EdTech Hub

Clear evidence, better decisions, more learning.

China: testing a decade of online education preparation

Contents

About this document

Acronyms

AI	Artificial intelligence
CDRF	China Development Research Fund
COVID-19	Novel coronavirus 2019
MIIT	Ministry of Industry and Information Technology
MoE	Ministry of Education
MoST	Ministry of Science and Technology
NDRC	National Development and Reform Commission
NIES	National Institute of Education Sciences

Key messages

– China's roll-out of online education was swift due to a decade of education digitalisation.

– All schools in China were offered access to content; persistent and growing urban-rural inequality highlighted the importance of other factors like internet access, computer or smart device ownership and differences in parenting.

– The government has encouraged state agencies, schools and universities, education and technology firms to collaborate and find new solutions, as long as the national platform remains dominant.

– EdTech is here to stay; Beijing will invest in better internet infrastructure for the future.

– Policy-making in China is iterative and responsive to on-the-ground developments, even at the height of an emergency.

– The COVID-19 EdTech roll-out has made clear that internet infrastructure is critical, online training for teachers inadequate and education inequality still an underlying challenge.

Context: China's education system

All education-related affairs in China are managed by the Ministry of Education (MoE), under the State Council, China's cabinet. The MoE liaises with other relevant agencies as necessary: technological, industrial and economic development are managed by the Ministry of Science and Technology (MoST), Ministry of Industry and IT (MIIT) and National Development and Reform Commission (NDRC) respectively.

The Chinese education system typically has four levels. Starting ages and the move from primary to junior high school differ by province. Preschool education is provided for children from the age of three; compulsory education starts at the age of six or seven and lasts for nine years (five or six years in primary school, three or four in junior high). For those continuing in education, high school is three years and secondary vocational programmes are between three and five years. Undergraduate degrees are four years; vocational higher education three. Master's programmes are two or three years, doctoral studies at least three years.

A typical Chinese academic year consists of two semesters: fall and spring. Fall semester starts on 1st September, followed by a break that coincides with the Spring Festival (Chinese New Year), as determined by the lunar calendar. Spring semester ends on 31st June. In 2019/20, fall semester was scheduled to end on 17th January and spring to start on 17th February.

Human-to-human transmission of COVID-19 was confirmed in China on 20th January 2020. This was also the first day of school holidays, just before the Spring Festival break began on 24th January. Three days later, the State Council extended the public holiday period for all workers, which had been due to end 30th January, until 2nd February and announced that all education institutions were closed indefinitely (for example, beyond 17th February).

Two days later, the MoE announced the 'Suspend school, not study' campaign with a declaration that resources were being prepared to guide online teaching, to be ready 17th February. All further policy announcements on the response to COVID-19 in education fall under this campaign banner.

In the first week of February, the MoE issued instructions for universities to teach online and to make all online courses freely available. On 12th February, primary and middle schools were also instructed to move teaching online and a national online platform and TV channels for education delivery were launched. Two days later, the MoE responded to two problems that had arisen: it announced that it would improve digital infrastructure support and help teachers to adapt to online teaching.

On 12th March, alongside healthcare authorities, the MoE launched guidelines and criteria for education institutions to reopen; provinces started releasing timetables for reopening in early April, allowing graduating students to return first. On 14th April special guidelines for reopening universities were released by the MoE and healthcare authorities to address concerns about increased inter-provincial travel.

Introduction: 'Suspend school, not study'

The MoE first alluded to the COVID-19 and education campaign 'Suspend school, not study' on 29th January. National campaigns have a long history in Chinese political engagement. Focusing on a single issue, they mobilise officials and resources right down to the local level, and are an immensely effective way to coalesce a large population around targeted action. Through a series of policy statements and decrees, 'Suspend school, not study' rapidly directed schools, universities and others in the education sector towards the approved on-the-ground response to COVID-19.

The campaign's core pillars are:

- Moving to online learning:
  - For universities, announced 5th February.
  - For primary and middle schools, announced 12th February.
- Providing online education resources, including:
  - For grades 1–12:
    - National cloud-based platform for primary and middle schools, a collection of teaching and learning materials available online. As at 11th May, the platform had recorded 2.1 billion page views and 1.71 billion visits (Cheng & Wang, 2020).
    - Television programmes to support learning for primary school students and grades 9 and 12, aired on China Education Television. Between February and May, these programmes ranked in the top-ten most-viewed TV programmes in China.
    - Local platforms (for example, Wuhan cloud-based education platform), which consist of provincial-, county-, and city-specific teaching and learning materials, available online.
  - For higher education:
    - iCourse, a collaboration between central ministries and tech firm NetEase that collects courses online so that they are available to university instructors nationwide.
    - 20 other (usually open source) platforms variously developed by ministries, government-organised non-governmental organisations (NGOs), universities and local governments that gather resources for teaching and learning, pedagogical and tech support, and how to integrate these.
    - 1,454 university-specific online education frameworks (The Paper, 2020b). A total of 1.03 million faculty members offered 1.07 million courses, which were visited by 18 million university students 2.3 billion times.

This case study looks at the foundations for the 'Suspend school, not study' campaign, its roll-out, lessons learnt and future implications.

Mobilising tech capacity

A decade before COVID-19, China's MoE was already planning for education technology to address education inequality. The ambitious Education Digitalisation Plan (2010–20) (Ministry of Education, 2012) aimed to:

- – Create a platform of accessible high-quality online courses.
- – Connect all schools to broadband internet.
- – Integrate IT in teaching and education management.

The plan has been revised and extended over the past ten years, including a second incarnation that places greater emphasis on nationwide availability of resources and innovative capacity rather than simple tech applications (Ministry of Education, 2018). Considerable capacity for education technology has been developed as a result, and the COVID-19 school closures provided an opportunity to test effectiveness and resilience.

Problems were soon clear. With 282 million students told to study online, effective immediately, China's education technology capacity was overwhelmed — despite more than a decade of hardware investment. Even schools in Beijing, who have some of the country's best internet infrastructure, struggled initially to provide smooth live streaming for all of their students. The problems were worse in rural areas with low bandwidth and poor phone signal. Two weeks into the campaign, the MIIT doubled down on its request for enhanced tech support, asking the country's internet provider giants — Baidu, Alibaba and Huawei — and state-owned telecoms companies to find ways to meet the needs of millions of students (Zhang, 2020).

On top of hardware issues, teachers and students were frustrated with the materials provided through the MoE's platforms, finding them out-of-date, unappealing and at times incompatible with the school curriculum. Schools started signing up with tech companies that provided flexibility and allowed them to cherry-pick content from across different online resources.

But this relatively open period was short-lived. The MoE soon reined in school-private sector collaboration, and only allowed schools to partner with firms on official plans that would use approved platforms. The MoE's crackdowns on privacy violations, education technology and gaming bundling (Ren, 2020) and fraudulent teacher qualifications slowed down local experiments (Xinhua News Agency, 2020). A top-down, state-driven initiative is once again ascendant.

The Education Digitalisation Plan (2010–20), the state's bedrock initiative, addresses three technological components to facilitate online education: resources, digital infrastructure and smart devices for students.

Online resources can be accessed as either recordings or live streams. The MoE has long encouraged strong teachers and faculty members to record and store their courses on national platforms as part of the digitalisation plan.

In response to complaints that many teachers are unskilled at online teaching, the MoE has also made training resources available. To host all these materials and accommodate large

numbers of visits, the MoE has sought help from tech companies to set up high-capacity servers.

Live streaming requires reliable internet access. Massive infrastructure construction efforts in recent years mean most areas are now able to connect to the internet, or at least receive TV signals (Li, 2019), but demand during COVID-19 made it clear that much more is needed if online education is to be viable.

For students, the proliferation of smartphones in rural regions means more can access education online (Cheng et al., 2020). To supervise student work, teachers often use remote working apps (for example, DingTalk) to supplement online resources. Survey apps (for example, wjx) are used to gauge student feedback.

These apps are examples of the avenues schools have pursued beyond those provided by the MoE. Commercial offerings from online education firms or tech firms are being repurposed by schools for teaching and learning. The big three Chinese tech companies have all made significant progress in developing their educational offerings during COVID-19; Alibaba alone has arrangements in place with more than 300 local education bureaus to provide technical expertise.

Balancing the many dimensions of education inequality

Large-scale mobilisation of education technology is often expected to lead to greater education equality, regardless of location, gender or ethnicity. But current evidence often points to the contrary.

Studies routinely show that rural students are at a significant disadvantage in terms of participation. A survey by the China Development Research Fund (CDRF), published in April 2020, showed that only a little over half of rural students were able to keep up with the schedule of online education (Su, 2020). Teachers and parents in poorer regions are considerably less satisfied and optimistic about its effectiveness than those in urban areas, according to an National Institute of Education Sciences (NIES) survey of 180,000 teachers and 1.8 million parents in the same month (Wang et al., 2020). Meanwhile, rural students responding to Xi'an Jiaotong University's survey complained about the economic impact of COVID-19 on their families, and their limited access to smart devices, quiet study spaces and reliable internet connections (The Paper, 2020a).

Internet infrastructure remains the most significant cause of the vast gap between urban and rural learners. Even though MIIT data (from October 2019) shows 98% of villages have access to optical fibre and 4G connection, many regions contend with low bandwidth and unstable signals, rendering it impossible to watch live streams (Luo, 2020). Smart devices are also a precious resource. CDRF found that only some 7% of rural students have laptops, compared to 40% of their urban counterparts. These circumstances add pressure to learners, rather than alleviating it. A viral video shot in Shaanxi in February showed rural students travelling up to 5 kilometres to study in a tent with no heating because it was the only place in the area with reliable phone signals (Zong, 2020). Some of these issues can be resolved through installing emergency cables, but for regions without phone signals, almost nothing can be done in the short term.

Teacher and parental support are also typically lacking in rural areas. Rural teachers are more likely to struggle with adapting to online teaching methods; CDRF found more than 86% of urban teachers are willing and able to participate in online education, only 37% in rural regions. Parents of urban learners are notably more involved in their children's education, with some 65% helping with assignments (compared with 38% of rural parents). Almost a quarter of rural students feel their parents hinder their studies. Short-term solutions are limited. The MoE released resource packages for teachers to help them acquire online teaching skills, but this is not a quick fix.

Even high-quality online education materials can be problematic. Courses uploaded to MoE-supported platforms are usually taught in elite urban schools, and are often unsuitable for rural students. Rural teachers often use one recorded class over several lessons, or live stream their own instead of using the materials on platforms. These issues can be partially resolved by delivering online courses from less prestigious schools or adopting a 'dual teacher' model, whereby an experienced teacher's class is streamed or played from a recording, while a local teacher helps students digest the content. This dual teacher model is supported by the MoE, and may in time replace the previously endorsed 'three classrooms' model, which involves 'special delivery' classrooms providing online access to students in rural areas, 'top teacher' classrooms as an online resource for teacher

development and 'online top school' classrooms sharing high-quality education resources from top schools — a less clearly defined approach that has sparked debate.

Rural schools are on a steep learning curve in managing the challenges of inequality posed by online education. For example, two students in Shangpai township, Anhui province, were allowed to use internet facilities in their municipal building as they did not have TV or internet access at home. The situation in Huangcun township, rural Anhui, demonstrates the huge difference that pre-existing infrastructure makes in maximising the efficacy of online education in rural areas (China News, 2020). Teachers there used instant messaging apps to contact parents to discuss and better understand the study conditions of their learners. Through phone calls and instant messaging apps, they gathered parental support for online education and distributed teaching schedules.

When provincial authorities started delivering online education via the internet and TV channels, Huangcun teachers soon realised that with no interaction, they did not know how their students were progressing. They decided to turn away from government-delivered education. Jing county, where Huangcun is located, had started working with education technology companies before COVID-19 to develop software and train teachers. These teachers were then able to adapt to live streaming their own classes relatively quickly and could make use of interactive functions to ensure learners were engaging. Homework was uploaded onto platforms for teachers to assess student progress.

Other forms of inequality, beyond the rural-urban divide, are unfortunately not well documented or specifically addressed in policy in China, but they are likely equally serious. For example, although State Council data implies gender equality has been achieved at the level of compulsory education, imbalances are significant at higher levels (State Council Information Office of the People's Republic of China, 2019).

Inequality in education is a multidimensional issue; plugging one gap can create new inequalities. Online education seems to have smoothed out discrepancies in the quality of education students can receive but it has magnified other issues such as infrastructure standards and parental support. A more balanced approach that considers multiple facets of inequality and access needs is required. This may involve diversifying channels of online education delivery to address the needs of students in a variety of circumstances.

Trial and error: feedback and evidence-based policy-making in China

China's policy-making process is not confined to elite politicians in Beijing: it is highly iterative. Local government, researchers and private enterprise all engage in feedback loops in the form of, for example, official public consultation, symposiums, internal publications and public discussions — even if these result in policy decisions that are made behind closed doors. The roll-out of online education during COVID-19 provides a microcosm of this process.

At the start of the epidemic, local authorities were given relative autonomy to trial different approaches to large-scale online education that fit the broad policy decrees from Beijing. Tech firms were quick to take advantage of new opportunities. The MoE, through its provincial and local offices, monitored the impact and efficiency of locally specific trials and experiments to identify models that could be rolled out more widely. It also used this information to spot issues that needed to be addressed through further policy intervention:

- When it was clear that the existing internet infrastructure was insufficient, the MIIT asked private tech firms and state-owned telecoms to find ways to meet the need.
- When it was clear that teachers were struggling with online education, the MoE collected and made available training materials and prepared a new national training programme.
- When it was clear that students had not achieved satisfactory learning outcomes, localities cancelled scheduled exams so material could be retaught once schools reopened.

Trials of the 'dual teacher' model may have also initiated a shift towards this approach, which has proved more effective than the previously endorsed 'three classrooms' model.

State control of online education will become more pronounced as successful pilots are integrated into official policy. This will leave less space for local experimentation and collaboration with private companies as frameworks will firm up and expectations will be set. The MoE will then be promoting its own platforms and models, rather than encouraging new ideas; a state-driven initiative will be in place and further refinement (for example, due to technological developments) will be undertaken within that structure.

Reopening schools and the future of education technology

Preparations for reopening schools began in early March, when COVID-19 was seen to be coming under control. The MoE outlined a set of general criteria for schools to meet before they could reopen; from early April provinces started releasing timetables to stagger the return, limiting total student numbers on campuses (Huang et al., 2020).

The resumption of school was accompanied by plans to help students transition from online education back to the classroom. A Beijing Normal University survey shows that 95% of schools have already created such plans, and 72% of learners believe key points in materials taught online should be retaught (Zhang et al., 2020).

The gradual recovery of the education system does not spell the end of education technology. Rather, the MoE is now more confident that its long-term plan to digitalise education should continue. At a 15th May press conference, the MoE celebrated its achievements and vowed to use COVID-19 experiences as proof that teachers should keep up their use of digital resources (Ministry of Education, 2020).

The sector is also taking aim at the deficiencies in the online education system revealed by the COVID-19 roll-out, most notably the lack of interaction between teachers and students in the online environment, and heavier burdens for teachers in preparing lessons. New measures will include the introduction of artificial intelligence (AI) to create more individualised learning environments (Wang, 2020), instead of attempting to mirror the classroom experience online. Some of these applications are already in place. Baidu's education platform Zuoyebang uses AI to help students find the most suitable course among the myriad resources available online. Education may soon also benefit from Beijing's broader push for tech development in frontier areas such as AI, big data, 5G and blockchain.

Conclusions and suggestions

When school shutdowns became inevitable, the MoE was, thanks to a decade of preparation, able to quickly launch online alternatives. This nationwide roll-out revealed major flaws; a plethora of surveys show widespread dissatisfaction and, according to NIES, fewer than one in three teachers were satisfied.

Stable and capable internet and TV infrastructure is crucial for education technology. Almost all schools and students suffered from network issues, including slow connections, website crashes and weak signals. These issues exacerbate existing education inequalities. Online teaching methods also need to be reinvented, as the Beijing Normal University survey showed current online education requires significant offline re-learning.

The COVID-19 pandemic has provided a unique chance to test China's investment in infrastructure and the capacity of teachers and students to engage online. Lessons from this test will inform future directions domestically. The MoE has suggested, at its press conference in May, that it sees education as a long-term strategy to resolve education inequality (Ministry of Education, 2020), suggesting efforts will continue.

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