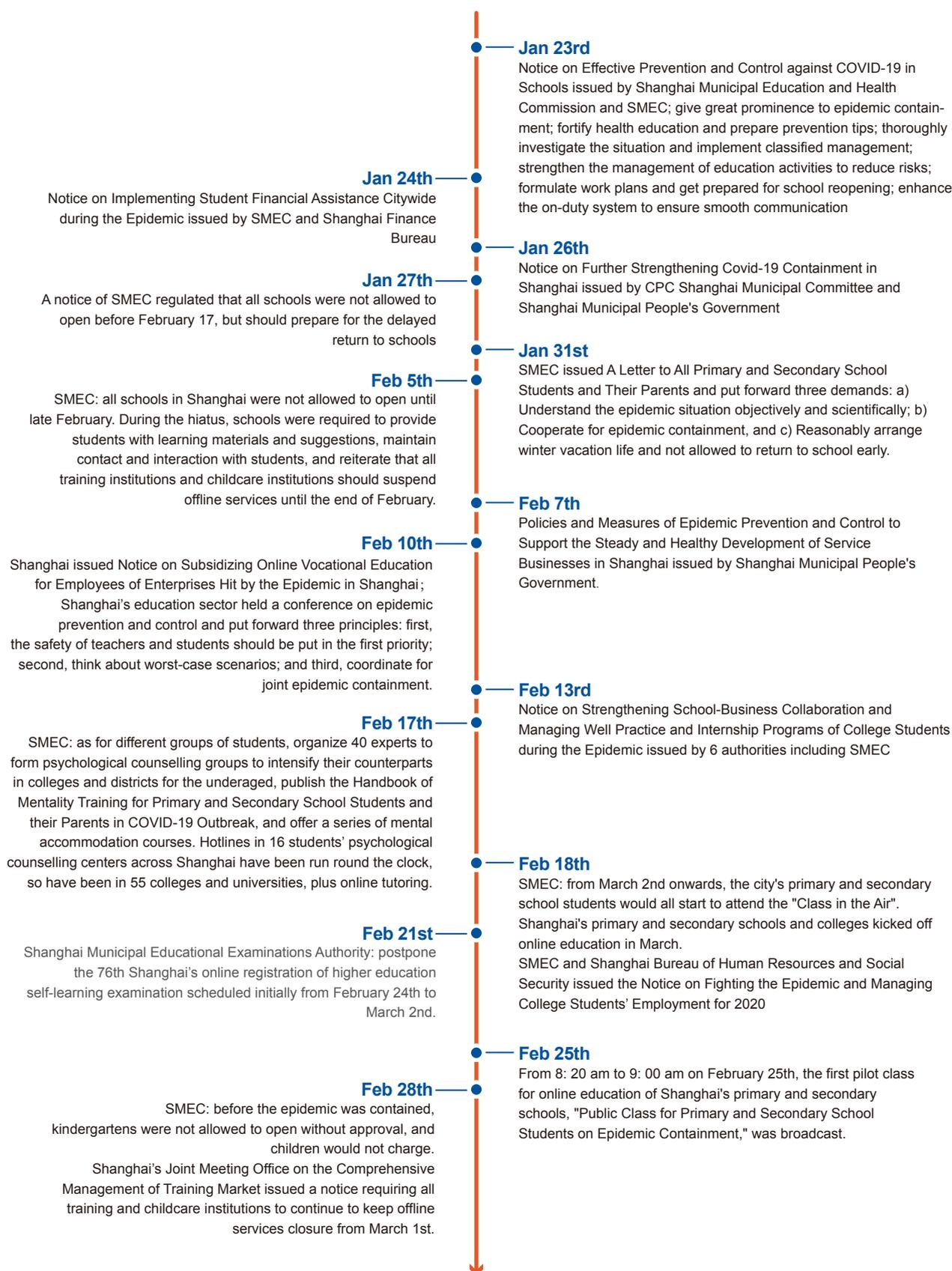


Figure 1.The Shanghai government action in January and February 2020.

1.1.1 Key actions to ensure education continuity

• Teaching children about Coronavirus

Shanghai Education TV developed specific broadcasting content called, "Learning to Be a Little Guard Fighting Pandemic" to help students gain knowledge and understanding about pandemic containment measures and actions. The first pilot program, "Public Class for Primary and Secondary School Students on Pandemic Containment," was aired on February 25th to teach about scientific containment methods and guide students to arrange their studying and living at home expertly. During the first airing, 1.425 million students, or 99.3 percent of the total students, watched the pilot course "public class on pandemic prevention", which was highly rated by students on interactive platforms (People's Daily Online, 2020).

• Keeping pandemic information updated

In addition to up-to-the-minute developments of pandemic containment measures made public on SMEC's website, the "Shanghai Education" WeChat account, and other platforms, key staff members of SMEC attended government press conferences to share information about the status of the pandemic.

• Paying attention to students' physical and mental health issues

SMEC engaged 40 experts to organize psychological counseling groups to inform and support their counterparts in colleges and schools through the publishing of the 'Handbook of Mental Health Training for Primary and Secondary School Students and their Parents in COVID-19 Outbreak' (Di Wu, 2020). In addition, the experts' group ran mental health courses, a hotline, and around the clock online tutoring in 16 students' psychological counseling centers across Shanghai (China Education Online, 2020). In total, these activities encompassed 55 colleges and universities. In order to adequately protect the eyesight of children and adolescents, Shanghai Municipal Government has identified specific measures such as restricting the duration of online screen time, balancing time for study and rest, strengthening information of how to take care of the eyesight, and guiding students to develop good work and rest habits (Liberation Daily, 2020).

• Monitoring and strengthening schools' management

A publication, "Targeted Policies for Respective Districts and Schools (Chen & Xia, 2020)," established a comprehensive pandemic containment system, and clearly defined the responsibilities of designated persons to achieve effective management of the situation.

- **Organizing schools to re-open**

On April 9th, the Shanghai government decided that Grades 9 and 12 students would return to school. This decision was implemented on April 27th when universities and secondary vocational schools could arrange the return of learners to school with a specific date released by respective schools once approved. Schools at all levels and of all kinds were instructed to prepare for students' return by grade thoroughly and in groups before May 6th (Xue, 2020).

1.1.2 Key actions to ensure quality of large-scale online learning

- **Providing guidance for online learning**

The education authority has published a document "Guide to Online Learning" to help educators effectively use technology and online resources to improve online interactions with students. It also included using TV and IPTV for teaching and learning and online textbooks for schools. One of the concerns regarding online learning for the Shanghai government is not to leave any students behind, and make sure every student has access to online learning. Special arrangements and support have been provided to help a minority of students who could not attend classes for various reasons through either TV or the Internet.

- **Learning support for parents**

A letter was sent to parents about online learning via WeChat for parents in Shanghai. The letter helped parents to understand online learning and ways of creating a positive learning environment for their children at home. It included guidance on how to support students' learning, physical and mental health, and to prepare children for return to schools after the pandemic. Hotlines were open for parents to ask questions and get information immediately (Huang & Xu, 2020).

1.2 Responses from different levels of education in Shanghai

During the pandemic, preschool education services were switched to online. Multimedia channels such as TV, radio, magazines, websites, and mobile apps have been used to support parents and teachers to engage with children learning at home. Approximately 1.435 million students in primary and secondary school officially started their online learning from March 2nd. Pre-recorded videos were provided to 12 grades via 12 TV channels (one channel for each grade). Online learning resources were accessible to teachers and students on various platforms and cloud services provided by IT companies and providers of educational services. Students could access lessons and complete assignments with the "Class in the Air" using their computers, tablets, mobile phones, TV sets. They could also interact with their class teachers through a dedicated webcast room and other social platforms. The courses were created by more than 1,000 recognized teachers and over 200 technicians (People's Daily Online, 2020). In the course development, the teaching and research office of SMEC played an essential role in helping the lecturers to refine lesson plans in order to improve the quality of the teaching continually. Learning through "Public basic courses" is provided by SMEC for vocational education through online learning resources (www.shedu.net.cn, zz.yiban.cn) and social resources (Chaoxing, vocational education MOOC, etc.) which are freely available for teachers and students at colleges (Shanghai Education, 2020). On March 2nd, 44 universities and 11 research institutes for postgraduates and undergraduates, as well as vocational colleges, first launched the online education. On this day, 7,000 courses were delivered to over 700,000 learners. SMEC has established a learning platform for universities to publish and share courses and resources (Shanghai Municipal Education Commission, 2020).

In response to the pandemic, key support actions have been carried out to support large scale online teaching and learning from pre-school to universities in Shanghai:

- **Sharing educational resources**

In response to the pandemic, Shanghai developed an online learning system for primary and secondary school students for cities in the Delta. The aim was to share the quality education resources of each city and support those cities that had fewer resources. The Shanghai-Zunyi Vocational Education Alliance (SZVEA), under the "Partner Assistance Framework," has set up the "SZVEA's Digital Resource Database Platform for Reading and Sharing" to provide online education resources to teachers and students of Zunyi's secondary vocational schools. Since its launch in late February, the platform has successfully delivered diversified online teaching activities and extensive teaching resources, receiving good reviews from teachers and students (Shanghai Education, 2020).

- **Improving online teaching quality**

The SMEC conducted a five-day, five-lecture-training program, "Teachers' Capacity Building for Online Learning," to improve online teaching for primary and secondary school teachers (Shanghai Municipal Education Commission, 2020). In addition, an eight-hour training program for online teaching has been delivered to over 500 secondary vocational school teachers (Shanghai Education, 2020). East China Normal University has developed basic requirements and standards of online learning to ensure the quality of online teaching through teachers' self-examination, student feedback, and peer reviews. Shanghai University of Medicine & Health Sciences has tested the teaching and learning through a specific database "electronic portfolio" containing 279,526 pieces of school-level teaching materials of 1,124 online course modules (Shanghai Education, 2020).

- **Supporting mental health and disabled students.**

ECNU has published the 'Handbook of Mental Health Training for Primary and Secondary School Students and their Parents in COVID-19 Outbreak', which is freely available online. Tongji University, East China University of Science and Technology, and Shanghai Publishing and Printing College coordinated the three major telecom operators to implement free "mobile data traffic" activities for students from low-income families. Several institutions, including Fudan University and the University of Shanghai for Science and Technology, provided a subsidy of mobile data traffic to students to address the problem of insufficient mobile data allowances. In response to the needs of deaf students in special classes, the Shanghai Institute of Technology added three sign language interpreters to increase the proportion of online text communication in teaching. This enabled teachers, students, and sign language interpreters to be online simultaneously to ensure effective teacher-student communication (Shanghai Education, 2020).

- **Providing technical support**

Shanghai Media Group and IT companies, including Oriental Pearl, China Mobile, China Unicom, China Telecom, Tencent, Xiaoheiban, and Bilibili, provide technical solutions for education to ensure that teachers and students can access online content and run online interactive sessions smoothly. Schools in all districts of Shanghai are encouraged to use their infrastructure and resources to deliver online education.

- **Paying attention to the health status of international students in Shanghai.**

Many universities in Shanghai carry out publicity work in both Chinese and English through WeChat official accounts, WeChat groups, electronic screens in student dormitories, etc., so that international students could learn about the pandemic situation in Shanghai and the pandemic prevention measures in real-time. The university's international student counselors provide study and living assistance to international students who stay on campus during the pandemic (Shanghai Education, 2020).

1.3 Innovative educational programs for the public

To provide guidance and assistance to home-based parenting, Shanghai has launched a program called "Grow Up Together – Parent and Children Amusement Park." This program is designed for families with children aged 3 to 6 and aimed to introduce indoor sports, creative activities, diverse parent-child games, nursery rhymes, nutritious meals, and health care. Families watched the program at home and then undertook various fun parent and child activities. During the pandemic, parents who used to be busy with work became the main companions, taking the children to do exercises and to play and learn together (Shanghai Preschool Education, 2020).

Counselor Ye Linjuan's Labour & Education Studio and Meng Xiancheng Academy of Classical Learning of East China Normal University initiated practice and experience activities for students, such as learning how to make a home-style craft from students' family members. Students use short videos, pictures, and paintings to record their experiences (China Education Network, 2020). To combat COVID-19, physical exercises at home have become very important. Shanghai University of Traditional Chinese Medicine's "Five-Animal Exercises" imitate the movements of tiger, deer, bear, ape, and bird. The collection includes elementary, intermediate, and advanced versions of Five-Animal Exercises suitable for college students and middle and primary school students based on Hua Tuo's heritage and the latest theories of traditional Chinese medicine. Shanghai Open University's Shanghai Parents School has established a lifelong learning system for "learning and growth of underage children". Shanghai Parents School also set up the "Wisdom for Family Education" online class, which joined 23,368 parents at the same time (Shanghai Open University, 2020).

To echo citizens' call for online learning, Shanghai Lifelong Learning (SHLLL) has established a "Class in the Air" for lifelong learning for Shanghai citizens, which helps people learn at home during the pandemic using MOOC, micro courses, and a virtual online classroom (Shanghai learning network, 2020). The website offers the latest information related to the pandemic and incorporated with positive messages on life, faith, science, and moral education to support "Shanghai's Students Gather Together to Combat COVID-19".

Chapter 2.

Preschool Education: Online and TV Programs Supporting Parents and Children Home Learning

In Shanghai, childcare services are provided for 0 to 3 years old through community-run early childhood education centers, kindergartens, and public/private nurseries. To ensure pandemic prevention and control measures, children who used to learn and play at kindergartens had to stay at home in the past months. As a result, parents faced new challenges; they had to learn professional childcare skills in teaching, nursing, healthcare, nutrition, as they take responsibility for their children's education.

Shanghai Municipal Education Commission organized district education bureaus and kindergartens to offer online services to tackle the challenge the preschool education has faced during the pandemic. Some initiatives are described below.

- **Health information alert system**

Many schools in Shanghai have developed WeChat systems to record students' health conditions. Kindergartens gave prominence to children living in areas struck by COVID-19, those whose parents worked in the frontline of pandemic containment, and children whose families suffered under the siege of contagion.

- **One-stop inquiry**

Shanghai's parents can check out the admission policies of kindergartens of 16 districts and engage with the districts on a government website. Parents' questions and concerns are addressed by officials from the Shanghai Municipal Government. Parents can visit schools on the Cloud and participate in online presentations and interact with primary and secondary schools and kindergartens.

- **Class in the Air**

During the pandemic, "family" has become the main venue for children to study, while parents have also played a "major role of childcare" in the real sense. Relying on "Internet plus Scientific Parenting Guidance", Shanghai integrated the city's professional resources, covering "health care", "nutrition recipes", "diverse games", "indoor sport", "nursery rhymes", "creative production" and other aspects, to be selected and consulted by teachers and parents. Shanghai Special Education Online offers rehabilitation and learning programs for children with physical handicaps to make sure that no one is left behind.

- **Parents Schools**

Shanghai provided professional guidance for early childhood institutions and parents in scientific parenting. The online course "Shanghai Parents School," created by Shanghai Open University, invited prominent experts in the homeschooling field to give live lectures every week. More than 150,000 parents nationwide have so far watched and studied in the seven courses delivered. The online class, "A Guide to Children with ASD at Home," was disseminated through the China Social Sciences Press, Himalayan App, and other platforms, to benefit more than 3,000 parents.

- **Quality education service alliance**

The Shanghai government takes responsibility for enhancing the quality of preschool education resources and providing free resources to parents across the city. A large number of international teachers and professional researchers have worked collaboratively to promote the sustainability of public services in Shanghai's preschool education and help parents to deal with the anxiety of childcare during the pandemic.

Best Practice Case Studies

Case 1. High-Quality Online Recourses for Preschools

The Age06 (<http://www.age06.com/age06web3>), Shanghai preschool education resource website, has been used by parents and teachers in preschools to help children learn and engage in different activities. There are two main sections, "Access to Courses" and "Family-Kindergarten Connect," to support online teaching, online learning, and online family-kindergarten interactions (Figure 2).



Figure 2. Example of teaching and learning on Age06 and its WeChat account
(Source: Age 06 WeChat account)

Nearly 10,000 courseware from different districts in Shanghai have been submitted to Age06's Preschool Education's Online Curriculum Resources Repository and Hydlight APP covering the topics of "health care", "nutrition recipes", "diverse games", "indoor sporting", "nursery rhymes" and "creative production". These resources were designed to be used by Shanghai's kindergarten teachers to plan and deliver lessons for family-kindergarten joint education.

Eighteen episodes of online microcourses for parents, entitled "Smart Parents and Life for Fun", were created, and thirteen of them were launched through Age06's WeChat account and the WeChat account of Shanghai Scientific Parenting Guidance program (SSPG). Additionally, "Inspiration on Weekends", a parent-child game (Table 1), has been presented on the SSPG to provide parents with more game resources. "Experts online" have been set up to answer parents' questions with 15 experts from pediatrics, psychology, preschool education, nutrition, and other fields that hosted their Q&A sessions.

Table 1 SSPG's "Inspiration on Weekends", a Collection of Parent-Child Games

Date of Publication	Subject	Expert/Institution
March 6th, 2020	Parents shed tears in watching a 9.2-minute CCTV documentary. You need this Handbook on Interactions for Family Health to satisfy the natural desire for family life.	Ruijin No.1 Road Kindergarten, Huangpu District
March 13th, 2020	Video: Theater artists from abroad to show you Games of cure therapy.	Shanghai Children's Art Theatre
March 20th, 2020	Grandparents' 33 babysitting tricks soothe your nerves the next whole week	Changning Nursery
March 27th, 2020	Parents, please take good care of yourself	Jing 'an District Homeschooling Guidance Center
April 10th, 2020	Video: Int'l artists come to "Play with Cloud" again! Take the theater home.	Shanghai Children's Art Theatre

During the pandemic, the Age06 and its WeChat account, scientific parenting guidance platform, and App received more than one million visitors. Among them, hits of every single article on the account exceeded more than 10,000. More than 200,000 users downloaded and subscribed Hyhlight app to take the initiative to accept guidance. In the fight against the coronavirus, the number of readings of each post about online courses on SSPG's WeChat account was more than 20,000, and a few were even beyond 100,000. Nearly 200 general and typical questions and answers by experts. The "Internet+ Shanghai's scientific parenting guidance" has played an essential role in supporting teachers and parents for children's education during the pandemic.

 Expert comments:

"Internet+ scientific parenting guidance" provides professional assistance for children's growth.



Case Video: <http://www.shou.org.cn/kfzx/2020/0514/c8522a67016/page.htm>



Case 2. Flagship Children Programs on Television

A 38-episode series of TV masterpiece "Grow Up Together – Parent and Children Amusement Park" was produced and showed three times a day on Shanghai Education TV in March and April (see Figure 3). The TV masterpiece, guided by the SMEC's nursery department, municipal teaching and research office, and preschool education information department, focused on preschool education. It was designed to serve 580,000 Shanghai families with 3-6-year-old children.

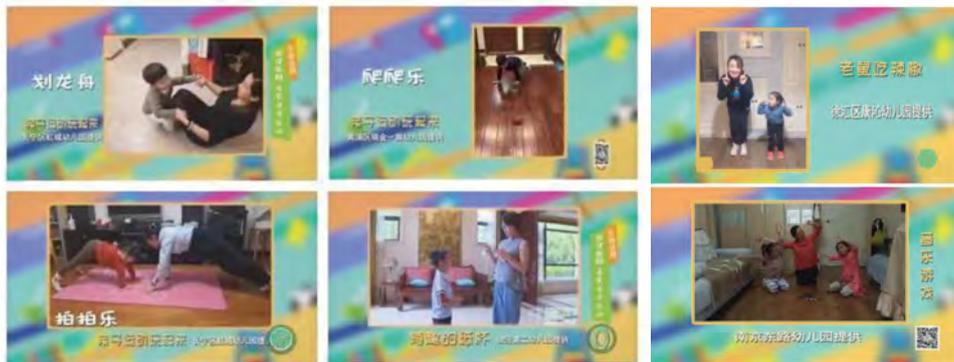


Figure 3. Short videos to show a collection of parent-child activities at home
(Source: Shanghai Education TV station WeChat Official Account)

The program invited the experts from Shanghai Center for Women and Children's Health and Shanghai Children's Medical Center to popularize and advocate health knowledge needed by parents, such as eye hygiene, nutritional diet, children's susceptible diseases, vaccination, pandemic prevention at home, psychological counseling, common endocrine disorders, and growth and development (see Figure 4). These efforts made a relatively comprehensive guide to accompany and educate children at home during the pandemic. Through the interaction of TV programs, the happy scenes of children and their parents in Shanghai families were connected, which became a bright and cheerful scene on the screen of Shanghai during the pandemic.



Figure 4. Education and medical experts gave professional advice in the studio
(Source: Shanghai Education TV station WeChat Official Account)

The TV program "Grow Up Together – Parent and Children Amusement Park" has received positive responses to support parents in interacting with their children and exploring new approaches to engaging with children at home.



Expert comments:

TV programs cater to the needs of children's growth, and parent-child themed programs provide clarification for parents during the pandemic.



Case Video: <http://www.shou.org.cn/kfzx/2020/0514/c8522a67014/page.htm>



Case 3. Special Online Courses for Parents

Shanghai Parents School, founded on January 21st 2020, aims to establish a homeschooling system to address such problems as parent-child communication, parenting predicament, and psychological anxiety arising from the pandemic (see Figure 5). The content includes 1) the scientific parenting and learning concepts, 2) hot topics on learning at home, and 3) guest interviews and workshops.



Figure 5. Online class of Shanghai Parents School
(Source: Shanghai Education TV station WeChat Official Account)

From March 2nd onwards, several online courses were uploaded on the "Online Open Class" for free access of parents. An hour of expert lectures and half an hour of online interactions were arranged in the evenings every weekend. Parents could leave messages and interact with each other and ask experts questions. All courses can be replayed on Shanghai Open University's Department of Non-Degree Education website. To promote the online courses, Shanghai Parents School collaborated with schools, communities, and businesses to roll out their courses and promote activities to reach more parents. So far, each course was accessed by 20,000 parents (see Figure 6).



Figure 6. Shanghai Parents School Students were watching the lectures carefully
(Source: Shanghai Education TV station WeChat Official Account)



Expert comments:

The Parents School gathers professional education resources and interacts with each other through the "cloud" platform to solve parenting puzzles.



Case Video: <http://www.shou.org.cn/kfzx/2020/0521/c8522a67041/page.htm>



Case 4. Online Learning Community for Parents

With the outbreak of COVID-19, Soong Ching Ling Kindergarten built a collection of "parents-and-children-to-combat-the-pandemic" resources which involve home games, science, sporting, multiculturalism, parent-child reading, popular science, and environmental protection. The kindergarten has presented resources to parents, not only those whose children attended kindergartens but also parents across the community.

The kindergarten has guided parents to produce creative parent-child activities to improve parent-child relationships. For instance, the activity "small space, great sporting" was designed to orient families toward flexible sporting in limited indoor space. Figure 7 shows the design process and activity material development for parents to access and modify math materials and curriculum activities at home.

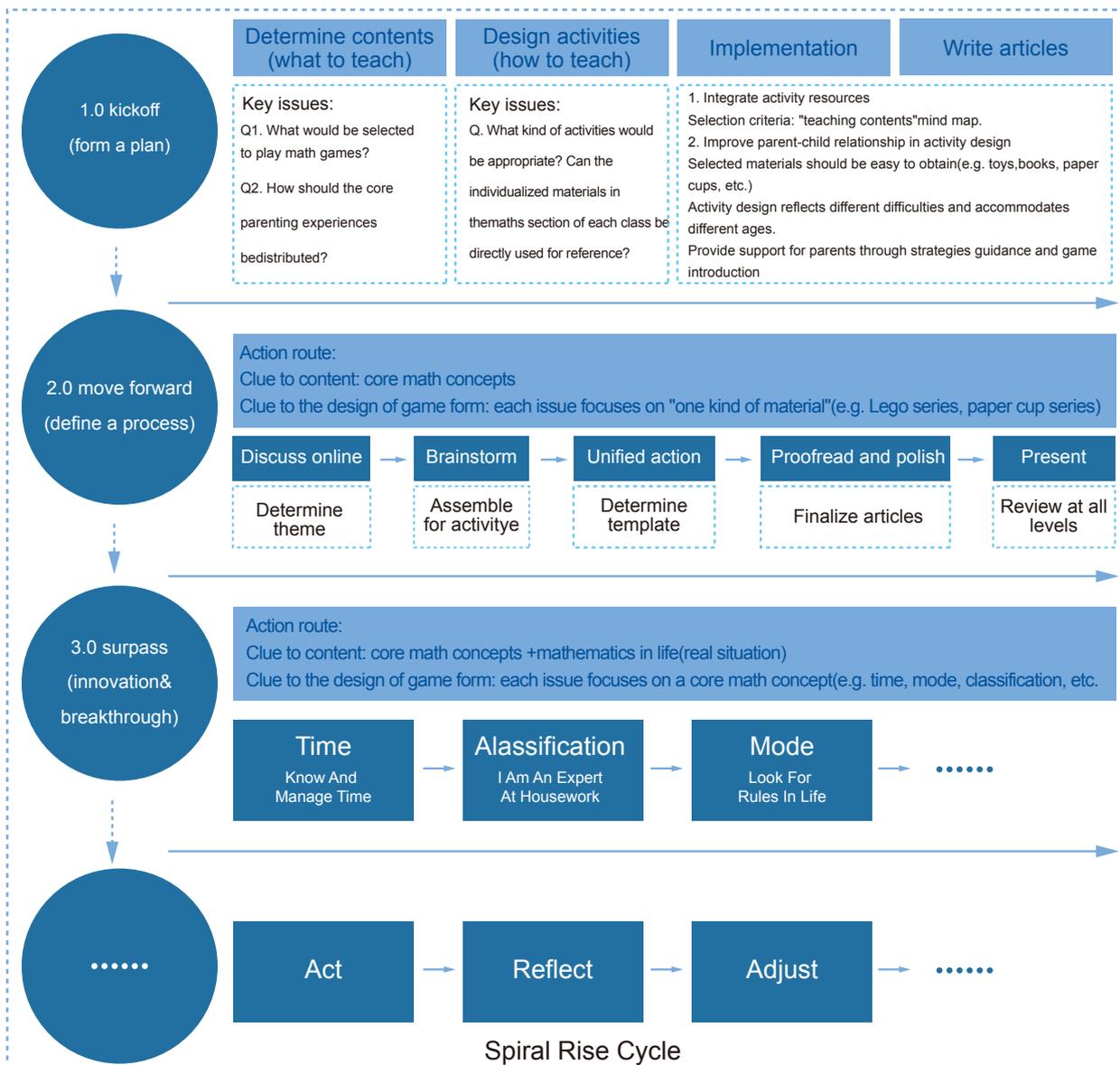


Figure 7. Flowchart of the operations of the math team

The growing positive feedback enabled both Chinese and foreign teachers to engage with parents more actively. As of April 17th, the official account of the kindergarten has launched 72 posts of tips in the column "Parent-Child Fighting the Virus," with a total of 207,200 hits, a maximum of 7,950 hits for a single post and 2,900 hits for on average. Soong Ching Ling Kindergarten has created a professional supported parent online learning community to support parents in better positioning themselves to fight the virus and take care of their children throughout Shanghai.



Expert comments:

The involvement of children and parents was underscored in the process of making tips to fight the pandemic. The Kindergarten through "Cloud Teaching and Research," was campaigning to mobilize the entire community behind it, including researchers, Chinese and international staff members, and health-care professionals for the mission.



Case Video: <http://www.shou.org.cn/kfzx/2020/0521/c8522a67040/page.htm>



Chapter 3.

Basic Education: Individualized Solutions for Different Levels and Groups of Students

There are 698 primary schools, 842 middle schools and 31 special education schools in Shanghai. The COVID-19 outbreak disrupted Shanghai's schools for the 2020 spring term, SMEC has decided to roll out large-scale online education from early March. A shift from face-to-face teaching to online teaching in a short time resulted in significant challenges to the government, schools, teachers, students and parents. Shanghai's education authorities at all levels have been actively involved in experimenting with online learning approaches to deal with the constraints brought about by the pandemic.

At the government level: SMEC campaigned to mobilize the entire sector in designing online learning courses for grade 1-12 to meet the basic needs of primary and secondary schools. Those online courses were shared resources for all schools, which solved the low-speed Internet connection problem of some students and relieved the burden on teachers. Meantime, education institutions in each district have made plans to publish resources to support different online learning models and platforms, teacher training, and mental health of students. The Shanghai Teachers Training Center (STTC) has also undertaken the online vocational training programs for teachers from other provinces and cities.

At the school level: A series of microcourses entitled "Scientific Arrangement for Housebound Life" developed to help students adapt to the online learning at home, and cultivate good learning habits, and stay physically and mentally healthy during their time at home. The teacher in charge of the class would regularly communicate with each student to check learning progress and health conditions. Primary and secondary schools communicated proactively with the parents to ensure that they create an effective learning environment for students to study at home. During the online education, the district's special education center and teaching researchers helped teachers in special schools arrange personalized lessons for students with special educational needs.

This section includes five cases that illustrate a picture of Shanghai's primary and secondary schools' emergency response to online learning at the municipal, district and school levels in the COVID-19 outbreak.

Best Practice Case Studies



Case 1: Excellent Online Courses from Best Teachers

The essential task at the municipal level was to help schools and teachers ensure the quality of teaching, which was the top priority in organizing large-scale online teaching. In this context, "Class in the Air" (the Class) designed by SMEC was deemed as a city-level synergetic program of online learning for primary and secondary schools that students can access at various platforms: cable TV, Internet Protocol TV (IPTV), Internet broadcasting service platforms for PCs, laptops, and tablets. Online courses for each grade (1-12) were broadcasted at different channels. The course curricula were based on the regular face-to-face teaching schedule. The courses were created by more than 1,000 prominent teachers plus over 200 technicians. In the course development, the teaching and research office of SMEC played an essential role in helping the lecturers to refine lesson plans in order to improve the quality of teaching continually. The "Class in the Air" has created a pool of high quality resources for implementing large-scale distance learning lessons to support students who stayed at home in Shanghai:

- Each week, a total of 380 video lessons for online education of 12 grades were produced in the resource library of the Class, including 159 lessons for 11 subjects of primary schools, 123 lessons for 17 subjects of junior high schools, and 98 lessons for 13 subjects of senior high schools (Shanghai Municipal Education Commission, 2020). These lessons covered all primary and secondary courses.
- Districts and schools are allowed to use "Class in the Air" flexibly according to their local context and students' needs and teaching practice. Teacher training was provided to help teachers develop new skills and transforming their teaching approaches from face-to-face to online teaching and use those courses creatively in their lessons (Shanghai Municipal Education Commission, 2020).
- Teachers are encouraged to use "Class in the Air" to support their online teaching and to help students learn at home effectively. Teachers can watch courses with students and use interactive tools to estimate students' learning progress and assign different tasks and assessments to individual students.

- The “Class in the Air” was highly recognized by teachers, students and parents, especially by those who were not in elite schools, because it provided easy access to high-quality educational resources.



Figure 8. Grade 3 student from Jingcheng Campus of Minhang Experimental Primary School attended the "Class in the Air" via TV



Parents Comments:

"As a parent, I am very grateful to the city's authorities at all levels for gathering excellent teachers in such a short time to provide children with quality educational resources," said the mother of a student at Fenghua Junior High School.



Expert Comments:

The city-level online courses of the Class provided flexible resources to schools and enabled teachers to spend more time for individualized instructional design.



Source :

A collection of lessons for Grade 1 in the Class on March 2nd:

<https://www.bilibili.com/video/av93435762/>

Math lessons for Grade 7: <https://www.bilibili.com/video/av96219114/>



Case Video: <https://www.bilibili.com/video/av93377059/>



Case 2. Supporting Students in Need

Minhang District is the second-largest district. There are 141 primary and secondary schools, many students are from families of migrant workers. The challenge for schools in implementing large-scale online education was in using limited teaching resources to support low-income families, especially students experiencing difficulties with access to technologies.

Technology readiness survey for launching home-based learning

The Minhang Education Bureau has launched a technology readiness survey to investigate and understand the availability of technologies for teachers and students in order to support and implement remote learning. The "Minhang's IT-enabled Education Resource Questionnaire" has been sent to all schools in the district. A working group has been set up by the Minhang Education Bureau to oversee the development and implement remote learning during the COVID-19. Based on the information gathered from the survey, the team worked with schools and parents to explore ideas and develop specific policies to ensure that all students had devices for their learning at home in the district.

Solutions aimed to support low-income families

The technology readiness survey showed that 681 students did not have smartphones, tablets, computers or TV sets at home, and 34 families had gone back to their hometown with no Internet access. The district education bureau proposed the following solution to enable students to participate in online learning:

- Providing personal devices, e.g., Pad with 4G network card for students who live in Shanghai, and guide them to use it for online learning;
- For students not returning to Shanghai (also no Internet access), the district education bureau coordinated with the Science and Technology Commission and network operators to provide mobile data traffic to facilitate their online learning.
- Providing one-on-one catch-up lessons to immigrant families who had gone back to their town with neither device or access to the Internet when students return to schools.

Mental health services for students

The Minhang Institute of Education put students' mental health high on its agenda during the pandemic. It arranged the counseling service, education resource allocation and working mechanism holistically. It offered the psychological counseling service by group, level, and stage to the underaged, specified in three aspects as follows:

- 24-hour psychological hotline for all teachers, students, and parents
- Online workshops for teachers to help them maintain students' mental health during the outbreak.
- Online courses and resources to help students and parents to maintain mental health during the outbreak.



Expert comments:

The working group of the Minhang Education Bureau offers various solutions to support families based on the results of the technology readiness survey, and the Institute offers psychological counseling services to ensure the smooth running of online learning.



Case Video: <http://mzxt.mhzhjy.net/open/course/1782>



Case 3. Online Training for Teachers in Undeveloped Provinces

One of the responsibilities for the Shanghai Teacher Training Center at SMEC is to organize training courses for teachers in other provinces to promote high-quality teaching and share "Shanghai Experience" (see Figure 9). Due to the COVID-19 pandemic, they had to switch initially planned face-to-face training program for teachers in Zunyi (a poverty-stricken area in China) to online training. The project team had redesigned the training program by drawing a wide range of online learning resources to support self-directed learning. The project team used group discussions and presentations to achieve expected training outcomes and enable Zunyi teachers to learn and practice online teaching with their students.



Figure 9. Online courses produced by staff members of Shanghai Teacher Training Center

Online training engagement activities

The online learning resources covered a wide range of fields, including conceptual thinking, theoretical learning, theoretical analysis and practical reflection. A large number of classroom cases enabled Zunyi teachers living in remote areas to have access to the quality classroom teaching examples developed by well-known Shanghai teachers (see Figure 10). Based on self-directed learning, online workshops were organized so that teachers could reflect on their learning and improve their teaching practices. A total of nine teachers for each subject delivered presentations on their lesson plans and expected learning outcomes. Experienced teachers from Shanghai provided valuable feedback and comments for each presentation.



Figure 10. A Zunyi teacher trainee demonstrates and exchanges achievements online

Participating in teachers' learning community

Zunyi teachers are encouraged to join CCTALK's teachers' network to post questions and discuss new ideas with other teachers on the platform. The questions were collected from previous stages and the questions were asked on the platform which were all answered by educational experts. It provided an excellent opportunity for Zhuyi teachers to exchange thoughts and to share new ideas on online teaching and learning online. It inspired them to move their teaching practices to a new level. More than 10,000 teachers have participated in the online discussions and contributed to the teacher learning community.



Expert comments:

The Shanghai Teacher Training Center offered none-stop professional training for teachers in other provinces to share Shanghai's experience during the pandemic.



Case Video: <http://www.shou.org.cn/kfzx/2020/0527/c8523a67116/page.htm>



Case 4. Supporting Students with Special Needs

Donglifeng Meikangjian School is a special school established by Xuhui District People's Government for intellectually disabled children and adolescents aged 3-16 to receive nine-year compulsory education and three-year pre-school education. The school mainly enrolls children with moderate to severe intellectual disability, with many having multiple disabilities including physical, this includes dyskinesia, speech and language disorder, autism or other diseases, such as congenital heart disease, epilepsy and asthma. There are currently 213 students (including students receiving special education delivered to their home), 18 classes (including pre-school classes), and 67 full-time teachers. In February 2020, due to the COVID-19 pandemic, Donglifeng Meikangjian School actively explored new approaches to provide personalized support to help students with special needs to learn at home. Considering the cognitive and attention characteristics of students with moderate or severe intellectual disabilities, the school decided to provide them with suitable home-based learning resources, and parents supported them to study at home flexibly. Therefore, home-based learning is oriented as follows.

• Promoting healthy stay at hom

Advocating the principle of “healthy home-based learning,” the school guided parents to lead their children to establish and maintain the rhythm of family life. It featured early to bed, early to rise, balanced diets, a combination of physical exercise and rest, and integration of study and relaxation, to build up the children's ability to cope with the situation through the practical support of family members (see Figure 11).



Figure 11. A student is doing physical exercise at home requested by the school

• Learning by doing

Taking each student's family environment as the learning context and the family's daily life as the process, the school works out the most common, essential, and typical issues or problems in students' life. The approach was to guide parents to integrate the learning into family life based on their children's characteristics and abilities (see Figure 12).



Figure 12. A student is doing scientific exploration at home

- **Personalized learning outcomes**

To respect the differences among students, the school requires teachers to implement the targeted special therapy guidance by reflecting on the characteristics of students of different ages and individual features, and placing emphasis on objectives that supported by instructions on what needs to be done step-by-step.

- **Simplified content and interesting activities**

The learning style of children with special needs described is thought of in terms of “small steps and multiple cycles”. In order to help children and parents learn efficiently and reduce their anxiety, the teachers provided children and parents with learning resources that were easy to follow and complete. Particular attention was paid to the appropriate amount of learning content with appropriate difficulty and challenge, and exciting activities that would motivate students to study at home (see Figure 13).

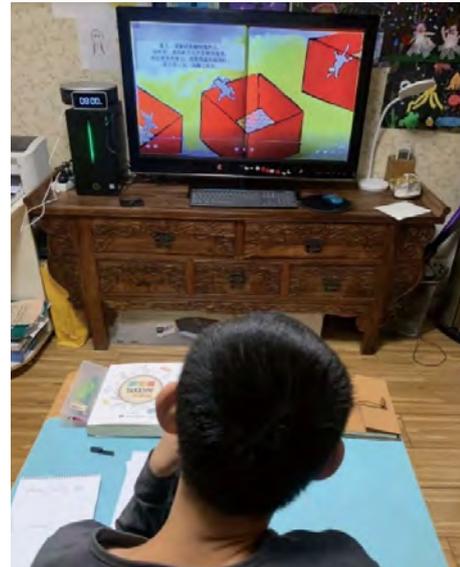


Figure 13. A student is watching a video course played on TV



Expert comments:

Online learning was especially difficult for students in special schools because the individual needs of each student vary. To meet this challenge, Donglifeng Meikangjian School created personalized curricula that can make full use of students’ family environments and provide guidance to parents on how to facilitate learning.



Case Video: <http://www.shou.org.cn/kfzx/2020/0522/c8523a67072/page.htm>



Case 5. Innovative Remote Learning in Schools

Teachers and Schools in Shanghai have been actively involved in exploring new pedagogic approaches to support students learning remotely at home.

• Supporting individualized learning

A Chinese teacher at Qiangwei Primary School explained that she would try to address potential difficulties during preparation. Audio conferences were held with individual students after class to explain new words encountered. She would highlight and explain the problems that students were likely to encounter, using the QQ platform 'red pen' marking tool for errors (see Figure 14). After students corrected their errors, they were required to resubmit for checking and grading with further motivating feedback.

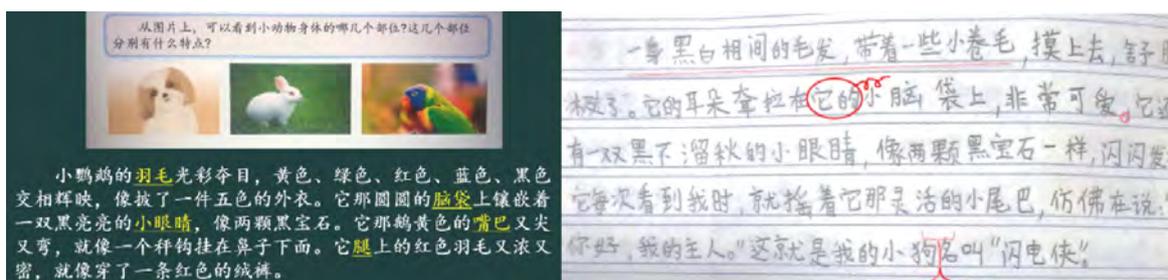


Figure 14-1. Example of parrot appearance description in Chinese class

Figure 14-2. Online correction of students' homework

• Developing group teaching

The teachers from Jinshan No. 2 Experimental Primary School formed a learning community to adapt to online education. When mastering the online platform applications, the school organized teachers into groups to promote mutual learning. Teachers supported each other making recommendations about teaching platforms, social software, mini-programs in WeChat, feedback platforms, learning how to make short videos, and how to assign homework online. In terms of instructional design, the school engaged teachers of different grades and subjects to share lectures (team teach), and everyone was encouraged to listen to the lectures delivered by other teachers (see Figure 15). The school encouraged every teacher to share their online classes, hoping that teachers could learn from each other. As a result, the school had presented 120 online classes, involving more than 100 teachers and all subjects. Every teacher was encouraged to take part in this activity.



Figure 15. Collectively preparing lessons within a teaching and research group

• Planning online/off-line activities

Teachers at Yuannan Middle School have explored and developed a range of approaches to improve students' motivations and engagements in remote learning at home (see Figure 16). These approaches include providing instant feedback to students who have problems and are confused, designing online and offline activities to attract their attention and interest. For example, English teachers incorporated impromptu speech, display of excellent homework, sharing of reading assignments, and uploading of photos of compositions to share. The geography lesson preparation group added some news hotspots in the teaching content in the "Classroom in the Air," such as "Vegetables across the Nation Donated to Wuhan" and "the flat-earth theory," which motivated students to analyze these phenomena with the geography knowledge they had just acquired. To enhance students' interest in studying physics and lead students to make full use of time at home, the physics lesson preparation group guided students to experiment at home. They also encouraged students to explain why the experiments succeeded based on physics knowledge, thereby achieving the integration of theory and practice.



Figure 16. Students of Yuannan Middle School are doing science experiments using materials found at home

• Getting parents involved

There are 1104 students at Shanghai Zhoupu Yucai School. Parents of 64% of the students are factory workers and farmers who are not well-educated. To help those students learn at home, the school has developed a "connected home-school" program and organized some home-school activities. An online parent-teacher meeting on "family-school together to fight the pandemic with love and duties" was held to communicate with parents about the plans of schools and the matters around online teaching and learning. Many parents have expressed their support and exchanged some ideas with teachers and schools.

The school has also arranged an activity called “learning about parents’ jobs” for students who can complete some tasks with their parents at home. Sixteen parents have volunteered to deliver lectures to students (see Figure 17). Among them there are representatives of such professions as doctors, community workers, factory workers, teachers, hairdressers, etc.

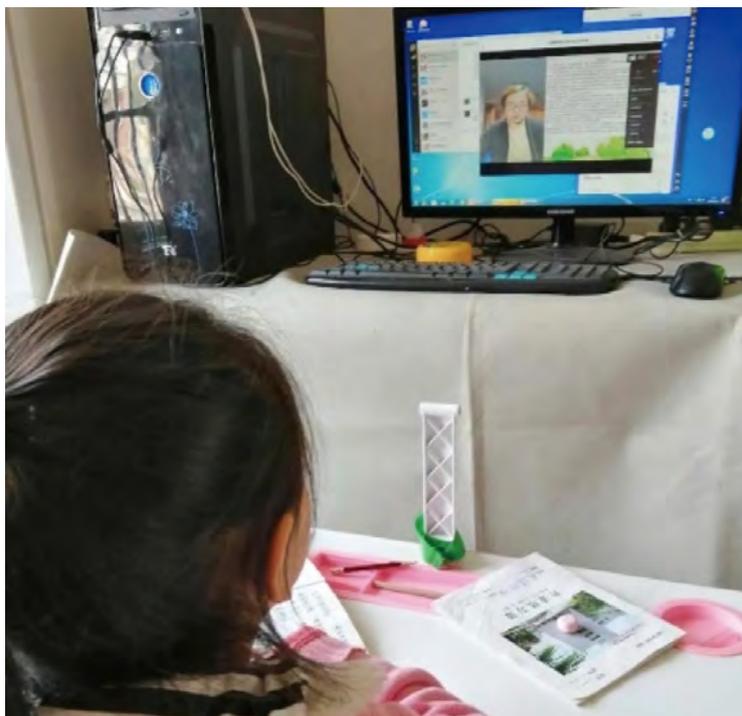


Figure 17. A student from Shanghai Zhoupu Yucai School is participating in the activity of “learning about parents’ jobs”

• Improving online interactions

Shanghai Qibao High School focused on the design of interactive online sessions to enhance learning outcomes of remote teaching and learning during the COVID pandemic. The school required teachers to design learning activities for different subject areas. For example, in a live session, teachers would prepare some questions based on the last lesson, and the students would have been asked to answer, when they entered the online classes. Teachers have designed interactive exercises or multiple-choice questions for students to participate in and receive real-time feedback to keep students engaged. The teachers have continuously reflected on the process of online teaching to modify and improve their teaching methods. A teacher from the school said, “Engagement and interaction are the priorities in live streaming for online education, and it is important to make students feel as if that they were receiving one-to-one tutoring.”

Many teachers have used DingTalk to organize a variety of activities such as video class meetings, simulations and online home visits. One of the challenges was to make students get up and study in the morning. To help the students overcome this difficulty, the teachers organized an online activity called “Greeting Each Other in the Morning.” Since the students had to greet each other early in the morning, gradually, they no longer overslept.



Expert comments:

Effective teaching design is a serious challenge for online teaching. Teachers develop effective instructional design using various technologies to provide interactive and personalized guidance for students' online learning and try their best to help students adapt their learning.



Case Video: <http://www.shou.org.cn/kfzx/2020/0522/c8523a67071/page.htm>



Chapter 4.

Vocational Education: Scaling up Online Practical Training for Students and Professionals

Shanghai's vocational education system includes secondary vocational schools and professional training and development for businesses. Vocational education focuses on the acquisition of occupational skills in the form "theory + practice." There were more than 100,000 secondary vocational students (including full-time and part-time students) who had to change from face-to-face to online mode. During the pandemic, the major challenge for vocational training in Shanghai was to ensure the quality of online practical courses and good learning results when students used a range of different learning environments, learning equipment, and learning habits. During the pandemic, many companies were shut down completely or partially. Some of the challenges they faced were how to organize online training for employees to improve their vocational skills and make adequate preparations for the resumption of work and production. The Shanghai local educational authority, schools, and teachers have been working closely to make online learning useful for learning theoretical aspects, as well as practical skills.

• **Creating an immersive online learning environment for students**

Various intelligent tools have been used to convert the previous on-site practical resources into online courses. For example, some schools used simulation software to help students build practical environments, answered students' questions in real-time, gave explanations, and one-to-one guidance through the live broadcast platform to create "immersive" training and teaching. These efforts not only helped students effectively master relevant practical skills during the outbreak but also provided an opportunity to accumulate experience for the transformation of vocational education models in the digital era. One approach was to use guests for live demonstrations to students.

• **Online practical training courses for teachers**

Teachers were required to use technology effectively to ensure the quality of online learning. To improve technical skills of some teachers and help them to create an interactive learning environment for teaching students "theories and practices" in a distance mode, specific online training was provided on software tools, applications, and courseware development. Teachers were encouraged to develop ideas and innovative approaches to meet the practical teaching requirements for vocational education.

- **Online professional training for businesses**

Shanghai's authorities have issued several support policies to encourage businesses to provide vocational training during the pandemic and to grant subsidies to relieve the burden. During the pandemic period, many enterprises in Shanghai offered free professional training courses to their employees through online platforms to improve their work skills and prepare for resumption of work.

- **Online learning support for low-income student**

Considering the fact that some secondary vocational students may not be able to attend online courses due to family difficulties and network restrictions in their residential areas, some secondary vocational schools in Shanghai saved teachers' course videos and related course materials on tablet computers and sent them to students who cannot attend classes online.

Best Practice Case Studies



Case 1. Integrating Different Resources to Support Online Learning

The sudden outbreak disrupted the routine teaching plan of vocational schools. After the pandemic stabilized, Shanghai education authorities allowed vocational education students to resume classes. The way to resume classes includes organizing teachers to record basic public courses so that students could watch them on open platforms, such as Shanghai education TV station and Shanghai Yiban secondary vocational class. Students can also learn on-demand and have academic exchanges with teachers on designated live broadcasting platforms.

- **Setting up a technical team to support the production of general courses**

Shanghai's education authorities have built a team of teachers from different vocational schools to produce courses and design online activities. Shanghai Vocational Education Online (shedu.net) has also created an "online teaching" task force on WeChat to provide teachers with technical advice and guidance to ensure that any technical issue in the application of software or production of courses could be resolved immediately.

- **A blend of live broadcast, broadcast on-demand, and interaction**

Courses were delivered through various platforms, such as Shanghai Education TV, Yiban Secondary Vocational Classroom (zz.yiban.cn), China Mobile, and VLEs for schools. Students could watch live courses through TV channels and also play on-demand and playback courses through Yiban (see Figure 18). Students could study anytime and anywhere and satisfy their needs in reviewing and mastering knowledge and developing skills.

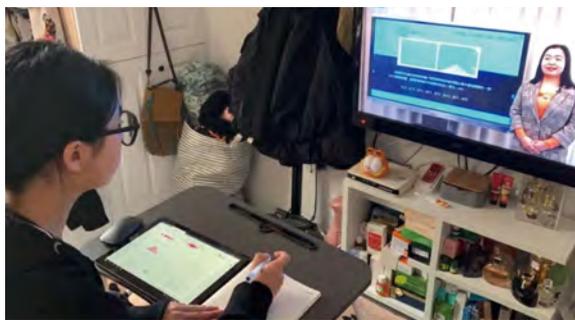


Figure 18. Attending the "Class in the Air" through TV

- **Using social software to realize teacher-student interactions**

Several social media tools, such as Tencent Classroom, WeChat Work, DingTalk and public online communication platforms, including the WeChat group and QQ group, have been used for teacher-student online communications. Some schools have used the "XiaoHeiBan," a third-party app, to supplement online assignments and tests, keep records of all activities and results of students' online learning, and serve as the reference of formative assessments. In this way, teachers can monitor students' learning progress and adapt their teaching appropriately.

 **Expert comments:**

The practice of arranging teachers to produce video courses and broadcast through multiple channels has ensured that all Shanghai's vocational schools would drive forward the courses in a uniform manner during the pandemic. The sharing of excellent teachers' resources and courses were also prioritized for Shanghai's vocational education.



Case Video: <http://www.shou.org.cn/kfzx/2020/0514/c8524a67010/page.htm>



Case 2. Innovative Online Labs and Online Practice Training

Lab experiments and practical training are vital for vocational education. Shanghai Commercial Accounting School and Shanghai Technician School have focused on building a practical operation environment online and developing online training to improve students' practical skills.

• Designing "immersive" online learning environment

The cloud platform "Intelligent Finance and Economics" was developed independently by Shanghai Commercial Accounting School. It was deemed as a smart online platform of educational scenarios integrating "learning, operating, practicing, and evaluating." The "simulated" and "realistic" scenarios of the financial and accounting workplace have been created for students to learn accounting theories and to practice their skills online. Government, banks, and taxation websites were incorporated into the learning platform to create an authentic learning environment. The learning and teaching space on the cloud allowed teachers and students to interact with each other and communicate effectively.



Figure 19. Smart Financial Cloud's Teacher Preparation Platform Practice Interface

- **Using simulation software to teach students' practical skills**

The "Introduction to Information Security" course provides specialized network and information security training delivered by the Shanghai Commercial Accounting School. The "Network Security Equipment and Topology" is a unit of this course usually taught in the wiring training room. Students were asked to install the Cisco simulator on their computers to carry out simulated network topology exercises. Also, teachers applied "demo video + practical operations live + after-class practices" to consolidate students' practical skills:

- Teachers produced the videos demonstrating practical operations and uploaded them along with the operation manual to the platform "Cloud Class" for students.
- Hands-on simulation software was used to cooperate with live streaming platforms such as Tencent Classroom and WeChat Work to answer various questions of students during operations.
- Students could submit the results to the "Cloud Class" after completing the assignments for grading by teachers (see Figure 20).

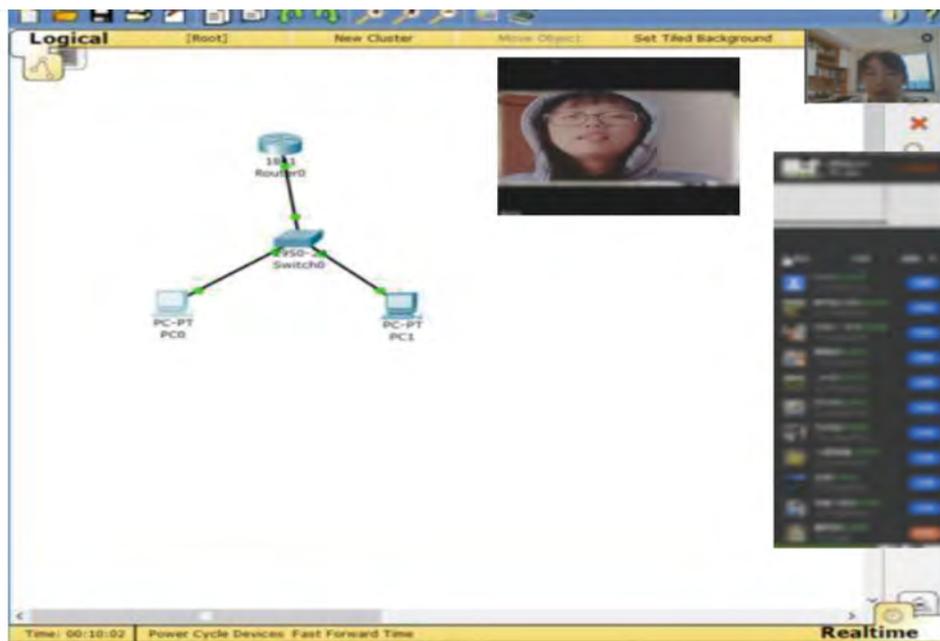


Figure 20. The platform "Cloud Class" to broadcast practical training live

• Supporting industry practices through live video

Three years ago, Shanghai Senior Technical School and the Institute of Technical Education (Singapore) started cooperation within the Ted innovation project. This year, the project is focused on cooperation and exchange between the two sides is a "cloud-based intelligent environment detector." The students of Shanghai Senior Technical School completed the hardware assembly and the debugging of the software. The Singapore partner was responsible for the packaging and delivery of the molds. The student teams in Shanghai were unable to attend the event in Singapore because of the COVID-19 pandemic. But they participated in a video conference on the Webex Meetings platform. Students from Shanghai Senior Technical School explained the design concept and application of the intelligent environment detector online (see Figure 21). The staff present in Singapore were responsible for the offline display operation. The two sides cooperated to win the interest and praise of the guests from all over the world.



Figure 21. Briefing on the device for guests to give a try through live connection



Expert comments:

Building a practical training studio on the cloud and shifting the offline practical operation training to online through information technology was an exploration conducted to tackle the problem of insufficient training stations in vocational education.



Case Video: <http://www.shou.org.cn/kfzx/2020/0514/c8524a67011/page.htm>



Case 3. Online Business Training and Professional Development

Bailian Group, a large retail enterprise in Shanghai, which adheres to the principle "Business Disruption and No Increase of Commodity Prices" during the pandemic, arranged some employees to shift to work for market supply. Considering their subsidiaries' main businesses and job features, the "Bailian I-learning" platform launched vocational skills trainings, such as "Department Store Management and Sales Up-skilling" and "Supermarket Operation Up-skilling" (see Figure 22). These courses were developed to encourage their employees to learn using computers or mobile phones, and to upgrade job skills when they either return to work or work from home during the pandemic.



Figure 22. Homepage of the "Bailian I-Learning" platform

Shanghai Education Software Development Co., Ltd is an educational information service enterprise. During the pandemic, based on the characteristics of its own business, it developed three tailor-made Internet technology training courses, including software design and development, data analysis model application, and understanding big data for all employees. The company organized three periods of nine-day online learning for employees, and the qualified rate of employee training was 90.53%. The corresponding credits obtained by the company's employees after completing the course learning and assessment will be deposited into the personal learning account of the Shanghai lifelong education credit bank and converted into credits of academic education courses (see Figure 23).



Figure 23. Training homepage of the Shanghai Education Software Development Co., Ltd.

 Expert Comments:

Despite tough competition on the market, companies had to accept the reality of business disruption during the pandemic. Taking the opportunity to provide employees with diverse online courses may allay employees' anxiety while improving their vocational skills to lay a foundation for the resumption of work.

 Source :
 Yiban Secondary Vocational Classroom platform website: <http://zz.yiban.cn>
 "Bailian I-learning" platform website: www.bailianedu.com
 "Shanghai learning platform for millions of people to improve learning ability on the job" website: <http://xlts.shlll.net/home/index>

 Case Video: <http://www.shou.org.cn/kfzx/2020/0514/c8524a67009/page.htm>



Chapter 5.

Higher Education: Leading Changes in Online Education for College Students

There are 64 universities, 14 institutions for adult education, 391,300 undergraduates, 196,300 postgraduates (including both full-time and part-time), 135,300 vocational college students, and 148,100 adult education learners in Shanghai. As instructed by SMEC, higher education institutions in Shanghai started the spring semester online gradually since March 2020. On March 2nd, 44 universities and 11 research institutes for postgraduates and undergraduates, as well as vocational colleges, first launched the online education, and on that single day, 7,000 courses were delivered to over 700,000 learners.

• Producing and sharing online learning resources

To enrich the curriculum resources of colleges and universities, the Municipal Education Commission set up a platform for producing and sharing information and resources for colleges and universities in Shanghai. As a shared resource, the SMEC organized the best teachers to produce videos for two general courses of vocational colleges, i.e., the Fundamentals of Computer Application and College English. Furthermore, teachers from colleges independently developed abundant online teaching courses on learning management platforms. For example, there were more than 1000 online courses on Shanghai University's online platform, including over 20,000 videos explaining key ideas and concepts, nearly 20,000 slide presentations, and more than 8,000 assignment exercises.

• Virtual Graduates Career Services

The SMEC actively broadened its recruitment activities for college graduates. This included expanding the enrollment of postgraduates and undergraduates (for junior college students), increased opportunities for further studies, enhanced educational guidance for college graduates, promotion of "one-stop services" concerning employment, organizing online recruitment for all kinds for graduates, and adjusted relevant policies for employment services. Colleges and universities in Shanghai built a "cloud employment" platform integrating "cloud recruitment," "cloud interview," "cloud guidance," "cloud service", and "cloud consultation."

• Supporting International students

Colleges and universities have helped international students to stay safe in Shanghai during the COVID-19 pandemic. Universities have set up WeChat groups and used dormitory electronic screens to keep students informed. Universities have reinforced apartment management and services and paid extra attention to the health of each student. Universities also provided translation services to communicate in international students' native language to ensure that they have received accurate and timely information. Online meetings with international students were also held regularly to answer their questions.

Best Practice Case Studies

Case 1. Flexible Online Learning for Graduate Students

East China Normal University (<https://www.ecnu.edu.cn/>) is a comprehensive research-oriented public university supervised by the Ministry of Education, jointly established by the Ministry of Education and the Shanghai Municipal People's Government. There are 15,454 full-time undergraduate students, 3,272 doctoral students, 15,940 postgraduates, 1,341 international students and 2352 faculty members.

ECNU officially launched online education on March 9th, involving 643 classes, 548 online teachers, and 10,858 students. Students participated in a range of online learning activities, live streaming, on-screen communication and questions and answer sessions.



Figure 24. Online education shown on the real-time monitoring system of ECNU

In principle, students' graduation thesis (design/creation) was prepared and implemented as initially scheduled. As the primary responsible person, the academic advisor guided the students through e-mail, WeChat or telephone to urge them to complete their theses on time. If the graduation thesis (design/creation) could not be completed on time due to objective circumstances, an appropriate adjustment was allowed.

Impacted by the COVID-19 pandemic, graduates were confronted with severe challenges in terms of employment. ECNU has taken the initiative to focus on promoting online services to facilitate graduates' employment. Counselors from various schools and departments provided students with online employment guidance and career planning.

On March 11th, the Spring Online Fair officially launched. On this platform, students could submit their resumes, initiate online voice or video chat with the employers selected. At the same time, employers could directly interview students online, and the two parties could reach a preliminary employment agreement. Before the official launch of this Fair, combining the current national policy support for "stabilizing employment" and the experience concerning employment guidance, Zhao Linhua, Director of the Employment and Entrepreneurship Office of the School of Economics and Management, provided graduates with online employment guidance and encouraged them to apply for work within major national projects and essential sectors. The national CCTV News Studio reported this initiative in the Special News Program named Battle against COVID-19.



Figure 25. A special report on Zhao Linhua made by CCTV News



Case Video: <http://www.shou.org.cn/kfzx/2020/0522/c8525a67064/page.htm>



Case 2. Flexible Use of Online Platforms and Tools to Reach Students Globally

New York University Shanghai (<https://shanghai.nyu.edu/>) was founded in 2012 by New York University and East China Normal University upon the Ministry of Education's approval and the strong support of Shanghai and the Pudong district. This was China's first Sino-US research university and the third campus of NYU's global network worldwide.

NYU Shanghai encouraged teachers to flexibly use the online teaching platforms, tools, and systems built by the university to conduct online teaching using live streaming, recorded classes or the combination of the two. In the case of live streaming (optional for teachers), classes were delivered as previously scheduled for students to learn online in real time. All the courses on Zoom system can be recorded and watched later. For pre-recorded classes, teachers produced in advance slides with background voice for explanation, and answered students' questions at a fixed time (according to class schedule or a specific time agreed with students).

Moreover, teachers and students could also carry out an academic discussion, group-based study, learning guidance, and interaction through video conferences, e-mail, and WeChat group chat. During this semester, the university carried out several surveys among students and teachers to evaluate the effectiveness of online teaching. All non-academic training courses and programs were postponed or canceled during the pandemic.

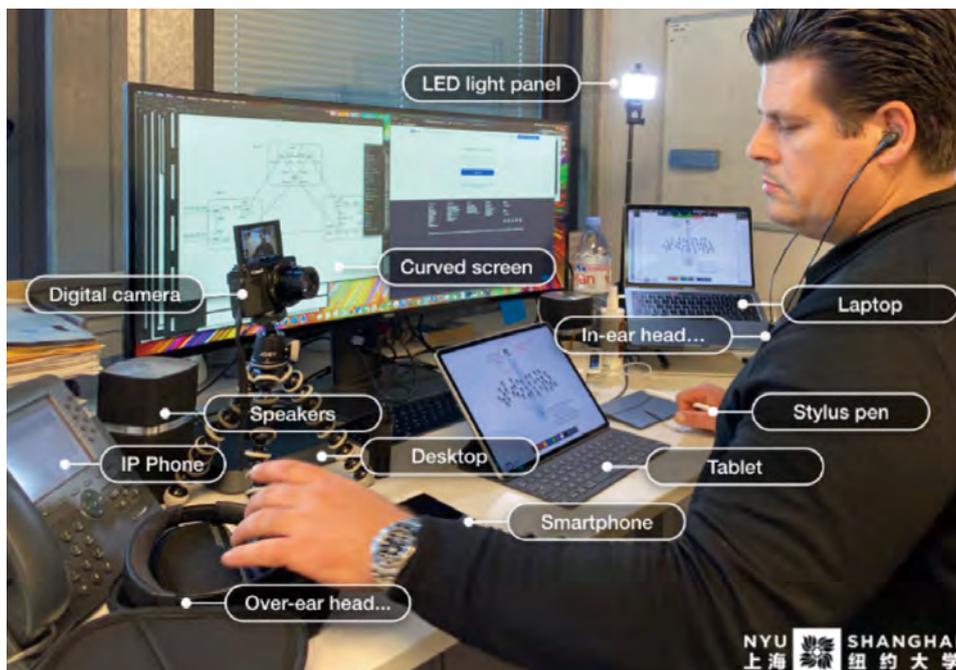


Figure 26. Promethee Spathis is teaching online classes in Paris, France

To make sure that the network could run smoothly during this critical period, NYU Shanghai had tested the stability of the online teaching platforms before the launch of online classes, and made corresponding adjustments to the network and hardware. This was done to eliminate technical issues under control of the University as far as possible. For example, work was done to set up a special VPN for education, which doubled the bandwidth available. The network infrastructure was optimized and work was undertaken with the Chinese operator of Zoom, a leading teaching platform online to minimize the delays and drop-out arising from network routing. If some individual users had limited bandwidth to access the network, an endeavor was made to ensure that they can obtain smooth experience in different places and using the connection methods of different operators. Technicians were designated to guarantee the video communication quality of each online lesson during the teaching time. Network traffic was monitored in real time to give priority to the critical traffic required by distance education such as Zoom, and relevant traffic policies were adjusted in real time as needed.

NYU Shanghai successfully launched 260 courses, and 183 teachers have delivered online classes to 800 students globally.



Case Video: <https://www.bilibili.com/video/av582721321/>





Case 3. Online Innovation and Entrepreneurship Training Camp

Shanghai Open University (SOU) offers associate degrees and bachelor degrees for adult students. It claims to be Shanghai's largest university by the number of students and has enrolled approximately 70,000. During the pandemic, all SOU's 40 branch schools and teaching centers in Shanghai were connected to the broadband network of distance education to share the education platforms and resources so that students could complete their learning tasks at home.

During the pandemic, SOU moved to face-to-face 'training camps' online for education in innovation and entrepreneurship, an essential part of which is the practical application of innovative thinking and entrepreneurial activities around the "make", "think", and "create" model. The online camp has used different tools to support interactions between teachers and students and has adapted a learner-centered approach to make online training programs more effective.

• Integrating the learning loop into online training design

The online training camp adopts a cycle teaching method of "learning-output-feedback-improvement," emphasizing student-centered teaching, urging students to participate in learning and sharing actively, and stimulating students' innovative thinking.

Each study day in the training camp has a theme, such as a mentoring sessions, knowledge sharing sessions, etc. In the training camp, students not only learn new knowledge but also regularly review what they have learned and participate in simulation experiments to apply what they have learned before. On the question discussion day of the training camp, the students check their gaps in knowledge through the feedback from tutors' comments and student peer evaluation. On the knowledge summary day, students further transform "knowledge" into "action" by presenting business posts and expressing their understanding of learning.

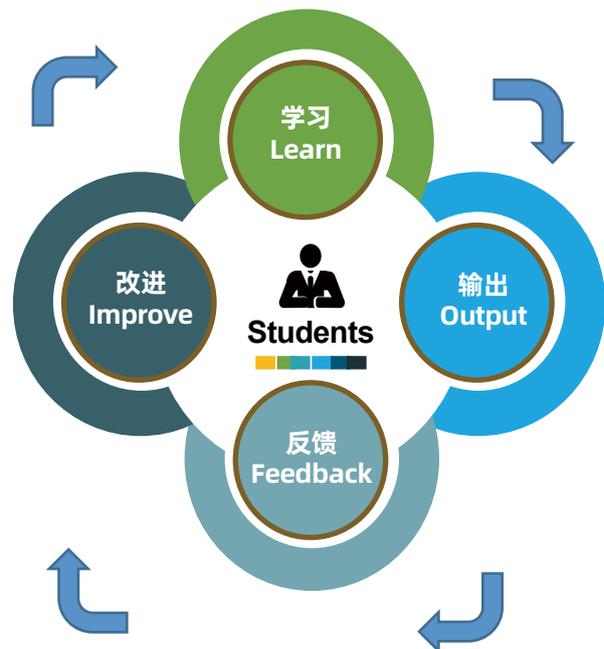


Figure 27. The learning loop "learn-output-feedback-improve" with students as the center

• Various tools to support effective online interactions

With the help of a variety of online teaching tools, the entire boot camp effectively moves the learning interaction between teachers and students online. Through the cloud tutoring platform, students can submit assignments and have learning experiences online in real-time (see Figure 27). Every student who has completed the daily tasks can see and comment on each others' work. Analytics are used to understand the participation and outcomes for students based on homework and comments they have accomplished. According to statistics, within 14 days, there were a total of 23,800 useful interactive messages in the WeChat group of the training camp, with an average of 140 speeches per student and a user activity rate of 98.9%.

• Personalized service to support online learning

SOU has provided teachers and students with a service team composed of professional operating officers and teaching assistants to follow up on the learning progress and offer timely personalized support for learning. Through a highly interactive learning approach, "knowledge crowdfunding," the team has encouraged students to explain their learning experiences by sharing the homework and discussing the difficulties. The students are from such sectors, as manufacturing, service, agriculture, and IT, they would benefit from the conversations among different industries, which provides an added value to classroom learning and cultivates the global mindset of innovators and entrepreneurs. The students are also asked to share work with their families, friends, and teachers outside the training camp and keep records of their feedback, which further develops the students' ability to express ideas, receive feedback and develop their perseverance.



Expert Comments:

Innovation & Entrepreneurship Online Training Camp of Shanghai Open University has set a clear learning objectives for students, including kaleidoscopic learning activities and an awe-inspiring team for real-time interaction.



Source :

Training Camp News: <https://mp.weixin.qq.com/s/LVUQzBW1hgivLfnufMKIqw>

Training Camp Trainee Handbook: <https://docs.qq.com/doc/DVktSSHVEeU9BaFdj>



Case Video: <http://www.shou.org.cn/kfzx/2020/0525/c8525a67089/page.htm>



Chapter 6.

Lifelong Learning: Online Learning Community and Flexible Learning for the Public

The digital learning platforms in Shanghai are the primary approach to support citizens in online learning, mobile learning, and distance learning. The Shanghai Lifelong Learning (<http://shlll.net/>) website is for the general public to access the courses, learning resources, search, learning map, interactive school, learning files, learning incentive, remote support, and other eight kinds of learning services. Shanghai has comprehensively integrated and selected high-quality resources for lifelong education to meet different learning needs of citizens of all ages, from individual learning to group-based learning and experimental learning. These differentiated online learning resources help the citizens make sensible decisions about what to study at home. Shanghai has also shared its quality lifelong education resources with Hubei Province, Chengdu City of Sichuan Province, and Karamay of the Xinjiang Uygur Autonomous Region. It helps to mitigate the shortage and imbalance of school teachers in other areas so that education support could bypass the bottlenecks of local resources.

Best Practice Case Studies



Case 1. Building an Online Learning Society

Shanghai Lifelong Learning is the largest comprehensive public welfare learning website in Shanghai, which gathers a large number of lifelong learning resources. During the pandemic period, the platform integrated multiple resources such as Shanghai education MOOCs for elderly, community education microcourses, Cloud View Classroom for Shanghai citizens' lifelong learning, citizens' online learning experience project, lifelong learning humanistic walking project, and Shanghai Education Resource Center to launch and create the "Class in the Air." The class was constructed to meet the different needs of home-based learners during the pandemic.

- **Virtue humanistic walking**

Through the integration of different urban landmarks, a series of routes for citizens to "walk" and "visit" have been designed. The "Home-based Humanities Walking" program offered on the "Class in the Air" has used a 720-degree panoramic map and virtual reality technology to visit museums and places to explore history and culture and get new knowledge (see Figure 28). This program lets people reach every place in Shanghai without leaving home and enjoy the landscape and local habits of Shanghai.

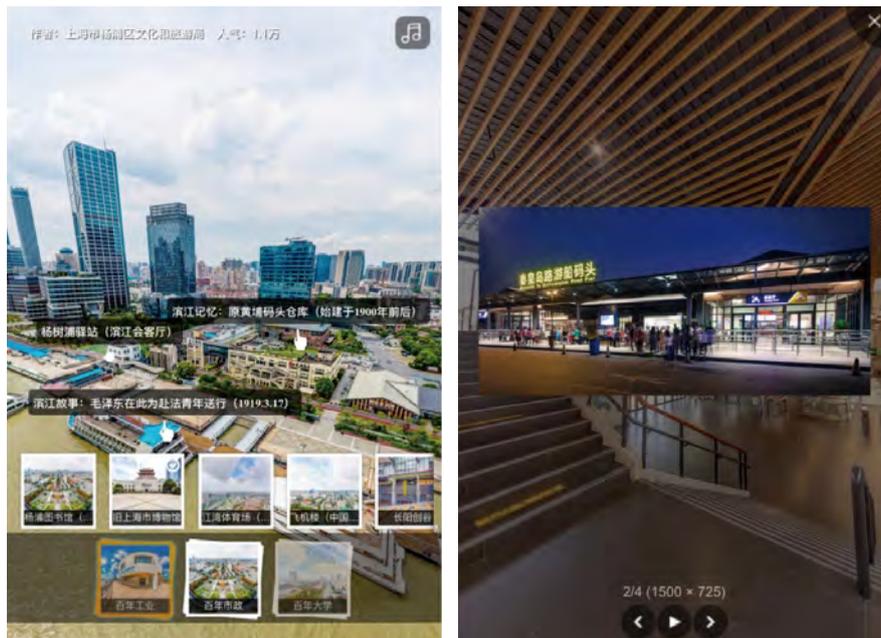


Figure 28. Humanities Walking

- **Promoting mobile learning**

To meet residents' intense demands for mobile learning during the pandemic, an online course on the applications of smartphones for the "Cloud View Classroom" has been delivered to the public. Many learners who are eager to master mobile opportunities for online learning have attended the Cloud View Classroom through various devices, such as computers and smartphones (see Figure 29). The audience can ask questions and interact with the teacher online. The live session has been recorded to add to the platform as a digital learning resource that the public could view.

Since its launch on February 3rd, 2020, "Class in the Air" has been viewed more than 546,000 times, more than five times the average page views of regular programs in the same period without the pandemic. During the pandemic period, the page views from mobile devices increased from 31% to 50.47%.

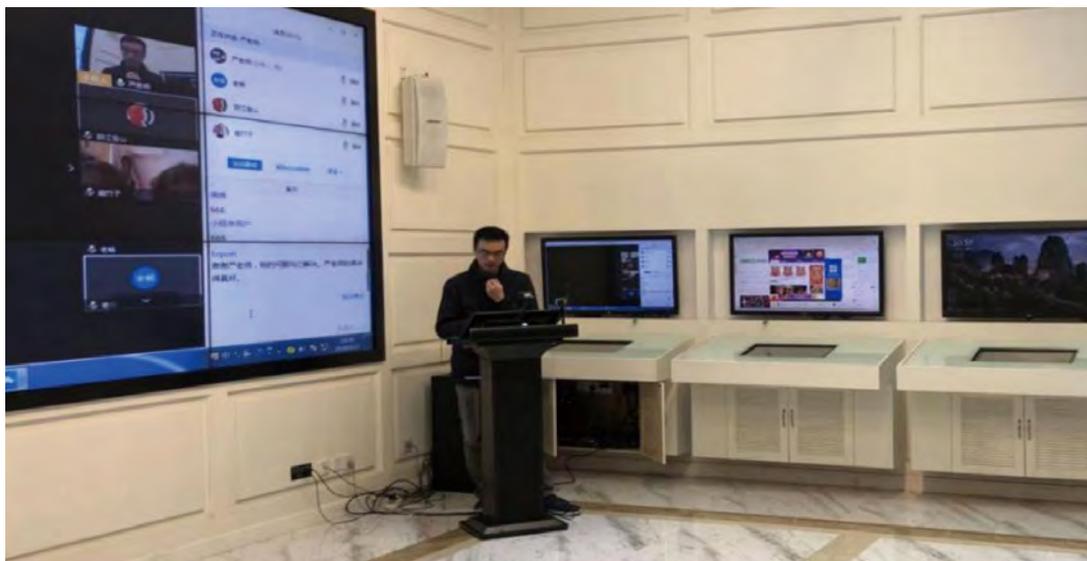


Figure 29. Cloud View Classroom



Expert Comments:

The Shanghai citizens' lifelong learning cloud "Class in the Air" integrates quality courses and resources across platforms, opens up access to these platforms, and provides flexible and efficient cloud classroom learning services for Shanghai citizens.



Source :

Shanghai citizens' lifelong learning cloud "Class in the Air":

<http://www.shlll.net/main/zsy/pc/index.html>

Cloud View Classroom: <http://course.shlll.net/CloudCourse>



Case Video: <http://www.shou.org.cn/kfzx/2020/0526/c8526a67100/page.htm>



Case 2. Radio Class in Mobile Cabin Hospitals

The radio station "Courses by Shanghai Open University" has launched by "Radio for Cabin Hospitals" for cabin hospitals in Wuhan, bringing more than 100 quality courses with 16 significant themes to patients in many cabin hospitals and designated hospitals in the pandemic area (see Figure 30). The courses include poetry and songs, traditional Chinese medicine, health preservation, art, and other themes, which can meet the learning demands of different patients of in-cabin hospitals.

To support the mental health of frontline medical staff, the radio station has added content to help doctors relieve psychological pressure, providing behavioral and psychological guidance to medical staff on how to deal with patients of different age and with their families.

In addition, patients of in-cabin hospitals could start a radio app on WeChat by scanning the QR codes with their mobile phones. They could listen to the rich content offered by the radio without downloading any app.



Figure 30. QR codes of radio station available in the cabin hospital

"Courses by Shanghai Open University" have currently released more than 4000 audio and video courses. These courses have been watched or listened to over 10 million times and the average daily viewing time of frequent users peaked to 45 minutes. The statistics show that the users' age varies from 20 to 80 years.



Expert Comments:

"Courses by Shanghai Open University" radio station is an integration of Internet + education. Through the new media platform, it makes the public service mode of lifelong education more diversified. It can expand the access of educational service and resources and enable learners to enjoy excellent, efficient, high-quality, and convenient education services.



Source :

News about Radio Class in Mobile Cabin Hospitals:

<http://www.sh.chinanews.com/kjy/2020-02-20/71524.shtml>



Case Video: <http://www.shou.org.cn/kfzx/2020/0527/c8526a67118/page.htm>



Case 3. Flexible Learning for Elderly

Shanghai is the first city in China to enter into an aging society, and also the city with the highest degree of aging. There are more than 500,000 students aged 60 and above who attend various universities (schools) for the aged in Shanghai. Under the current pandemic situation, the challenges which the elderly education in Shanghai are facing include: how to use various media to spread health knowledge and protect the physical and mental health of the elderly students; and how can the elderly learn and adapt to online learning, so that they could take a variety of online courses at home?

• Virtual classroom for the elderly

Classroom for the Elderly refers to a series of courses meeting the learning needs of the elderly. Curriculum design for the elderly is based on the learning needs of the elderly in China, and learning resources are provided to the elderly through TV and Internet platforms. The course content is closely related to the physical and mental health of the elderly. Currently, Classroom for the Elderly broadcast on Shanghai Education TV Station is watched weekly by more than 600,000 registered elderly students at over 6000 learning sites throughout the city, covering 93% of learning sites in village and neighborhood committees in Shanghai (see Figure 31).



Figure 31 Shanghai education TV station courses for the elderly

• Supporting elderly learning through mobile Apps

WeChat, as a popular social app nationwide, is also a widely used mobile app for the Chinese elderly. Through the WeChat public account of "education for the elderly," Shanghai University for the elderly has continuously released articles, information, and video courses suitable for the elderly to learn during the pandemic (see Figure 32). It enables the elderly to realize the distance learning for "anyone, anywhere and anytime can learn" through using mobile phones in the most familiar way.



Figure 32. Content in the WeChat official account of education for the elderly



Expert Comments:

Shanghai is not only the first city in China to step into the aging society but also the city with the highest degree of aged population. The active practice and exploration of distance education for the elderly in Shanghai have opened up the "last mile" of lifelong learning for the elderly.



Source :
Shanghai Learning Website for the Elderly: <http://e60.shlll.net>
Live classes by the Shanghai Elderly Learning Team:
https://www.sohu.com/a/384733160_120209938



Case Video: <http://www.shou.org.cn/kfzx/2020/0514/c8526a67015/page.htm>



Chapter 7.

Challenges and Future Impact

The COVID-19 pandemic was an extreme event for Shanghai and many other cities in China and worldwide. Online teaching and learning became the only option for school and university campuses when they had to close. The emergency response of the city government and collective actions of the public in Shanghai have demonstrated the importance and potential of information and communication technologies in education during emergency situations. Schools explored new ways of administration using technologies; teachers developed innovative instructional design in technology-facilitated learning environments; and learners adjusted to online learning in home environments. The achievements of Shanghai through the collective efforts of government, educational institutions and the people imply not just the continuity of education, but also a new understanding and inspiring experience of online and open education. Many teachers, learners and education administrators in case studies collected for this report have expressed their desire to keep online learning as part of the so-called “new normal” when schools and universities are reopened. However, this change has not been an easy one, there have been lots of difficulties and challenges in this unprecedented situation. As we are entering the post-pandemic era, new questions arise: What role will technologies play in future teaching and learning? Which trends in online and open education will emerge and reshape future education?

7.1 Major challenges in online and open education in Shanghai

- **Connectivity and resources**

Access to technologies has been a major challenge during the pandemic for online and open education in Shanghai. Unlike face-to-face classes, distance learning happens in technology-facilitated environments, and requires both students and teachers to have access to fundamental resources such as learning devices, the Internet and learning platforms. While SMEC tried to minimize the technological difficulties by providing easy-access to educational resources, such as the Class in the Air, some students from low-income families still needed extra help to get basic learning devices and connectivity to access remote learning, and both the city and schools made great efforts to ensure those students have the support they needed.

• ICT capacity

ICT capacity in online and open education is essential for teachers, learners and administrators. To teach online, technology proficiency is no longer an optional skill but an essential requirement for teachers. Although SMEC and the district and educational institutions have provided professional training and technological support, some teachers might still struggle with online teaching as they had to deal with technical and pedagogical issues themselves. For learners, especially for some of the elder ones enrolled in community-based lifelong learning courses, technology proficiency might have been to be a barrier to online learning.

For administrators, the major difficulty was to move daily operations and services/activities from face-to-face to fully online. Different IT systems have been used to facilitate management and operations in institutions, and it is inevitable because many problems have arisen when the entire process was moved online. In order to respond to these challenges, many institutions formed temporary groups to assist the daily management of activities such as timetabling of sessions, teachers' work, e.g. planning lessons collaboratively, and communicating with students and parents. Also, it has been difficult to move some offline services or activities online, for example, job fairs for the graduates. While the educational institutions in Shanghai provided innovative alternative ways of continuing education, as demonstrated in the best practice cases, there is ongoing discussion about how technologies can best augment these traditional face-to-face management, services and activities.

• Education quality assurance

Quality assurance of online and open education is a challenge for educational institutions. To ensure the quality of distance learning, districts and schools encouraged teachers to collaborate in instructional design by sharing best practices and online teaching experiences. Teachers explored innovative instructional designs for learners belonging to different age groups using various technologies and tried to develop activities and assignments that better adapt to online environments. Although there are already have some achievements described in the best practice cases, the quality assurance of online and open learning is not as extensively developed as in traditional face-to-face learning, and the exploration of these new practices requires an ongoing process of identifying what works and why by schools and teachers

Learners also have to change the way that they study if they wish to learn effectively in an online mode, and this will vary for different age groups and the home context in which students find themselves. Parents can play an important role in facilitating distance learning at home for preschool children, lower-grade students in elementary schools, and students in special schools. For some older learners in community-based lifelong learning courses, technology proficiency might be the most significant barrier to learning. One of the concerns for students in higher education and vocational schools is keeping up with the lab work and undertaking professional skills training online. There is also the pressure of continuing research remotely for some students in colleges. Despite the varied difficulties faced by different groups, technology proficiency and self-directed learning ability in the technology-facilitated environments are two major issues for all learners to ensure high-quality learning in online and open education.

• Inclusive education

Online and open education is particularly difficult for learners with special needs as they need extensive support in a traditional classroom, and this is even harder to provide at a distance. It is important to involve parents in facilitating their learning at home, and Shanghai schools have made a great effort by guiding the parents via online communication. However, designing personalized instructions to meet students' individual learning needs in the family context can be problematic. Successful distance inclusive education requires close collaboration among schools, teachers, and families.

• Emotional and psychological issues

The emotional and wellbeing support has been a concern during the pandemic as all groups, administrators, teachers, parents, and students faced pressure not only due to switching to distance teaching and learning but also resulting from the change in the lifestyle during the pandemic. Both the government and the educational institutions in Shanghai have considered emotional and wellbeing issues as a priority and provided various resources for different groups, such as online courses, social media articles, and 24/7 hotlines. In addition to the official resources, schools also organized online communities where teachers and parents could share their experiences and concerns.

In summary, online and open education in Shanghai is a challenge for all education stakeholders. Technology is playing an increasingly important role in educational institutions, and this is the first time that the entire teaching and learning process has been moved online. Innovative practices have developed as an emergency response, however, the way the online and open education practice influences the education in the future still needs further exploration.

7.2 Future impact

• Policy and strategy

◆ Ensuring connectivity and developing resources

During the pandemic, the Shanghai government, local educational authorities and educational institutions and organizations have made significant efforts to make sure every student has access to basic technologies and online educational resources are openly available to all learners and the public. The accessible technologies and high-quality educational resources made it possible for schools and universities to deliver distance learning and support students' studying at home, minimizing disruption of their learning schedule. Thus, it is important to continue providing connected environments and public resources for online and open education at the government level, which includes investment in the ICT infrastructure for schools, affordable technology solutions, and public educational resources.

◆ Addressing the openness and equity of education

It is important to produce and share quality educational resources to address and promote equity in education. There is no doubt that the current crisis accelerates digital transformation in education, but it also has the potential to expedite the digital divide. Shanghai is one of the most developed cities in China, but school closures and remote learning highlighted digital inequality issues there, as some families and students reported no access to the Internet and lack of devices required to access learning. Much attention has been paid to help students from disadvantaged communities to be able to join online learning, for example, through providing free basic devices and mobile data, but this has been only a temporary solution. New policies and regulations are needed to bridge the gap between those whose "who have" and those who "don't have" to improve the quality and equity of education with the use of digital technologies.

• Pedagogy and learning

♦ Developing blended learning

By bridging the limitations of geographical remoteness, online teaching overcomes the distance between teachers and students and enables students to study at home. Nevertheless, the sudden change in the teaching mode has also brought unprecedented challenges. Online learning is not a modified version of offline learning in the technological-facilitated environment. Instead, teachers need to design appropriate offline and online activities through the effective application of pedagogic principles and technology that support meaningful learning. In this transformation process, teacher training plays an important role in developing and improving teachers' capabilities for technology-enabled. In a future post-pandemic era, further efforts will be needed to develop teachers' capabilities in infusing blending teaching in their daily instruction.

♦ Enabling personalized learning

During the pandemic, technology has been used extensively to support teaching and learning at schools and universities. In many cases, teachers have used tools and online resources to provide personalized learning support and pay more attention to students' needs. Technology can make it easier for students to voice their need for help and revisit resources like videos so that they could have more time to digest them. In the future, the combination of online teaching with big data and AI technology may provide students with individualized learning resources and better serve students' personalized learning needs.

♦ Supporting self-directed learning

During the pandemic, traditional classroom teaching was replaced by studying by students using their own devices and interacting with teachers remotely. Students were provided with curriculum resources; these include course videos from well-known teachers and online learning materials that directly support students in acquiring knowledge and skills. It has provided a great opportunity to develop students' ability of self-directed learning. In this process, teachers play a key role in helping students make a smooth transition from teacher-directed to self-directed learning. This requires teachers to develop new pedagogical approaches to increase students' metacognition, helping with self-awareness and self-regulation. In the future, with the support of AI technology, teachers should be able to monitor students' learning process, track students' performance, and identify gaps in understanding in real-time mode. Armed with this knowledge, teachers should be better placed to support learners' needs through a self-directed learning process.

- **Technical supports**

Technology has made it possible to mitigate the crisis of COVID-19 and provide “undisrupted learning”. Various ICT infrastructure and tools have been used in schools and universities, including internet access, TV, radio, cellular subscriptions, mobile devices, laptops, and print media across Shanghai and beyond. Online learning platforms, especially MOOCs and AI-enabled APPs have been widely adopted by teachers and students to support teaching and learning remotely. The spread of the COVID-19 pandemic has resulted in schools and campuses closing, and caused a global increase in technological solutions needed to support students in continuing learning. This has highlighted and may lead to revision of the role of technology in education. The fast development of innovative technologies provides more flexibility for innovative instructional designs to be realized. To meet these needs, technologies such as image recognition, personalized recommendation, intelligent homework correction, and AI teachers will continue to be developed to support different learning approaches.

- **Collaboration**

Collaboration is an essential element in online and open education. Learning in the technology-facilitated environment is a complex process which can be considered under multiple prisms, such as technical platforms, instructional design, and content delivery. This process involves the participation of IT/educational companies, schools, teachers, parents, students, and administrators. To make it work, deep and meaningful collaborations among different parties, both regionally and internationally, is required. In Shanghai, regional government, hospitals, schools, parents, society at large, scientific research institutes and Internet enterprises worked closely together through national and regional collaborations in the battle against the outbreak of COVID-19. This collaborative ecosystem has provided an open and accommodating atmosphere for online learning. In the future, the continuous development of online and open learning will rely on deep collaboration among different government sectors, as well as different regions and countries. Global collaboration will create an encouraging environment for on-going online and open education. It will enable the sharing of resources among educational organizations and institutions and efficient communication among administrators, practitioners, and researchers at national and international levels.

References

Chen, L. & Xia, L. (2020) Shanghai's education system has deployed pandemic prevention and control work; Schools make and implement policies. Retrieved from <http://edu.eastday.com/node2/jypd/n5/20200212/u1ai30350.html>

China Education Online (2020). Psychological "pandemic prevention" assistance, Shanghai Education System in action! Retrieved from https://www.sohu.com/a/369804553_100226214.

China Education News Network (2020). East China Normal university carries out home-based practical activities for students. Retrieved from https://www.sohu.com/a/376614388_243614

Huang, H.H. & Xu, R.Z. (2020). When children study at home, teachers need to show more professional skills. Shang Guan. Retrieved from <https://web.shobserver.com/news/detail?id=212804>

Huang, R.H., Liu, D.J., Tlili, A., Yang, J.F., Wang, H.H., et al. (2020). Handbook on Facilitating Flexible Learning During Educational Disruption: The Chinese Experience in Maintaining Undisrupted Learning in COVID-19 Outbreak. Beijing: Smart Learning Institute of Beijing Normal University.

Liang, X. Y., Kidwai, H. & Zhang, M.X. (2020). How Shanghai Does It: Insights and Lessons from the Highest-Ranking Education System in the World. World Bank Group. Retrieved from <https://open-knowledge.worldbank.org/bitstream/handle/10986/24000/9781464807909.pdf?sequence=2&isAllowed=y>

Liberation Daily (2020). Shanghai primary and secondary schools launch online education from March 2. Retrieved from <https://baijiahao.baidu.com/s?id=1658927100349246282&wfr=spider&for=pc>.

McAlevy, T., & Gorgen, K. (2020). What does the research suggest is best practice in pedagogy for remote teaching? Retrieved from <https://edtechhub.org/wp-content/uploads/2020/05/remote-teaching.pdf>

People's Daily Online (2020) Shanghai's schools open online, with millions of students taking online classes, attracting students from other countries to join. Dajiangdong. Retrieved from http://k.sina.com.cn/article_6456450127_180d59c4f02000wuiw.html

Shanghai Education Commission Government Affairs WeChat "Shanghai Education" (2020). Shanghai and Zunyi join Hands to build a "digital reading and sharing platform. Retrieved from <https://xw.qq.com/cmsid/20200315A0INWG00?f=newdc>

Shanghai Education Commission Government Affairs WeChat "Shanghai Education" (2020). Universities in Shanghai take measures to get online education to operate normally.

Retrieved from <https://xw.qq.com/cmsid/20200307A0BLCW00>.

Shanghai Education Commission Government Affairs WeChat "Shanghai Education" (2020). Shanghai international students and local students together to overcome the difficulties.

Retrieved from https://www.sohu.com/a/378374057_391459.

Shanghai Education Commission Government Affairs WeChat "Shanghai Education" (2020). Shanghai vocational online teaching in an orderly manner received praise.

Retrieved from <https://xw.qq.com/cmsid/20200303A0B3PR00>.

Shanghai Learning Network (2020). The second wave of home-based learning resources are coming, Shanghai's lifelong learning cloud "Class in the Air" has been updated.

Retrieved from https://www.sohu.com/a/376884295_559657.

Shanghai Municipal Education Commission (2020). More than 7,000 courses launched online, and Shanghai colleges fully started online teaching. Shanghai Education.

Retrieved from <http://edu.sh.gov.cn/html/article/202003/105369.html>.

Shanghai Municipal Education Commission (2020). "The Class in the air" launched as the online education for primary and secondary schools officially started in Shanghai. Shanghai Education.

Retrieved from <http://edu.sh.gov.cn/html/article/202003/105435.html>

Shanghai Open University (2020). Parents and children take online classes together - Shanghai parent-school online class family education" Psychological wisdom " received high praise by parents!

Retrieved from <http://edu.eastday.com/node2/jypd/n5/20200316/u1ai30799.html>

Shanghai Preschool Education Network (2020). Grow Up Together - A Paradise for Parents and Children TV program launched. Retrieved from <http://www.age06.com/Age06Web3/Home/MobileImg-FontDetail?Id=2aa2ce91-0de2-46d6-ae56-e16269d3e959>

Wu, D. (2020, February 17). To strengthen public psychological counseling, Shanghai provides 24-hour psychological counseling services.

Retrieved from <https://www.jfdaily.com/news/detail?id=212330>.

Xue, H.W.X. (2020). The time of returning to school in Shanghai in 2020 is confirmed, and some educational examination arrangements have been adjusted.

Retrieved from <http://sh.bendibao.com/news/202049/220894.shtm>.

