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Can Deadly Virus Stop Education?

COVID-19 is a sudden human disaster. As the country with the earliest outbreak, China's epidemic situation has been basically controlled after arduous efforts. In the fight against the epidemic, the Chinese government has continued to postpone the start of new school semester, launched the largest online education activity in human history, and realized "School's Out, But Class's On" at all levels.

With the continuous spread of the virus, more and more countries and regions in the world have announced the suspension of schools and the use of online education in order to control the epidemic. In order to better help countries around the world to understand China's experience, the editorial office of the journal organized a special issue to report on the practices and experiences of Chinese schools in conducting online education activities during the epidemic.

It should be noted that some of the manuscripts presented in this issue are not "academic research" in a strict sense. We believe that at such an urgent moment, academic standards should give way to realistic needs to a certain extent. In the manuscripts we present, there is a comprehensive analysis of the actual basis and impact of the largest online education activity in human history in China, as well as detailed descriptions of online education measures in different schools in China. The schools herein included came from both developed and underdeveloped regions of China, and also from urban and rural schools. Therefore, it can represent the status of basic education in China more completely.

We hope that through the sharing of these experiences, we can provide some lessons for all educators working hard to fight and control the virus. We also hope that with the efforts of everyone, the disaster will end earlier and quickly, and people's lives and school education will return to normal as soon as possible!

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“School’s Out, But Class’s On”, The Largest Online Education in the World Today: Taking China’s Practical Exploration During The COVID-19 Epidemic Prevention and Control as An Example

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Abstract. Online education is a hot topic that is widely concerned in various countries today. In the era of mobile internet, countries around the world have made various effective attempts at online education, but online education is more of a supplement to school education, and large-scale normal online education lacks cases. The “School’s Out, But Class’s On” campaign launched by the Chinese government during the COVID-19 epidemic created a large-scale, normal online education application. We analyzed the background of this large-scale online education, clarify the foundation of large-scale online education, and reveal the impact of the largest online education activities on society and education.

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Keywords: Online Education; COVID-19 Epidemic; School’s Out, But Class’s On; Practice; Foundation

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E-LEARNING, distance education or online learning, refers to the method of content dissemination and rapid learning through the application of information technology and Internet technology. The “e” of e-Learning stands for electronic learning, efficient learning, exploratory learning, experiential learning, expanded learning, extended learning, easy-to-use learning, and enhanced learning. The United States is the birthplace of e-learning. After 1998, e-Learning has been being spread worldwide, and has rapidly expanded from North America and Europe to Asia.

Online education is one of the important education methods today. It has developed rapidly around the world and has gradually become an important category of school education. Countries around the world are actively exploring how to effectively educate students through the Internet, and many good examples of online education have emerged, resulting in many valuable experiences in online education.

Although online education is developing rapidly around the world, more applications of online education are used as a supplement to regular school education. In the normalized education and teaching practice, more students go to schools to participate in traditional classroom teaching, and large-scale online education lacks practical application scenarios.

The outbreak of COVID-19 in Wuhan, China, at the end of 2019, was a major public health emergency that had the fastest spread, the widest scope of infection, and the most difficult to prevent and control in China since its establishment (Xinhuanet, 2020). Affected by the epidemic, the government requires departments at all levels to organize forces to limit or stop crowd gathering, and requires non-essential enterprises to suspend production and business operations, and normal economic and social activities were greatly affected (Guangming.com, 2020). The World Health Organization-China Joint Expert Expedition calls the powerful public health measures China has taken in response to the COVID-19 epidemic, which may be “the most ambitious, flexible and active disease control in human history” (People’s Network, 2020).

While blocking the spread of the COVID-19 epidemic to schools, in order to reduce the impact of the epidemic on education, since February 4, 2020, the Leading Group of the Ministry of Education of China to respond to the COVID-19 epidemic has issued the “About Guiding Opinions on Online Teaching Organization and Management of General Colleges and Universities during the Period, Notice on Supporting Education and Teaching with Information Technology during Epidemic Prevention and Control, and Several Suggestions on Targeted Teacher Work during Epidemic Prevention and Control Notice”. It is proposed here that during the COVID-19 epidemic,

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schools use internet platforms to guide students to realize “School’s Out, But Class’s On”, i.e., “School is closed, but student learning is continuing online” or “Online Home Study” (This refers to the Official Website of the Chinese Ministry of Education: <http://en.moe.gov.cn/>).

Against this background, offline education and training institutions nationwide suspended their courses, elementary and middle schools postpone the start of 2020 spring semester, and actively conducted online teaching activities such as online teaching and learning as required by the Ministry of Education. This provides necessary learning support services for elementary and middle schools students’ home study, guarantees the teaching progress and teaching quality during the COVID-19 epidemic prevention and control, and achieves the goal of “School’s Out, But Class’s On”.

Although the Chinese government’s decision is an education measure that must be taken as a last resort, the activity itself has had a profound impact. According to the official data of the Ministry of Education in 2019, China has 270 million students at all levels and nearly 20 million faculty members at all levels (Ministry of Education of the People’s Republic of China, 2019). So many teachers and students carry out educational activities through the Internet for a period of more than six weeks, which is a great initiative of online education in the world. Based on the implementation status of “School’s Out, But Class’s On”, we are trying to summarize the reasons for the smooth development of large-scale online education activities based on the development results of modern education in China. The effective implementation of the preface provides reference and inspiration.

Origin of Large-Scale Online Education Activities

Due to the need to prevent and control the COVID-19 epidemic, schools postponed the start of 2020 spring semester, so students cannot study at school during normal school hours. The Ministry of Education requires local education departments and schools to do a good job of “School’s Out, But Class’s On” during the postponed period, to provide students with learning resources and learning support services to help solve practical difficulties. (China Education Daily, 2020)

On February 28, 2020, the Ministry of Education issued the “Notice on Coordinating in the Education System during COVID-19 Epidemic Prevention and Education Reform and Development”, which states that “School’s Out, But Class’s On” is essentially through modern education technology. Guide online elementary and middle school students to study through online education, and replace the interruption of teaching behavior caused by the COVID-19 epidemic through online education. The relevant documents of the Ministry of Education pointed out: “School’s Out, But Class’s On” is a broad-based learning, and online teaching is only one of the ways. We must further improve the construction of elementary and middle schools online learning platforms, continuously enrich learning resources, and prevent normal classrooms from being copied of the teaching methods, duration and arrangements (Ministry of Education of the People’s Republic of China, 2020).

Regarding how to carry out this activity, the Ministry of Education clearly pointed out: To clarify the current teaching “what to teach” and “how to teach”, and to continue to explore the organic combination of classroom teaching and online education after school. At the same time, it is proposed to “adhere to the combination of school teachers’ online guidance and assistance with students’ home-based self-learning” and “strengthening home-based study guidance, help students to scientifically formulate home-based learning plans, rationally select resources, and focus on developing students’ autonomous learning ability (Ministry of Education of the People’s Republic of China, 2020).

On March 6, 2020, the Ministry of Education issued the “Notice on the Ministry of Education’s Deployment of Elementary and Middle Schools” School’s Out, But Class’s On “. The summary of the notice promoted the typical experiences and practices of “School’s Out, But Class’s On” in the previous stage of each place, and provided a reference for the next step of the work.

1. Making overall use of television and network resources to achieve complementary advantages, resource sharing, and comprehensive coverage, especially to meet the learning needs of students in remote rural areas where the network is lacking or signal is weak.
2. Coordinate curriculum learning and special education on fighting against the “epidemics”, and strengthen the guidance of patriotism education. Focus on the education of advanced deeds and epidemic prevention knowledge, life education, public safety education, and mental health education as important learning content. Guide students to correctly understand the relationship between humans, society and nature, to respect the objective world, to act scientifically and rationally, and to cultivate students’ patriotism, love for people, and socialism.
3. Coordinate the characteristics of online learning and the actual needs of students, prevent normal classroom teaching methods, duration, and teaching arrangements from being copied, and strengthen study guidance for different grades and disciplines.
4. Make overall use of local resources and national platforms, and guide local and schools to make good use of national elementary and middle schools network cloud platforms and China Education Television Channel 4 classroom air learning resources.
5. Coordinate the role of backbone teachers and all other teachers, organize outstanding backbone teachers for course recording, resource provision and online teaching guidance, and organize all teachers to participate in students’ online learning guidance, answering questions, and home-school communication in a variety of ways.
6. Combining overall planning and active promotion with standard implementation, we pay attention to timely and standardizing online teaching behaviors. It is strictly forbidden to generally require teachers to broadcast or record classes live. Students must not be forced to “Clock In” and up-

load learning videos on the Internet every day. Try to avoid temporary home purchase of equipment due to print assignments or study materials, which will increase the financial burden on students' families (Ministry of Education of the People's Republic of China, 2020).

After the documents of the Ministry of Education were issued, the provincial education departments actively responded and promulgated specific local implementation plans according to relevant documents of the Ministry of Education.

Taking Zhejiang Province as an example, the province actively used the advantages of informatization of basic education, and used the Internet and informatization methods to comprehensively organize and implement online education and teaching activities in elementary and middle schools in the province. According to the latest survey report by the provincial teaching and research office, 96.0% of Middle school students in Zhejiang province participated in or are participating in online teaching activities organized by the school (Zhejiang Teaching and Research Office, 2020).

The province has made clear regulations for online teaching during specific implementation (Leading Group for Prevention and Control of Pneumonia Epidemic Situation of COVID-19 Infection in Zhejiang Provincial Department of Education, 2020):

1. Adhere to the five-core educations (morality, intelligence, sports, aesthetic, and labor) and comprehensive development.
2. Push curriculum resources, electronic textbooks, previews and homework manuals, and online homework operation manuals in a timely manner.
3. Online teaching is organized by class as a unit and two-way interaction. It is mainly based on recording and broadcasting, and adopts the form of "recording + online Q & A". Conditional schools can take the form of live broadcast + online Q & A. After-school tutoring can take the form of on-demand or online Q & A.
4. Scientifically and reasonably grasp the schedule of online teaching. The teaching time for each lesson is about 20 minutes in elementary school and about 30 minutes in middle school. Allow a certain amount of time for preview and practice in each class.
5. Multiple forms of homework should be arranged for online teaching, and the students' content should be examined and evaluated in a timely manner.

The local education administration departments have formulated the specific implementation plan of "School's Out, But Class's On" according to the spirit of the documents of the Ministry of Education and the education administration departments of their respective provinces.

Taking the Education Bureau of Guangzhou City, Guangdong Province as an example, on February 29, 2020, the Guangzhou Education Bureau put forward work guidelines for online learning of elementary and middle schools in the city (Guangzhou Education Bureau, 2020):

1. Adhere to the five-core educations (morality, intelligence, sports, aesthetic, and labor) at the same time and formulate online education programs.

2. Scientifically grasp the progress and arrange work and rest reasonably.
3. Combine online and offline to avoid increasing student burden.
4. Establish “television classrooms” to do a good job in supporting the city.
5. Accurately analyze the academic situation, and ensure the connection of back to school.
6. Strengthen classified guidance and implement online education in secondary vocational schools.
7. Take measures to ensure the smooth progress of online learning.

As provinces, municipalities, and districts successively promulgated the detailed rules for online learning at home during the epidemic prevention and control period, schools in various places based on the school situation and made corresponding implementation plans based on the actual situation of the school. Elementary schools, middle schools, high schools, and universities in various places have given specific plans for “School’s Out, But Class’s On” during the epidemic prevention period, starting from the development needs of students in different semesters and the actual situation of the school.

Based on the online learning practices in various places, there are mainly seven online methods provided by each school: live broadcast, recording broadcast, resource package, live broadcast + recording broadcast, live broadcast + resource package, recording broadcast + resource package, live broadcast + recording broadcast + resource package, etc.

The Foundation of the Largest Online Education Campaign

Large-scale online education activities need to be guaranteed by a well-established Internet infrastructure. Without strong infrastructure, large-scale online education activities cannot be carried out. After nearly three decades of construction of the Internet in China, the Internet infrastructure has been basically improved, providing a basic guarantee for large-scale Internet education.

Achievements of National and Educational Informatization

Since the mid-1990s, the construction of the “Information Superhighway” has begun globally, the Internet has begun a large-scale commercial process, and information technology has ushered in the second wave of vigorous development (Mei, 2018). To catch up this big wave, in 1993, China established the National Economic Informatization Joint Conference chaired by Vice Premier Jiahua Zou, and established the guiding ideology of advancing the implementation of informatization projects and driving industrial development with informatization. Therefore, China’s informatization construction was officially launched.

In October 2000, the Chinese government reviewed and approved the “Recommendations of the Central Committee of the Communist Party of China on Formulating the Tenth Five-Year Plan for National Economic and Social Development”. The

Tenth Five-Year Plan clearly lists “strengthening national economic and social informatization” as a major strategic, macroscopic, and policy issue that must be researched and resolved at the beginning of the 21st century (Xinhuanet, 2000). The “Tenth Five-Year Plan” Key Special Development Plan” and the “Industry Tenth Five-Year Plan Outline” have been successively promulgated, providing more specific action guidelines for accelerating the advancement of informatization.

In 2012, informatization China was identified as one of the strategic goals of the new modernized country. The Chinese government gradually promoted informatization construction from top to bottom by constructing an informatization system framework and demonstration pilots (Zhao, 2016).

In 2017, China set the development goal of “promoting the deep integration of the Internet, big data, artificial intelligence and the real economy, building a network power, digital China, and a wisdom society”, opening a new era in which the network power is moving towards a network power (Xinhuanet, 2017).

After decades of development and construction, China’s industrialization and informatization have made great progress. All aspects of informatization infrastructure, network scale, digital economy, and network governance have been prepared from quantitative change to qualitative change. In 2018, the number of Internet users was 829 million, the Internet covering rate was 59.6%, the digital economy scale was 31.3 trillion yuan, and the proportion of GDP reached 34.8% (Chen, 2019). The number of online government service users reached 394 million, accounting for 47.5% of the total Internet users (Yang, 2019). The total value of domestic and overseas Internet listed companies in China is 7.89 trillion CNY (China Internet Network Information Center, 2019). The development level of national informatization and its global influence continue to increase.

China’s education informatization exploration initially participated in the education and teaching reform in the form of “electronic education”. In 1978, the Ministry of Education issued the “Preliminary Plan on E-education Work” (discussion draft), which is the first time to deploy education informatization at the national level (Hu, 2019). Subsequently, the Ministry of Education successively introduced such strategic plans as the “National Ninth Five-Year Plan” for electrification education, the “Action Plan for the Revitalization of Education for the 21st Century”, and the “Tenth Five-Year Development Plan (Outline) for Education Informatization”. This means that China is progressing from the initial stage to the rapid development stage (Zhong, et al., 2017).

With the further innovation of modern science and technology, especially the development of next-generation information technologies such as the Internet, big data, and artificial intelligence, education informatization has led to the modernization of education, which has become a strategic consensus for the development of education in China (Zhong, et al., 2017).

In 2018, the Ministry of Education released the “Action Plan for Educational Informatization 2.0”, announcing that China’s education informatization has entered the 2.0 stage. In the 1.0 stage of education informatization, it is mainly based on the con-

struction of education informatization. The focus is on the construction of “three links and two platforms”, that is, the realization of “broadband network for every school, high-quality resource for every class, and online learning space for everyone.” And build a public service platform for education resources and a public service platform for education management (Ministry of Education of the People’s Republic of China, 2012).

With the transformation and upgrading of information construction, education information construction has entered the 2.0 stage, that is, to promote the integration and innovation of information technology and education and teaching, and to reconstruct the education ecology. Put forward “taking education informatization as an endogenous variable of systemic reform of education”, “promote the reform of education through the integration and innovation of technology and education and teaching”, and then “build a networked, digital, intelligent, personalized, lifelong education system to build a learning society that everyone can learn, can learn everywhere, and can learn from time to time, and achieve more open, more suitable, more people-oriented, more equal, and more sustainable education.” (Ministry of Education of the People’s Republic of China, 2018).

The “Education Informatization 2.0 Action Plan” marks China’s construction of education informatization from equipment construction to integration and application with technology and education, focusing on extending and expanding teaching content, innovative teaching methods, changing teaching evaluation, and changes through modern technology. Education supply mode to promote the ecological transformation of the education system (China Education News, 2019). In 2019, in the “China Education Modernization 2035” document, for the first time, the state raised the construction of education informatization to the height of education modernization, indicating the direction for the construction of education informatization (Xinhuanet, 2019).

With the continuous support of the country, China has continuously promoted the construction of education informatization with “three links and two platforms” as its core. China has successfully completed the “Full Coverage of Digital Educational Resources for Teaching Sites” project, which has provided teaching sites in China, including rural remote areas, with modern teaching equipment and nationally prescribed curriculum resources (Ministry of Education of the People’s Republic of China, 2015). According to the official statistics of the Ministry of Education, as of 2019, 98.4% of elementary and middle schools (including teaching sites) in China have achieved network access, and 90.1% of elementary and middle schools have multimedia classrooms, with the number reaching 3.74 million, of which 70.2% Elementary and middle schools achieve full coverage of multimedia teaching equipment; the national education resource public service system has access to 150 online platforms, which include 1 national platform, 25 provincial platforms, 52 municipal platforms, and 72 district / county platforms (Cyber Security and Informatization Leading Group of the Ministry of Education of China, 2020). In addition to the public resource platform built by the state, educational platforms such as Tencent Class, Netease Open Class, Chinese University MOOC, Homework Help, Xueersi Online School, Ape Coaching, and VIP KID are emerging. According to the “China Online Education Industry Market Outlook and In-

vestment Strategic Planning Analysis Report”, as of December 31, 2018, 11 “unicorns” were born in China’s online education sector, with a total valuation of 16.95 billion US dollars (China Economic Time, 2019).

Especially after entering the 2.0 stage, China’s informatization construction has paid more attention to innovation and leading China’s education development, knowledge creation and cultivation of innovative talents. Maker education, STEAM education, artificial intelligence education, robot education, etc. have become important means to promote the development of education informatization. The smart learning environment to promote knowledge innovation has gradually become a new trend in the construction of learning environments. Three-dimensional (3D) resources, holographic resources, simulation resources and other intelligent learning resources that are immersive, interactive, realistic, highly intelligent, and highly experiential make learners have unprecedented new experiences (Wang, et al., 2019).

With regard to the overall improvement of information literacy, the Ministry of Education launched the National Elementary and Middle School Teachers’ Information Technology Application Ability Enhancement Project 2.0 in 2019. Annually hold advanced seminars, teachers’ informatization teaching ability improvement training and other activities to improve the application of education informatization (the People’s Republic of China’s Leading Group of Cyber Security and Informatization, 2020).

Since the 1990s, China’s education informatization has been underway for 30 years. From a global perspective, breakthroughs have been made in China’s education informatization work. This has created a modern education environment for 1/5 of the world’s population, made an important contribution to the balanced development of global education, promoted human lifelong learning, and improved population quality (Huang, 2019). In the past three decades, the achievements of national informatization construction, especially the achievements of education informatization construction, have provided a strong technical guarantee for the development of this large-scale online education activity.

Colorful Teaching Resources

The development of large-scale online education activities must be supported by colorful teaching resources suitable for students of all grades. Without suitable online teaching resources, large-scale online teaching activities will not be carried out. After more than 20 years of unremitting efforts, the construction of online teaching resources in China has also been fruitful.

With the development of information technology, in early 2000, the Ministry of Education’s “Modern Distance Education Engineering Resources Construction Fundamental Education Project” was formally established. Its basic goal was to build a rich, open, national-level basic education resource library to promote comprehensive quality and provide information support for education and the realization of informatization of basic education (Zhu, 2010). Since then, China has successively released the “School-to-School Link” project, “Guiding Opinions on the Construction of Elementary and Middle Schools’ Campus Network”, “Elementary Education Resources Metadata Speci-

fication CELTS-42”, “Requirements for the Development of Modern Distance Vocational Education Resources”, and “Modern Distance Education in Rural Elementary and Middle Schools” project that put forward clearer requirements for resource construction, and launched resources such as subject resource websites, various distance education course resources, and various teaching and research topics.

At the same time, the enterprise resource library products also developed rapidly during this period. The enterprise education resource library represented by the “K-12 Educational Resource Library” and the Journal Library (CNKI) launched by Tsinghua Tongfang have emerged. In addition to the library of teaching materials, e-books and periodicals resources, online course resources, theme website resources, professional training resources, etc. have been launched in the market, and there is endless stream of teaching resource products (Li, 2007).

With the comprehensive advancement of information technology, the construction of teaching resources has entered the third stage, that is, the construction of information education resources. A series of documents have been issued around the construction of digital resources. In 2010, China clearly stated in the “Outline of the National Medium and Long-term Education Reform and Development Plan (2010-2020)” (the Ministry of Education of the People’s Republic of China, 2010) that “the development and application of high-quality educational resources” and “the construction of a national education management system “As a key construction content to achieve the goal of” accelerating the process of education informatization. “In March 2012, the Ministry of Education issued the Ten-year Development Plan for Educational Informatization (2011-2020), which includes education informationization resources such as “promoting the construction and sharing of high-quality educational resources” and “building a public service platform for continuing education”. The construction content is highlighted (Ministry of Education of the People’s Republic of China, 2012). In 2014, five ministries and commissions, including the Ministry of Education and the Ministry of Finance, issued the “Implementation Plan for an Effective Mechanism for Enlarging the Coverage of High-Quality Educational Resources by Informatization Means”, which called for accelerating the realization of “Co-construction and sharing of high-quality digital education resources, comprehensive and deep integration of information technology and education and teaching” (China Education Information Network, 2014). The “China Education Modernization 2035” issued in 2019 also clearly pointed out the need to innovate the educational service format and establish a digital education resource co-construction and sharing mechanism. The release of a series of documents puts forward goals and requirements for strengthening the construction and application of digital education resources public service system in the new era (Cai & Chen, 2019).

In addition to teaching materials, the construction of teaching resources at this stage also includes a shift from focusing on the content of the resources to a more individualized resource development and application model that emphasizes “people-oriented”. This includes resource creation tools, resource operating environments, resource construction evaluation and reward mechanisms based on online course resources.

Up to 2019, the national system has extensively engaged in the gathering of high-quality resources for the entire society. A total of 457 teaching applications have been gathered in 290 units. Through the “One Teacher, One Excellent Course; One Lesson, One Excellent Teacher” activity, it attracted more than 2.28 million participating teachers, collected 3.14 million online courses, and recommended 17,312 lessons for provincial excellent courses. Selected 1,005 ministry-level excellent courses, and generated 8 million resources. These famous teachers and lessons have continuously enriched the country’s construction of one-stop distance open education platform curriculum resources that support millions of students’ online learning. As of 2019, the platform has 1,360 new courses in storage, 4,671 media material resources, 3265 five-minute courses newly developed, 255 national digital learning resource centers, 7974 sub-center courses, and 95,000 media resources. The number of courses has reached more than 4,800 courses (China’s Ministry of Education Network Security and Informatization Leading Group, 2020). These national online course resources provided a powerful resource support for this large-scale online learning activity.

In addition to the resource construction of the national system, companies and schools everywhere have made explorations. Internet giants such as Tencent, Alibaba, ByteDance, iFlytek, and Dongshi Ideal have long been deeply involved in the education industry. In this epidemic response, in addition to providing live broadcast infrastructure, they also integrated existing educational resources with personalized learning resources, and introduced courses ranging from kindergarten to senior high school, including subjects such as Chinese, English, and mathematics. And quality education courses such as programming and thinking training (New Fortune, 2020). The school combines school-based curriculum with online resources to develop school-based curriculum resources suitable for the school. For example, Zhenjiang Experimental School in Jiangsu Province digitized school-based protocol-guided learning materials to form digital guide drafts (Xia, 2020). These have provided more targeted teaching materials for online learning during the epidemic and enriched online teaching resources.

Educational Reforms Provide a Change In Concepts and Methods For Online Learning

The fundamental goal of education information construction is to promote the development of education. Educational information technology must be deeply integrated with education and teaching to truly play its expected role. The development of large-scale online education activities must be based on scientific education concepts and correct teaching concepts. Only in the continuous reform of education and teaching, can we give full play to the function of education informatization with the guidance of the correct concept of education and teaching. Since the founding of New China, the long-term education and teaching reforms have paved the way for the healthy development of education, especially the eighth reform, which began in 1999, and has profoundly affected the reform of basic education in China.

In 2001, the Ministry of Education issued the “Outline of Basic Education Curriculum Reform (Trial)”. The document clearly proposed to change the tendency of the

curriculum to place too much emphasis on knowledge transfer, emphasizing the formation of a proactive learning attitude, so that the process of acquiring basic knowledge and basic skills simultaneously becomes a process of learning to learn and forming correct values. It is necessary to change the current status of curriculum implementation with too much emphasis on acceptance of learning, rote memorization, and mechanical training, and encourage students to take an active part, be willing to explore, and be diligent in their work, and cultivate students' ability to collect and process information, acquire new knowledge, and analyze and solve problems, and effectively communication and cooperation (Ministry of Education of the People's Republic of China, 2001).

In 2019, the State Council issued the Opinions of the State Council on Deepening the Reform of Education and Teaching and Comprehensively Improving the Quality of Compulsory Education, stating that "the teaching methods should be optimized. Adhere to the teaching excellence, pay attention to heuristic, interactive, and inquiry-based teaching. Teachers should guide students before class Preview, the key points and difficulties, the knowledge system should be clarified in the class, and students should be guided to think actively, actively ask questions, and explore independently" (General Office of the State Council of the People's Republic of China, 2019). This is the first important document issued by the Central Government and the State Council to focus on education and teaching reform at the compulsory education stage. It is a programmatic document for deepening education and teaching reform in the new era and comprehensively improving the quality of compulsory education (People's Daily, 2019).

After eight times reforms, China's education and teaching concepts have undergone tremendous changes. The classroom has changed from knowledge transfer to students 'active learning, and "teaching and learning" has undergone profound changes (China Education News, 2019). As President Xi Jinping pointed out at the National Education Work Conference on September 18, 2018, after 40 years of exploration, we have a series of understanding of China's education reform and development, and our education concept has also developed to a new height (Xiang, 2019).

Impact of the Largest Online Education Campaign

The "School's Out, But Class's On" event, which was adopted because of the new crown epidemic, is the largest normal online education event in the history of modern education. In a teaching period of more than one and a half months, nearly 270 million colleges, high school, middle school and elementary school students in China have conducted normal course studies online. Nearly 20 million universities, high school, middle school, and elementary school teachers have carried out teaching activities through the Internet, creating the largest number of online students and refreshing the online concurrency of Internet use. "School's Out, But Class's On" is not just a crisis response plan, it is more like an exploration of a new type of education and teaching model in the spirit of reform (Wang, et al., 2020), by using modern information technology Transforming student learning methods and teacher teaching methods has an impact on the reconstruction of ecological education models in China and even worldwide.

Speed Up the Integration of Educational Technology and Teaching

The Ministry of Education's "Notice on Coordinating and Coordinating Educational System COVID-19 Epidemic Situation and Educational Reform and Development Work" clearly states that "Schools conduct online education and teaching on a large-scale and established basis during the epidemic prevention and control period. A test of the ability of major public health emergencies is of great significance to use information technology to promote education and teaching reform." (Ministry of Education of the People's Republic of China, 2020). "School's Out, But Class's On" is a test of the achievements of China's informatization construction, especially education informatization construction. The implementation of this activity proves that China's informatization construction has achieved world-renowned achievements, and it also proves that education informatization construction and its application have reached a new level.

Professor Dehuan Liu of Peking University once commented that this "large-scale online live classroom is the largest experiment in the history of human education in 40 years." (ThePaper.cn, 2020). In this huge online teaching activity, the national basic education resources public service platform, China University MOOC and other mainstream MOOC platforms are meeting together with Alibaba, Tencent Education, ByteDance, Dongshi Ideal and other educational information enterprises to integrate all types of online education resources at all levels, to achieve full coverage of the platform, and share all resources.

Online learning breaks the limitation of study time and space and the limitation of the source flow of offline teaching students. It makes full use of the advantages of modern education technology to provide online education with high-quality, non-delayed, multi-form live interactive classrooms, and realizes live teaching in multi-person online classes. In online teaching, teachers use cutting-edge Internet technology to restore real teaching actions, and use massive electronic teaching resources to enrich teaching content, thereby realizing richer, practical and interesting live teaching (Luo, 2019). Students use the Internet to make learning choices more diverse and personalized, to make learning content and activities more free, and to make information technology and teaching more closely.

Online teaching is considered an important part of the future teaching model. However, since the emergence of online learning in 2013, online learning has not become one of the popular teaching formats in China (Wang, 2019). The successful launch of this large-scale online education activity provided valuable experience for the further implementation of online education, enriched people's understanding of online education, and increased the stickiness between educational technology and education and teaching. It is foreseeable that after the normal start of school, the use of the Internet for autonomous learning and after-school supplementary learning will become an important way for students to learn. Online teaching through the Internet will become

an important form of teacher teaching, and teaching management using the Internet will also become an important form of school management.

Promote The Reconstruction of Ecological Teaching Model

The implementation of this large-scale online education objectively proves the effectiveness of China's education reform. The implementation of "School's Out, But Class's On" made all the people who are connected with education and rely on determination and inertia to stop at the old track (Wang, 2020). It changes the teaching environment under normal conditions, allowing teaching activities to move from offline to online, teacher's teaching from face-to-face to online cloud teaching, and student's learning from classroom listening to home-based autonomous learning. "School's Out, But Class's On" has completely changed the learning methods of students and the teaching methods of teachers, and has overturned the traditional teacher-centered teaching model in traditional teaching.

"School's Out, But Class's On" is not simply transplanting normal classroom teaching or offline education scenarios to the Internet platform. Its essence is a large-scale and far-reaching education and teaching practice in China. Online education is a combination of modern education technology, education concepts and traditional education to form a new model suitable for educational needs (Ji & Sun, 2019). In order to ensure the quality and effectiveness of online teaching, it is not only necessary to change the form of learning and teaching, but also to redesign the online teaching model (Wang, 2020). In the teaching process, taking the student as the center and the goal of promoting student development, teachers should select the corresponding digital education resources according to the nature of the discipline and the needs of student development, appropriately intervene and regulate the student's learning process, and rationally design and use learning activities to guide students to learn independently.

Therefore, the large-scale online education activities under the background of "School's Out, But Class's On" have stimulated the exploration of online teaching models and promoted the reconstruction of ecological teaching models. For students, online education promotes the transformation of learning models. Students have a more autonomous and personalized learning experience, allowing students to grasp the learning progress and choose the learning environment according to their own knowledge and ability level. For teachers, there is a need to rebuild the curriculum structure, improve teaching methods, and diversify classes. For schools, the new technology makes teaching management more effective, and also blurs the school's geographical boundaries, changes the structure of the school's curriculum, and makes it have the characteristics of "lead teacher + teaching assistants + technical staff".

The implementation of "School's Out, But Class's On" has brought new opportunities to China's overall education reform, brought about new changes in teaching methods, learning methods, and management modes, and put forward new requirements.

Promote the Integration of Home Education and School Education

Affected by the epidemic, during the “School’s Out, But Class’s On” period, the teacher-student relationship and parent-child relationship encountered the modern dilemma with discrete time and space. Students cannot go to school to receive teacher guidance. In order to cooperate with their children’s autonomous learning, many parents have supervised their children to study instead of teachers. Parents became important partners of students’ autonomous learning during this special period. In this process, the relationship between parents and teachers was closer, and school education and family education were further integrated. “School’s Out, But Class’s On” really opened the way for family-school co-education.

Online learning during “School’s Out, But Class’s On” is not only an academic education, but also a “life education, belief education, science education, moral education” (Zheng, 2020). During the growth of students, ‘School’s Out, But Class’s On’ is not eager to master new knowledge of subjects in online courses, nor is it eager to take the opportunity to “overtake the peers”, but to comprehensively improve the quality education of students to meet Students need to grow. At this stage, schools strengthen home-school ties, guide parents to establish a scientific concept of child rearing, learn scientific child rearing methods, and establish harmonious family relationships. Through home-school collaborative management, guide students to learn self-planning, independent learning, and self-management to achieve more valuable autonomous growth (Yu, 2020).”

Schools and families are indispensable subjects in the healthy growth of children. Building a harmonious home-school relationship and forming a pattern of cooperative education can guarantee children’s healthy growth (People’s Daily, 2019). The implementation of “School’s Out, But Class’s On” has provided more time and space for teacher-student relations and parent-child relationships, and has closer links between schools, families and students. This really promotes the integration of home education and school education, creates a good environment for students to learn independently, and promotes students to achieve more valuable growth.

Conclusions

In this sudden epidemic, the implementation of “School ‘s Out, But Class ‘s On” enabled 270 million students in China to learn online. Many places and schools across the country actively use the “cloud” technology to independently choose online live classrooms, online on-demand teaching, TV video learning and other methods for online teaching. Make full use of relevant national, local, and school-related teaching resources to provide online learning with rich, diverse, selectable, and high-quality online teaching resources covering all regions.

Such a large-scale, established system of online teaching activities is a test of China’s education system facing major emergencies. The test results prove that China has basically completed the infrastructure of the Internet through the construction of informatization and education informatization in the past three decades. This provided the basic technical guarantee and resource guarantee for this large-scale online education. At the same time, through continuous deepening of education reforms, education

and teaching concepts have been improved, and a “student-centric” education model has been basically established, creating possibilities for the occurrence of this online learning. Through the implementation of “School’s Out, But Class’s On”, it has provided valuable experience for accelerating the integration of technology and education and for reforming the teaching methods of education in the new situation.

However, in the implementation process, online teaching also reflects some problems. For example, in online teaching, some teachers copy classroom teaching content to online teaching courses, ignoring subjective guidance, lacking teacher-student interaction, and poor teaching results. At the same time, some students, due to lack of self-control and self-learning ability, lacked face-to-face teacher or even parental supervision, online learning became a form, and the autonomous learning effect was not satisfactory. These questions put forward new requirements and new goals for online learning:

- How to better integrate technology and education;
- How to make students learn more autonomously in online teaching, teacher teaching is more effective, and online teaching models are more reasonable;
- How to make home education and school education more closely linked through online learning, these are the problems that need to be solved in online teaching.

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Practical Exploration of School-Family Cooperative Education during the COVID-19 Epidemic: A Case Study of Zhenjiang Experimental School in Jiangsu Province, China

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Abstract. *As the country fights against the COVID-19 epidemic, “School’s Out, But Class’s On” has been launched in schools everywhere. In order to do a good job in school education services and minimize the impact of the epidemic on normal education and teaching, the Zhenjiang Experimental School in Jiangsu Province has closely contacted parents, carried out school-family cooperative education through school and family cooperation, and worked together to ensure students with the quality of learning during the COVID-19 epidemic, and jointly promote the all-round development of students. We used Zhenjiang Experimental School’s practice during the COVID-19 epidemic as an example to explore a new path for the integration of home education and school education.*

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SCHOOLS and families are indispensable subjects in the healthy growth of children. Building a harmonious home-school relationship and forming a pattern of cooperative education are of great significance to the development of students. During the COVID-19 epidemic, the school's regular teaching activities could not be carried out normally, and the family became the only place for students to learn. The implementation of "School's Out, But Class's On", i.e., "School is closed, but student learning is continuing online" or "Online Home Study" (This refers to the Official Website of the Chinese Ministry of Education: <http://en.moe.gov.cn/>). made the family and school cooperate much closer.

Schools and families need to establish a unified goal to ensure the quality of student learning, cultivate students' autonomous learning ability, and promote the all-round development of students. Guide parents to actively cooperate with the online teaching activities carried out by the school, participate in student education, create a good learning and education environment for students, and achieve student development goals.

Zhenjiang Experimental School of Jiangsu Province, through home-school cooperation, gives full play to the important role of family education in the "School's Out, But Class's On" period, guides parents to actively participate in online teaching activities and offline academic guidance, and effectively promotes students' home study To achieve healthy and happy growth of students. This study used the School-Family Co-education practice of Zhenjiang Experimental School during "School's Out, But Class's On" as an example to explore how to integrate school education and home education during the epidemic. It ensures the quality of students' home study and promotes their comprehensive and healthy development.

Meaning of School-Family Co-education

School-Family Co-education is to cultivate students together through home education and school education, and its fundamental purpose is to promote the all-round development and healthy growth of students. Some scholars once defined School-Family Co-education as "the principle of mutual respect, cooperation, joint efforts, and coordinated education between schools and families, teachers and parents, and both parties share the responsibility of cultivating students and jointly develop two-way, Regular and comprehensive cooperation activities to promote the healthy growth and comprehensive development of students" (Wang & Dong, 2018).

Family education is the foundation of school education, and school education is a supplement and extension of family education. This requires families and schools to play their respective advantages to promote effective complementarities between school education and family education, and to form a joint education force (Lu & Liu, 2019). Schools should build platforms and provide guidance for parents to participate in school education and improve parents' family education. Parents should take the initiative to learn about family education, establish a correct concept of family education, actively communicate with the school, actively participate in school management and education, and maintain consistency with school education.

Home-school co-education, as a complementary educational behavior model and relationship model, is a valuable pursuit (Wen, 2019), which is of great significance to the cultivation of student morality and the promotion of comprehensive development. Therefore, school education should be closely integrated with family education, realize the synergy of education, provide better education methods for students, and promote better growth and development of students.

Bases of School-Family Co-education

The integration of school education and home education is an inevitable trend of modern education (Liu, 2015). Achieving School-Family Co-education requires schools to build platforms for parents and encourage parents to take an active part. During the epidemic, family education became the main form and home-school relationships were closer. Schools use the Internet to build a platform for School-Family Co-education, which not only enables teachers and parents to better communicate with their children's learning, but also provides children with better learning resources and effectively promotes School-Family Co-education.

Build School-Family Co-education Platform

The school establishes a platform for students' online learning and the School-Family Co-education network platform through the provincial, municipal and school platforms. In addition, it implements remote interaction with parents through the public communication platform QQ and WeChat group, and fully implements the Internet-based School-Family Co-education.

Use Public Platforms to Build Student Online Learning Platforms.

During the epidemic, the family became the only place for students to learn. The school set up an online learning platform for students through the provincial, municipal and school platforms. Guide students to realize online learning by watching Zhenjiang Public Education Platform "Zhenjiang Wisdom Education Platform" and Jiangsu Public Education Platform "Jiangsu Famous Teachers Air Classroom".

In addition, in response to students' learning and answering questions, the Jiangsu Province Teaching and Research Office organizes teachers to provide students with "one-on-one" online learning answering and tutoring through video calls every day from 15:00 to 16:30. On the public education platform in Jiangsu Province, teachers are used to provide students with question answering services in the form of teachers' self-selection.

Create A School-Family Co-Education Network Learning Platform Using A Common Platform.

The public learning platform not only provides platform support for students' online learning during the epidemic, but also provides a module for School-Family Co-education and provides an online learning platform for School-Family Co-education.

Use Public Communication Platform to Realize Remote and Timely Communication.

The head teachers of each class of the school organize the creation of parent QQ and WeChat groups, and the group members are the parents of each student, teachers of each subject, and head teachers. During the epidemic, teachers posted learning tasks in groups daily and instructed students on home study methods or related educational information. Parents can use QQ or WeChat groups to communicate student learning trends, problems or solutions encountered, so that teachers and parents, parents and parents can achieve remote interaction through QQ and WeChat. At the same time, the homeroom teacher can regularly push the epidemic prevention knowledge and other School-Family Co-education training resources during the epidemic through the WeChat public account of the class for parents and teachers to learn in time. This can effectively raise parents and teachers' awareness of School-Family Co-education, effectively promote the synergy of education, and provide students with better education methods.

School-Family Co-education Resources

The construction of home-school resources requires not only school resources, but also parent resources to jointly build home-school cooperative education resources. During the epidemic, the school relied on the municipal and provincial education bureaus to develop online learning resources. At the same time, the school used classes as a unit to dig deeper into parent resources and enrich students' home learning resources.

Develop Online Learning Resources by Relying on Provincial and Municipal Forces.

During the epidemic, the Jiangsu Provincial Teaching and Research Office organized provincial 8th grade students, special senior teachers, senior teachers, and city-level discipline leading teachers to record review sessions. For the courses of other grades, the Jiangsu Province Department of Education organized subject teaching experts to launch a one-week course catalog and broadcast schedule for each subject in each grade and class based on the content of the first week of the spring semester, so that students can follow the catalog with options for online learning.

At the same time, for the online learning of junior high school students in Zhenjiang, Zhenjiang Education Bureau organized the backbone teachers in the city to record synchronous classroom teaching videos covering all classes and grades (pre-school education regardless of age) in units of class hours. The city's public education platform "Zhenjiang Wisdom Education" was launched.

In addition, the school will digitize school-based learning resources based on study guides to provide more targeted learning resources for school students.

With the Help of Parents, Promote the Rationalization of Students' Home Study Content.

As a special social resource, parents are essential for optimizing curriculum construction. Especially during the epidemic, parents have become the most important study guides and companions for students, and have played an important role in the learning effect of students during their homes. The diversification of online resources brings abundant resource guarantees for students' home study, but whether it is suitable for the students' study rules and whether the student's home study can be completed requires the parents' timely guidance and evaluation of the students' academic work. Parents publish online teaching plans and student learning plans through schools to understand students' learning requirements and progress, and provide offline guidance, supervision and evaluation for students' academic learning, so as to work with class teachers and homeroom teachers to develop online learning resources and plan.

At the same time, the school digs into the resources of parents, launches "one thing a week", and implements family moral education practices. Each class launches a home network education activity on the theme of reading, calligraphy and painting, family labor, etc., combining students' moral education with family education. This promotes students to correctly understand the relationship between people, society and nature under the guidance of their parents, respects the objective world, acts scientifically and rationally, and makes students grow healthier.

School-Family Co-education Measures during the Epidemic

The home study of students is completely different from the study of students during school after the start of school, and requires the cooperation of homeroom teacher, classroom teachers and parents. Therefore, during the epidemic, schools have formulated different measures for homeroom teachers, classroom teachers, and parents to ensure the smooth implementation of School-Family Co-education.

Homeroom Teacher Level Work Measures

1. **Establish and manage class learning and communication platforms.** Class learning and communication platforms can be established through platforms such as WeChat group and QQ group.
2. **Daily statistics of student observations and assignments.** Each day, after each homeroom teacher and the teacher understands the completion of the homework submission, fill in the "Statistics Form for Online Learning of Students in Zhenjiang Experimental School" and submit it to the director in charge of teaching for the corresponding grade. This folder collects statistics on online learning of students in this grade and submits statistics to relevant personnel of the Academic Affairs Office.

Working-Teacher Measures

1. **Organize teaching seminars.** For the city's education bureau to organize the backbone teachers of the city, the recorded classroom teaching video content of each subject is synchronized, and the team leader organizes teachers in the group to conduct online teaching seminars and make relevant records at least once a week.
2. **Develop student exercises.** Teachers in accordance with the school's daily curriculum schedule for each grade, watch the online course with students, and make notes at the same time. And according to the online teaching content, develop weekly subject practice in advance, arrange only the basic questions, do detailed answers, and send them to the QQ groups in each class.
3. **Help students answer questions.** If students still have questions after watching the video, they can send them point-to-point to the corresponding subject teachers, and the teachers will answer the questions on the day (the questions asked by the students before 18:00 pm on the day).
4. **Review student work.** Teachers in the class select 30% of the students in the class daily to submit assignments. After the student's point-to-point to the corresponding subject teachers, the teachers make comments, feedback and correct comments or suggestions to explain the students' problems. Among them, the form of student assignments can be in the form of electronic manuscripts, printed manuscripts, or direct answers to questions in the assignment book. 30% of students submitting assignments should be selected alternately. While caring for key students, it is necessary to ensure that all students have the experience of submitting assignments in the short term.
5. **Statistics of teachers' teaching.** The preparation team completes the "Statistical Table of Online Teaching, Teaching and Research Work" of the preparation team, and reports it to the teaching director before 5:00 pm on Sunday.

Parental Measures

1. **Instruct students to learn about epidemic situation.** During the epidemic, parents should guide their children to pay attention to the official notification and authoritative broadcast of the pneumonia epidemic of COVID-19 infection, and guide children to learn relevant epidemic prevention knowledge and do personal health protection through special education on "epidemic".
2. **Urge your child to actively develop online learning.** Parents should cooperate with schools and teachers to urge their children to use Zhenjiang Smart Education Platform to conduct online learning. The main tasks are as follows:
 - Refer to the daily curriculum schedules of all grades issued by the school to arrange study and life, and promote the development of good study habits and living habits of students.
 - Guide and urge children to complete the learning videos, homework, teaching plans, homework explanation videos and homework answers for each subject in the learning platform on a daily basis. When in doubt, parents guide students to ask questions to the teacher through QQ.

- Parents with tutoring ability can provide tutoring to students' learning, and guide students who have the ability to learn autonomously through the "famous teacher air classroom" in Jiangsu Province.
- Upload student assignments and cooperate with homeroom teacher to complete statistics of children's online learning every day.
- Guide children to develop personal hobbies and implement family moral education practices while studying.

Concluding Remarks

"School's Out, But Class's On" is a challenge to both school education and family education. It not only requires schools to strengthen the guidance of students' online learning, and to do a good job in the service of students' home study. It also needs the cooperation of the family and the school to help students reasonably arrange their work schedules and home study course content, and improve the content of home study. During the epidemic, the School of Zhenjiang Experimental School in Jiangsu Province used School-Family Co-education to supplement school education and work together to promote student learning and development. It is true that when schools promote School-Family Co-education during the epidemic, there are still some problems that need to be solved urgently, such as difficulties for some parents to guide students, and the implementation of homework feedback cannot be implemented. These questions will encourage schools to further think about how to better establish a home-school linkage mechanism.

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A Six-Step Online Teaching Method Based on Protocol-Guided Learning during the COVID-19 Epidemic: A Case Study of the First Middle School Teaching Practice in Changyuan City, Henan Province, China

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Abstract. *The first Middle School in Changyuan City, Henan Province has been relying on protocol-guided learning for a long time. During the COVID-19 epidemic, the school used protocol-guided learning as a carrier and conducted online teaching activities based on an online teaching platform. We have created a six-step teaching method for students to learn independently during the epidemic. We explored this school's six-step teaching method based on protocol-guided learning during the COVID-19 epidemic.*

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AUTONOMOUS learning refers to the ability of learners to set learning goals, determine learning content and progress, choose learning techniques, monitor self-learning processes, and conduct self-assessment (Holec, 1981).

The first Middle School in Changyuan City, Henan Province, in recent years, has guided students in autonomous learning with protocol-guided learning. In the continuous practice, accumulation and improvement, a unique student autonomous learning model has been formed and achieved remarkable results.

Protocol-guided learning is based on curriculum standards and teaching materials for middle and elementary school teachers, combining students' academic situation and cognitive status, taking learning goals as the guidance, and questions as the core, and guiding students' learning before, during, and after class (Xia, 2020). Compared with the traditional teaching mode, teaching based on protocol-guided learning not only reflects the student as the center, but also significantly improves the academic performance of students, with an effect value of 0.29 (Zhou & Li, 2020).

During the COVID-19 epidemic, the first Middle School in Changyuan City, Henan Province, implemented the epidemic prevention and control requirements of the Ministry of Education and local governments. In response to the "School's Out, But Class's On" policy, i.e., "School is closed, but student learning is continuing online" or "Online Home Study" (This refers to the Official Website of the Chinese Ministry of Education: <http://en.moe.gov.cn/>), teachers and students throughout the school use protocol-guided learning as the carrier and online teaching platforms as the basis for online teaching activities to promote student autonomous learning. During the teaching process, the school resolutely and seriously implemented the teaching concept of "learning first and then teaching", combined with the way students learn independently during the epidemic, and created a six-step teaching method for online learning based on the teaching facts of the school.

Teachers Assign Learning Tasks

During the epidemic, the school strictly followed the normal teaching schedule to carry out autonomous learning activities for students. Restricted by the epidemic, the school adopted the "Internet + Protocol-guided Learning" teaching model and established public information exchange platforms such as WeChat group and Dingding group. In order to facilitate the communication and exchange between teachers, students and parents, teachers, students and parents are closely connected through the above public information communication tools.

Teachers will issue protocol-guided learning on established public information platforms (WeChat group or Dingding group). Teachers arrange learning tasks through the platform, students receive learning tasks on the platform, and parents urge students to accept tasks on the platform.

Students Prepare and Pre-Study According to the Protocol, Complete Homework and Communicate within the Group

In the daily teaching activities, the school emphasizes “learning first and then teaching”, and all students first preview the learning content and complete the corresponding preview test exercises. During the epidemic, students carried out autonomous learning activities based on tasks assigned by teachers on the platform.

When the teacher guides the students to preview, they mainly complete the “I. Self-learning the Basic Knowledge” part of the first lesson independently with “protocol-guided learning”, or try to complete the questions in other parts of “protocol-guided learning” with pencils. On the platform, the independently completed preview exercises are uploaded to the study group, and discussions and exchanges are organized between group members.

Parental Supervision and Teacher Guidance

Parents are important guides for the growth of students. In the daily teaching, parents are too busy with work and are neglecting to educate and guide their children. Only when teachers and parents work together can we ensure that students’ autonomous learning can be carried out smoothly during the epidemic, and that this” School’s Out, But Class’s On “will achieve its due effect (Zhang, 2020).

During the epidemic, parents were more with their students and more assumed some of the responsibilities that originally belonged to teachers. In order to give full play to the role of parents in educating students, the school puts forward different requirements for parents who work from home, parents who do not need to work at home, and teachers according to different personal circumstances.

If parents still have to undertake work tasks during the epidemic, they cannot always urge students to learn. Therefore, parents must put forward specific requirements to students every day, and strengthen the ideological education of students’ autonomous learning, autonomous consciousness, and active learning. For parents who rest at home, there is more time to urge their children to learn independently. Parents not only see whether they learn or not, but also the efficiency of learning. They should pay attention to observe whether students can keep up with the teacher’s teaching pace, and whether they can independently solve learning problems.

Students’ autonomous learning also needs the guidance and guidance of teachers. On the one hand, teachers should check the group summary report in time to understand the students’ autonomous learning situation. On the other hand, in response to students’ problems and doubts during learning, teachers need to do timely telephone communication and guidance with parents.

The Problem Feedback, Layer by Layer

In the school's normal teaching practice, the school establishes six- or eight-person study groups to promote student learning through study groups. Each student has his or her own learning partner. Generally, students with higher grades and students with less than ideal grades go together in order to improve each other.

During the epidemic, the study group was transferred to a public information platform, connecting students, parents, and teachers through the public platform. And set up learning groups on the platform, each group has its own learning exchange group, to facilitate the team leader to monitor the completion of the group members' work in a timely manner. At the same time, the teacher can understand the learning situation of all students through the group leader, saving time.

Tasks and homework assignments arranged by the teacher are studied in groups. The detailed learning steps are below:

First, students think independently and digest the knowledge they can solve by themselves. In the process of self-study, outline the points you don't understand and communicate with your learning partners. If there are still problems after the exchange between the partners, submit them to the group, and the group will cooperate to solve them. In the WeChat group, the teacher collects the problems that the students can't solve in the study, and the problems that the students don't solve, the teacher focuses on explaining through the online platform.

For the team members to complete the task, the teacher asked the team leader to report in two groups in the class every day:

1. Report the housekeeping, physical exercise, and dual-channel temperature reports before 6:30 am in the morning.
2. Inform the list of students whose other tasks are not completed on time or not completed before 8:00 pm.

The above two periods of reporting require that you take notes and make a weekly summary every Sunday to announce your personal grade reduction. Therefore, we particularly emphasize that the class teacher should attach great importance to the training of the team leader and teach them management methods; at the same time, special care and guidance should be given in study and life.

Teachers' Online Lecture Guidance, Problem Correction and Re-Feedback

Teachers learn about student group learning in a timely manner, and based on understanding of student learning, targeted teaching.

Teachers carry out online instructional activities based on the results of online learning and the learning of each group. Teachers' online classroom guidance must do three close integrations:

1. Closely integrate the "protocol-guided learning" of the school;
2. Closely integrate common questions raised in students' autonomous learning;

3. Closely integrate high-quality course resources. High-quality teaching resources such as the “Henan Provincial Experimental Middle School Quality Online Course” were launched by the Education Department of Henan Province. We must pay attention to collecting the problems existing in the pre-class review, pay attention to intensive lectures and interaction with students. After the online teaching of science, the method of recording multiple small videos of the most difficult points and further focusing on counseling was provided to allow students to selectively check for omissions.

In order to ensure the pertinence of teaching, teachers who have already met the students will no longer teach.

Consolidation and Promotion, Summary and Sublimation

The teacher arranges exercises for the students again through the network learning platform, and the students complete the corresponding exercises independently. After the students complete the homework, they submit it to the platform, and the teacher reviews it in time, and finds that the problem is corrected in time. Teachers guide students to summarize their learning content, so that students can refine the core knowledge of each lesson.

During the epidemic, the school guided students to learn independently through an original six-step method of online teaching. On the one hand, it responded to the national “School’s Out, But Class’s On” policy, which ensured the normal learning process of students and promoted the improvement of students’ autonomous learning ability. On the other hand, it has further strengthened the communication with students’ parents, strengthened the parents’ awareness of students’ supervision, and paved the way for the restoration of regular teaching activities.

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Autonomous Learning of Elementary Students at Home during the COVID-19 Epidemic: A Case Study of the Second Elementary School in Daxie, Ningbo, Zhejiang Province, China

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Abstract. *Autonomous learning is a topic of common concern in the education community. Various effective attempts and researches have been made around autonomous learning. However, autonomous learning is carried out more in the context of normal teaching, and lacks the exploration of elementary student autonomous learning outside the normal teaching scene. During the COVID-19 epidemic, the Second Elementary School in Daxie, Ningbo City, Zhejiang Province adopted an online education model to carry out distance education activities and student academic counseling, and actively developed teaching practices for students' independent learning at home. We discuss the teaching practice of home study for students during the school epidemic.*

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AUTONOMOUS learning refers to the ability of learners to set learning goals, determine learning content and progress, choose learning techniques, monitor self-learning processes, and conduct self-assessments (Holec, 1981). It helps students adjust their learning methods and coping strategies in a timely and proactive manner based on learning effects. Studies have shown that students' autonomous learning can effectively improve student learning performance (Zhou & Li, 2020), improve the effectiveness of student learning, and promote the cultivation of lifelong learning abilities Cheng (Guo, 2020).

Affected by the COVID-19 epidemic, schools were unable to carry out teaching activities normally. On February 12, 2020, the Ministry of Education and the Ministry of Industry and Information Technology jointly issued the "Notice on the Work Arrangement of" School's Out, But Class's On "During the Extension of Chinese Elementary School", advocating that "localities combine local learning resources and coordinate arrangements" to use the Internet To achieve "School's Out, But Class's On", i.e., "School is closed, but student learning is continuing online" or "Online Home Study" (This refers to the Official Website of the Chinese Ministry of Education: <http://en.moe.gov.cn/>), to provide services and support for students' home study (Ministry of Education of the People's Republic of China, 2020).

In order to implement the requirements of the Ministry of Education and the provinces and cities for the "School's Out, But Class's On" during the prevention and control of the COVID-19 epidemic, the Second Elementary School in Daxie, Ningbo City, Zhejiang Province made full use of the online education model to guide students to learn independently. In order to carry out distance education teaching activities and student academic counseling, strive to improve the quality of school students at home, cultivate students' ability to learn at home, minimize the impact of epidemic prevention and control on teaching work in the new semester, and ensure the "School's Out, But Class's On" effectively.

The Basis of Elementary Student Home-Based Self-Learning Practice during the COVID-19 Epidemic

The school's online education activities require a complete guidance system and well-designed guidance materials as a guarantee. Without a complete guidance system and well-designed guidance protocol and materials, the school's online teaching activities cannot be carried out. In recent years, the school has actively explored a classroom guidance system based on Protocol-guided Learning and has achieved a series of results, which has provided basic guarantees for the homeschooling practice of elementary students during the COVID-19 epidemic.

Schools Independently Develop Learning Protocol for Students' Independent Learning

Protocol-guided learning is based on curriculum standards and teaching materials for middle and elementary school teachers, combining students' academic situation and cognitive status, taking learning goals as the guidance, and questions as the core, and guiding students' learning before, during, and after class (Xia, 2020).

Since 2010, the school has independently developed task lists and Protocol-guided Learning suitable for students' learning. After years of accumulation, it has a relatively complete set of task lists and Protocol-guided Learning templates, and formed a more comprehensive Protocol-guided learning task, writing and guidance process.

During the epidemic, for the students to study at home independently, the school gave full play to the autonomy and school-based nature of the protocol-guided task list, and organized teachers to study the textbooks, syllabuses, and browse through various materials on the basis of students' actual learning. Break down the key and difficult knowledge, ask different types of questions, and equip them with a certain number of targeted practice questions to form a guided protocol and send them to students, allowing students to form autonomous learning through Protocol-guided Learning habit.

Exploring the Teaching Model of Students' Autonomous Learning

The "student-centered" teaching model is based on teaching materials as a carrier, closely connecting practical problems with student learning, and focusing on cultivating students' ability to collect information, analyze and solve problems, and then cultivate students' innovative and practical abilities (Lv & Lv, 2019).

Through years of practice and research, our school has established a relatively complete classroom guidance system. This system changes students' "passive learning" into active learning. Implement two prerequisites: the learning prerequisite and the problem prerequisite. Under the guidance of Protocol-guided Learning, students can reduce the difficulty of learning through self-directed learning, classroom practice, and consolidation after class. With the strategy of "taking students as the mainstay", teachers can organically integrate and carefully design textbooks, and rationally control "learning" and "teaching" in classroom teaching. The purpose is to improve the learning style of students, expand the study time and space of students, and advocate students' independent inquiry. Through self-directed, cooperative, inquiry, exchange, display, feedback and other learning activities, students make students truly masters of learning.

In ordinary classroom learning, by emphasizing learning prerequisites and problem prerequisites, the habit of students' autonomous learning has gradually developed. Therefore, in the face of the epidemic, students in our school can achieve non-classroom teaching and teacher guidance Use Protocol-guided learning to complete autonomous learning.

Problems Encountered by Students in Autonomous Learning during the COVID-19 Epidemic

Due to the impact of the epidemic, schools could not carry out teaching activities normally. In order not to affect the normal teaching progress, the school actively responds to national policies, advocates students to learn at home independently, and uses the Internet to achieve “School’s Out, But Class’s On”. However, in the specific implementation process, students often fail to learn autonomously due to various factors. The main issues are as follows:

Due to The Different Family Conditions of Students, It Is Impossible to Achieve Online Learning That All Students Can Participate In

Through a questionnaire survey across the school, it was found that 18.7% of the students in this school do not have mobile phones, iPads, computers and other electronic products; the mobile phone signal is too poor to account for 38.79%; the signal data is not enough to account for 22.41%; there are conflicts in time, only at night Studying accounted for 31.03%; those who would not operate mobile computers accounted for 37.07%; and no city or district digital TV accounted for 39.66%. These factors have prevented the school from fully implementing live webcasting.

Lack of Targeted Autonomous Learning Materials

In normal classroom teaching, teachers carefully design the teaching process according to the learning objectives of each lesson. By pinpointing the inherent connection between new and old knowledge, we can break through and break down the most difficult points of teaching. Use the students’ existing knowledge and experience to guide students from known to unknown and reveal contradictions. Students’ ability to cooperate and explore was developed through group discussions.

In the network teaching, due to the limitation of conditions, teaching interaction cannot be realized, and students’ autonomous learning is more important. In the true sense of self-study, students should independently think through new self-study textbooks and reference books, relying on existing knowledge, experience, and methods, and learn to explore new knowledge independently. In this process, targeted self-learning materials are of great significance to promote students’ autonomous learning. Most of the existing educational materials on the Internet that can be used by students for independent learning are mechanically copying the textbooks, without scientifically deleting, adjusting, integrating, and supplementing the textbooks appropriately to suit the students’ actual situation. Therefore, in the specific implementation of online teaching, due to the lack of targeted self-learning materials, students lack the goals and specific learning steps of self-study. They often simply watch instructional videos and complete uniform assignments, which cannot guarantee the learning effect.

Measures Taken by Students to Study Independently During the COVID-19 Epidemic

Aiming at the problems of students' autonomous study at home during the epidemic, according to the actual situation of the school and referring to the accumulated experience in the past, the following measures were finally determined.

Strengthen the Construction of Online Learning Platforms to Provide the Basis for Students' Autonomous Learning

Due to the heterogeneous family conditions of school students, students cannot fully participate in online platform learning. The school builds an elementary student online learning platform according to local conditions. For the poor mobile phone signal, insufficient traffic, conflicts in time, can only learn at night, do not operate mobile computers, no problems with digital TV in Ningbo or Daxie, the school carried out through existing public communication platforms, such as QQ group, WeChat group Online learning activities. The school mobilized subject teachers to record teaching micro-lecture videos in advance, and forwarded the corresponding videos to each class group the next day. Parents can adjust the time by themselves and let the children watch anytime, anywhere to ensure that more children can learn online. Teachers, students and parents are closely linked through QQ group and WeChat group.

For a small number of students who do not have electronic products such as mobile phones, iPads, computers, the school arranges class teachers to contact students in real time to appease anxiety. It is required to submit a home study plan based on the school's study plan and its own learning conditions, and to strengthen home-school communication during this time to ensure students' physical and mental health.

Prepare Targeted Learning Materials to Promote Students' Autonomous Learning

In response to the lack of students' self-learning materials, the school organizes teachers in various disciplines to write and design a guided learning protocol. And make full use of this protocol in the online learning process, to help students clarify learning goals, grasp learning points, lead students to explore laws, improve practical ability, consolidate what they have learned, let students learn to think about problems, learn to summarize and reflect, and promote autonomous learning. School work is arranged as follows:

1. Each class teacher designs a Protocol-guided Learning list according to the learning objectives of the teaching materials and the academic situation of the students, to make the knowledge organized and systematic. Teachers of all disciplines set up lesson preparation groups, and the instructor uploads the designed Protocol-guided Learning list to the lesson preparation group. Teachers of each lesson preparation member discuss and revise them. After the approval of the lesson preparation group leader, the final Protocol-guided Learning list is determined.
2. Before the lesson, the teacher uploads the Protocol-guided Learning list to the class group, and asks the students to preview according to the Protocol-guided Learning list, and requires that they upload to the class group after completing

the pre-reading part of the study plan, and the teacher corrects it. The Protocol-guided Learning list presents learning goals in the form of questions or tasks, enabling students to clarify their learning goals in the preview process, while stimulating students' interest in autonomous learning, and promoting the improvement of students' autonomous inquiry capabilities.

3. The teacher designs or adjusts the teaching micro-lectures according to the pre-reading assignments submitted by the students. After the students pre-learn through the Protocol-guided Learning list, they learn independently according to the high-quality micro-lectures uploaded by the teachers, and complete the classroom training in the process. The teacher explains the exercises in this part in the instructional micro-video.
4. The teacher arranges a small amount of homework according to the academic situation. The students complete the exercises and upload the homework to the class group. The teacher judges the student's learning results and gives appropriate guidance.

Elementary student autonomous learning outside the normal teaching scale is a new topic. Although the school has made corresponding attempts, due to the limitations of the school's running conditions, especially the use of students' information technology, many of the school's practices are still very superficial, and need to be continuously researched in the future to promote the better development of elementary student autonomous learning activities.

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Online Home Study Plan for Postponed 2020 Spring Semester during the COVID-19 Epidemic: A Case Study of Tangquan Middle School in Nanjing, Jiangsu Province, China

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Abstract. *The implementation of “School’s Out, But Class’s On” is inseparable from the support of online education. The problem that each school needs to consider for online teaching during the delayed start period is how to use the network for teacher and student learning and management on the basis of ensuring the health of teachers and students to ensure high quality and high efficiency of online teaching. Taking the practical exploration of Tangquan Middle School in Nanjing, Jiangsu Province as an example, we explored the implementation plan of online teaching in schools during the COVID-19 epidemic.*

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AFFECTED, by the COVID-19 epidemic, on January 27, 2020, the Chinese Ministry of Education issued a notice requiring all types of schools to postpone the start of the 2020 spring semester, and emphasized the use of the internet platform to ensure “School’s Out, But Class’s On” plan, i.e., “School is closed, but student learning is continuing online” or “Online Home Study” (This refers to the Official Website of the Chinese Ministry of Education: <http://en.moe.gov.cn/>). Tangquan Middle School in Nanjing City, Jiangsu Province, according to the requirements of all levels, take multiple measures to effectively and effectively solve the problem of autonomous learning of students, so that students can safely, orderly and effectively carry out the extended learning life during the extended school period.

Establish Work Goals and Requirements

In order to solve the problem of student learning during the epidemic, the school focuses on cultivating students’ autonomous learning ability and adheres to the five ethics of “morality, intelligence, sports, aesthetics, and labor.” In accordance with the characteristics of online learning and the actual needs of students, guide students to carry out independent learning, ensure the effectiveness and quality of online teaching, and promote the all-round development of students.

After discussion, the school established the following job requirements:

1. **Raise awareness.** Class teachers and teachers in all subjects should attach great importance to online teaching, actively guide students, organize students in this class to do online learning, and give full play to the role of leading cadres, party member teachers, and backbone teachers in exemplary and exemplary roles.
2. **Organization is in place.** Each class teacher and teacher in each subject must carefully plan, arrange carefully, and organize carefully to ensure that the student’s “School’s Out, But Class’s On”.
3. **Strengthen publicity.** The head teachers and teachers in each subject should timely publicize the work highlights and advanced models during online teaching and learning, and continuously gather positive energy.
4. **Encourage innovation.** Class teachers and teachers in each subject are encouraged to develop students’ autonomous learning ability based on the actual development of resources and focus on the guidance of learning methods. But to control the total amount of learning resources, we must not increase the excessive academic burden.
5. **Strengthen supervision.** The head teachers and teachers in each subject should strengthen inspections to ensure the effectiveness of work; the teaching affairs office and information center should strengthen their work guidance to solve technical and teaching problems in a timely manner for each head teacher and teachers in each subject; the teaching affairs office should strengthen supervision.

Set Up a Working Group

In order to better carry out “School’s Out, But Class’s On”, the school set up a working group led by the principal, and the vice principal as the vice-group leader. The heads of the teaching and research offices, and the lesson preparation teams are as the team members, so as to guarantee a good job of network teaching during the extended school period.

Develop an Online Teaching Plan

With reference to the online teaching requirements of the municipal and district education bureaus, the school has formulated online teaching plans for each grade. The online learning in the “School’s Out, But Class’s On” period was divided into two stages, namely the review and the new lesson stage.

Develop an Online Review Plan.

For the first week (02/03/2020-02/07/2020), it was the review period for students. The school arranged students to conduct home-based review through the Jiangsu Provincial TV Teaching Channel and other platforms.

Develop Plans for Online New Lessons.

Starting from the second week, online teaching had entered the new lesson learning stage. The school arranged students to study according to schedules through multiple platforms, and prepares record books for recording.

Build an Online Teaching Platform

With various teaching platforms at all levels, the school builds a platform for online teaching, tutoring and answering questions for teachers and students throughout the school. This effectively solves the problem of delaying students to attend school due to the epidemic situation, and realizes the “School’s Out, But Class’s On” of the whole school, and teachers are suspended from teaching.

1. **National or local public education platform.** The school uses Jiangsu’s teaching platform “Air Master Classes and Jinling Micro School”, Pukou District’s teaching platform “Pukou e Start”, and Jiangsu Province’s online learning mobile app “I Su” for online teaching.
2. **National or local television education channels.** During the review phase, the school required the school to listen to the “Drum Tower Online Review Class” for home-based independent review by watching the Jiangsu Education Channel. For ninth grade students, the school organizes students to learn independently by watching Pukou Television News Channel.
3. **Public communication platform.** The school establishes communication groups for each class through public communication platforms such as QQ or WeChat, so that teachers can help students answer questions in a timely manner.

4. **Enterprise live broadcast platform.** The school uses the office communication platform “Dingding” to carry out online group live broadcasts, and conducts online interactive teaching through the network live broadcast platform.

Building Online Teaching Resources

Schools give full play to their subjective initiative and, based on the use of public teaching resources in provinces, municipalities, districts and other countries, will further enrich curriculum resources for students’ learning based on the results of school classroom instruction reform.

1. **School-Based resources.** The school encouraged class teachers and teachers in each subject to develop resources, especially the construction of online instructional resources, according to the actual semester and the age characteristics of the students. The school organized teachers to prepare pre-study sheets and guide plans for students to study independently, appropriately increased the learning contents, focused on the guidance of learning methods, and enriched the online teaching courses during the postponed start of the school.
2. **National and local public course learning resources.** The school made use of the learning resources of famous teachers and lessons in public platforms such as the country, the province, and the urban area to conduct online teaching, and guided students to use rich network resources for student preview and development.
3. **Epidemic prevention and health knowledge.** In addition to academic knowledge, the school paid attention to the spread of epidemic protection knowledge, strengthened life education, public safety education, and enabled students to obtain comprehensive and vivid training and development.

Implementation of Online Teaching

1. **Develop a home study plan suitable for students.** The teachers in each class put forward different requirements to different students according to the students’ ability, and strive to have each student have their own home study plan.
2. **Teachers of each class teach online.** The teachers of each subject (Chinese, mathematics, English, physics, chemistry, politics, history, geography, biology, and 9th grade sports) would arrange the learning content of the new class in the first week and publish it in the class QQ or WeChat platform with the textbook pictures, self-study pre-study sheets, and tutorials. The answers were checked and announced the next day. Students revised and corrected them by themselves, then uploaded the pictures of the learning results to the group, and finally the teachers answered individual questions online.
3. **Home-school joint education.** In order to facilitate the communication between parents and children, the school had strengthened contact with par-

ents, unified curriculum and activity arrangements. All learning and activity resources were mainly based on Pukou District teaching platform (“Pukou e Co-study”) online learning, supplemented by teachers’ live broadcasts, through QQ, WeChat, Dingding and other platforms jointly carried out home study and counseling with parents. For the students who had the ability to learn, the school organized parents’ guidance and arranged for the students to choose the famous teacher class in Jiangsu Province, “Sky Master Classes and Jinling Micro School Platform” for independent learning with the help of parents.

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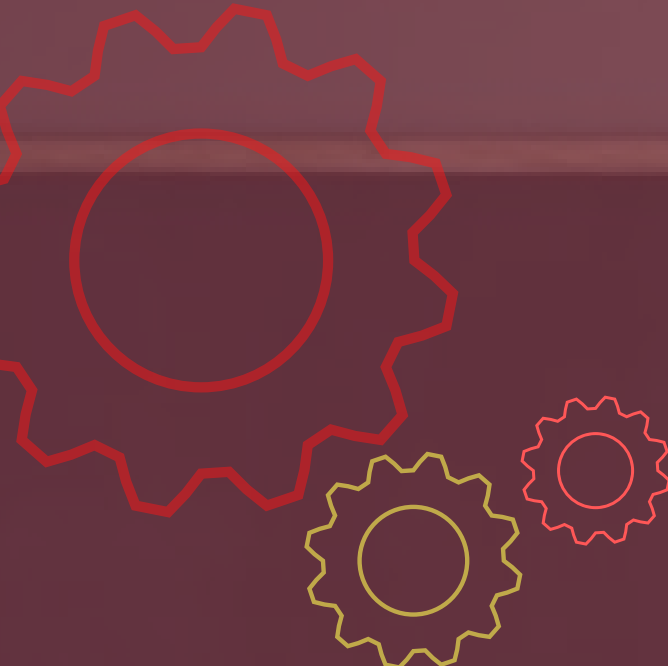
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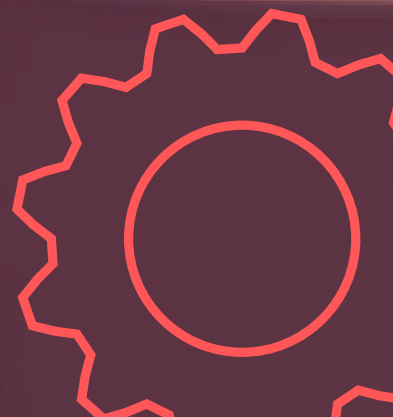
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