

THE PROBLEM OF DISTANCE EDUCATION IN LIGHT OF THE CORONA CRISIS - A REFERENCE TO THE EXPERIENCE OF CHINA

Dr. Fadila Boutora¹, Dr. Sufian Eltayeb Mohamed²

¹Faculty of Economics, Commercial and Management Sciences, Larbi Tebessi University, Algeria

²Corresponding Author: Dr. Sufian Eltayeb Mohamed, Associate Professor, Sultan Qaboos University

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Abstract: This study aims to diagnose the effective role the process of distance learning plays in responding to the Corona pandemic, targeting the experience of the People's Republic of China. The study revealed that distance learning is a systematic process that includes the selection, preparation and delivery of educational materials in addition to the supervision and support of student learning. The process is attained by bridging the physical distance between the student and the teacher through at least one appropriate technical means. It is noteworthy that one of the most important effects of closing schools around the world is the interruption of this latter process. Learning, education and social isolation, denial of nutrition and unequal access to digital learning platforms, as well as disparities in child care worsened the situation. In response to the Corona pandemic, the People's Republic of China has launched several tele-education initiatives, including a supermarket for free courses and e-textbooks for primary and secondary schools provided by pep and Dink Talk to offer live-streaming lessons, to name few. The present study recommended the need to provide a good technological infrastructure for educational institutions in Algeria in order to facilitate the process of communication and distance communication, and the success of the educational process. The need to develop an integrated strategy in order to support the process of distance education, given the positive effects, especially at the time of the spread of epidemics and diseases, such as the Corona Pandemic, which hit the world today, is imperative. Similarly, the need to conclude international agreements with leading countries in the field of technology and digitization in order to benefit from their knowledge and expertise on the one hand, and to keep pace with rapid technological development that the world is witnessing today, on the other hand, is also vital.

Keywords: Distance Education, Corona Pandemic, Chinese Experience.

INTRODUCTION

The world is now under great pressure due to the Corona pandemic and this is in various economic, social and cultural fields... Moreover, the Corona pandemic has affected education systems around the world, leading to the closure of most schools and disruption of education in many countries of the world. This has led many countries today to move towards distance education technology, which is one of the secretions of modern education, where all indications suggest that the mechanism of distance education will take a great deal of global attention and will spread throughout the world. Besides, it will have a strategic place in the education system everywhere in the world.

- **The problem:** From the above discussion, the study research questions are as follows: What is the effective role of distance education in responding to the Corona pandemic?

- **Sub-questions:** What is distance education, and what are its characteristics?

- What are the advantages and disadvantages of distance learning?
- What are the most important risks of education under the Corona pandemic?
- What are China's most important initiatives in responding to the Corona pandemic?
- **Significance of the study:** The significance of the study stems from the particular importance of the concept of distance education and its critical importance in addressing the Corona pandemic, by focusing on China's initiatives to address the pandemic.
- **The objectives of the study:** The core objectives of this study can be summarized as follows:
 - Learn about the concept of distance learning;
 - Highlight the most important risks of education under the Corona pandemic;
 - Study of China's most important initiatives in response to the Corona pandemic.
- **Research Methodology:** In this paper, the case study methodology was adopted to clarify the concept of distance learning and its most important elements, highlighting the most important initiatives related to distance learning in responding to the Corona pandemic.

1. DISTANCE EDUCATION UNDER THE CORONA PANDEMIC

1-1. The Concept of Distance Learning

Distance education is a planned and systematic activity which comprises the choice, didactic preparation and presentation of teaching materials as well as the supervision and support of student learning, which is achieved by bridging the physical distance between student and teacher by means of at least one appropriate technical medium (Both, H, 2006), The term distance education also expresses that " Distance education implies that the majority of educational communication between the teacher and student(s) occurs non-contiguously. It must involve two-way communication between the teacher and student(s) for the purpose of facilitating and supporting the educational process. It uses technology to mediate the necessary two-way communication (Aras, 2019)".

1-2. Characteristics of distance learning

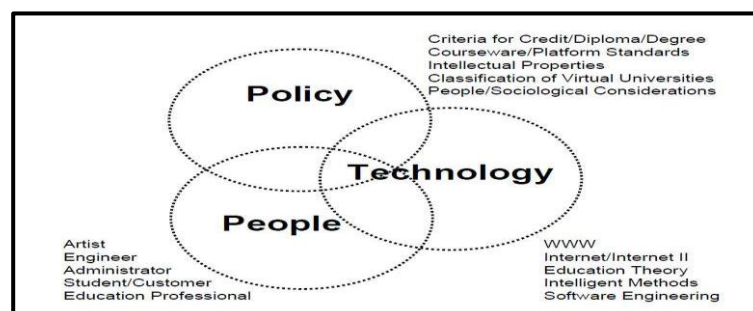
Distance education is a form of education in which the participants in educational process – teacher and learners are physically separated and communicate by different means and at different times. From this definition we can differentiate the main characteristics of distance education: (Gabriela, 2009)

- Separation of teacher and learners in space and time;
- Use of different media to realize the interaction among teacher, learners and educational content;
- The provision of two-way communication between teacher and learners;
- Control of the learning process by the learners rather than the teacher.

1-3. Elements of distance learning:

The most important elements of distance education can be summarized through the following Figure 1:

Figure 1: Elements of distance learning



Source: (Won & K. Shih, 2003)

1-4. Types of distance learning

Distance learning institutions usually use different methodologies for student education, and they use different types of distance learning courses to help students. Distance learning courses are actually present in different types; namely: (World Education)

1.4.1. Synchronous

Synchronous distance learning refers to learning by chatting online, teleconferencing and sitting in a classroom. This type of learning offers less flexibility and affects the student's life to an extent. It is, nevertheless, the most popular form of distance learning and continuing education programmes, as it makes interaction between students and teachers easy.

Synchronous learning is best suited for degree programmes that draw attention to communication, such as nursing, counseling psychology, general psychology, and general education.

1.4.2. Asynchronous

Asynchronous distance learning typically has a set of weekly time limit; yet it provides the students with the freedom to work at their own free will. Students have more communication with other fellow students and communicate through online notice boards. Asynchronous learning might get difficult at times as the only information received by students might be in the form of text medium. However in some classes, a video or audio option is also available.

Programmes dominated by assignments and projects work well in an asynchronous format because they provide the students with more time to focus on their work. Degree programmes that work well in this format include healthcare administration, marketing, educational/instructional media design, legal or paralegal assistant and advertising.

1.4.3. Hybrid Distance Learning

Hybrid or Blended courses are a combination of synchronous and asynchronous learning. Hybrid learning courses are lectures in which the students are required to be available at a fixed time in the Internet chat room or classroom. Yet, the students are allowed to complete assignments at their own pace and later submit them online.

1.4.4. Computer Based Distance Learning

Computer based learning requires students to assemble in a computer lab or in a classroom at a fixed time.

1.4.5. Fixed Time Online Courses

In these courses the students are required to log-in to their online accounts at a specified time. Such courses are the most common form of distance learning. Although they are absolutely online, live chats are a regular part of the course.

1.4.6. Open Schedule Online Courses

This type of online courses gives you the maximum freedom. The students are provided with mailing lists, email, Internet-based textbooks and bulletin boards to finish their assignments. At the beginning of the course, the students are provided with a schedule, but are allowed to work at their own velocity as long as the students stick to the schedule.

1-5. Advantages of distance learning

The most important advantages of distance learning are: (Manijeh, 2019)

1.5.1. Study from Anywhere, Anytime

The best thing about distance education is that you could acquire it from anywhere and at any time. It does not matter which part of the country you are living in, you can join the course and start learning whenever you need. Even if your course is offered by an international school you could easily get access to course material if you are a citizen of a different country, Get all the knowledge and training anywhere you reside on the planet.

1.5.2. Saving Significant Amount of Money

According to Bijeesh (2017), for any given program, the fee of a distance education degree (online or otherwise) may be much more affordable than the fee of a regular on-campus degree. Students who are looking for economically viable options can go for a distance learning program. You don't have to live in the same city or the same country to attend the

learning institution of your choice. You can study whenever you have access to a computer and Internet connection. Moreover, the courses offered at distance learning centers are cheaper than the courses provided at traditional education centers.

1.5.3. No Commuting

Nagrale (2013) stated that if you are opting for a distance education, then you do not have to commute in crowded buses or local trains. You need a computer with an internet connection in your home. The entire college would be in your bedroom and you do not have to go out. Commuting is the most difficult part because you waste a lot of time, money, and more importantly the energy. No one likes commuting for long hours.

1.5.4. Flexibility to Choose

Learners will have to follow a set schedule of learning as per the curriculum of the school if they are following traditional ways of learning. But different types of distance learning allow learners to set their learning schedule as per their convenience without following a regular schedule of learning. Even if they are out of touch from the learning process, distance learning programs offer learners flexibility to choose their course of learning.

1.5.5. Saving Time

Bijeesh (2017) argued that there's no time wasted in going to and getting out of a college, no time wasted waiting for a bus or train. In a distance learning program, your classroom is right in your bedroom - the study material is on your desk or the e-material is on your computer. Students who don't have enough time on their hands can turn to distance education as an option and pursue it from the comfort of their homes.

1.5.6. Earn While You Learn

Those who want to improve their resume by getting higher education and without breaking their existing job then distance learning can be the best option for them. Learners can go on earning their livelihood along with improving their qualification as distance learning will accommodate both learning as well as earning.

1-6. The disadvantages of distance learning

The most important disadvantages of distance learning are the following points: (Gabriela, 2009)

1.6.1. Isolation

Learners in distance education courses are separated from the teacher and sometimes feel uncomfortable because there is no visual interaction with the other participants. Learners sometimes feel a lack of support and reassurance when the learning content is difficult and they have problems with it.

1.6.2. Loss of motivation and self-discipline

Motivation is a basic agent in distance education, Loss of motivation will bring negative results. Learners should be strongly motivated in order to finish their education. Self-discipline is linked to motivation. In most cases, the teacher controls a final due date for individual tasks and projects, but learners are responsible for complying. Loss of motivation and self-discipline can be noted in certain cases.

1.6.3. Short period of courses

Distance education courses are shorter than traditional ones. This requires assimilation of the learning content in a shorter period of time and could be difficult for some learners.

1.6.4. High costs

At the beginning of the development of distance education course, expenses are considerable – not only financial, but also time. Teachers spend a lot of time preparing and structuring the whole course – time for examination of the audience, review of existing learning materials and already created courses, as well as time for preparation of learning instructions.

1-7. Risks facing education in light of the Corona pandemic

The world is now experiencing a catastrophe that has not been witnessed before, or at least in its modern history. Its effects were reflected in all aspects of life in the world, and education is not an exception. Rather, it was one of the sectors

most affected by that disaster, which was described by UNESCO Director-General Audrey Azoulay as saying: We have never seen this level of disruption in education.”

In light of the speed and size of the educational turmoil resulting from the closure of schools and universities to avoid the spread of the virus among their members, and in light of this world afflicted by the Corona virus, governments seek to provide education and learning for their children while students stay in their homes away from schools and universities where they learn from a distance.

The number of students affected by the closure of schools and universities in 138 countries has nearly quadrupled during the past ten days, reaching 1.37 billion students, representing more than three quarters of children and youth in the world; cited in UNESCO statistics of March 2020.

On March 16, 2020, governments in 73 countries announced school closures, including 56 countries that closed schools across the country and 17 countries that closed schools within a specified range. The closure of schools nationwide has affected more than 421 million learners globally. While the small-scale closure of schools has put 577 million learners at risk, according to data released by UNESCO on March 10, the closure of schools and universities due to the spread of the COVID-19 virus has left one in five students out of school globally.

The origin of education is that there are intended institutions, which are schools and universities established by the community for the purpose of providing educational and social services to its entrants, such as material requirements of buildings, equipment and human beings ranging from qualified and trained teachers and supervisors for this purpose. Therefore, the closure of schools in order to limit the spread of the virus; the new Corona, led to problems and disruption in the education of millions of students who were attending these institutions. Let alone those who belong to some disadvantaged groups or those with special circumstances.

Proceeding from the role played by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the field of education and training, the effects that can result from closing schools around the world have been limited to the following: (Khalil & Jamel, 2020)

1.7.1. Teaching and learning stopped

Closing schools will deprive children and students of the services provided by these institutions, especially in the early stages of life, which is of great importance in their social and educational upbringing.

1.7.1. Social isolation

Schools are not only a place for education, but they are also centers for practicing social activities and human interaction and providing students with many social skills or what we call life skills. When schools close their doors, many children and youth lose their social relationships that have a fundamental role in learning and development and protect them from what is called social isolation by being at home to avoid the spread of the virus under the campaign (stay home and avoid mixing).

1.7.2. Difficulty providing alternative education at home due to the unwillingness or ability of parents to do so at home

When schools are closed, parents are often asked to facilitate children's education at home, and parents often find it difficult to do so, especially for parents with limited education and resources.

1.7.3. Inequality of access to digital learning platforms

In light of the closure of schools, it becomes necessary to take advantage of technology and rely on it to obtain educational services through digital learning platforms and distance education programs, but the poor state of the digital infrastructure and the weak and sometimes lack of Internet service represent an obstacle to this. Achieving the principle of equality and equal educational opportunities becomes difficult; especially for students who belong to poor and disadvantaged communities.

1.7.4. The disparity in child care

Working parents often leave children alone when schools close when no alternative options are available, which can push those children to engage in dangerous behaviors, such as peer pressure and substance abuse.

1.7.5. The high economic cost to parents due to the presence of children in homes, in light of the closure of schools

Working parents will not be able to perform their work because they are free to take care of their children and stay with them, which causes a decline in income in many cases, and negatively affects regularity in their work and productivity.

1.7.6. Unexpected stress on the healthcare system

This fact is due to the absence of most female health care workers who are often unable to go to work because of their commitment towards their children at home as a result of school closures, which means the absence of many health care providers from their workplaces that are most in need in times of health crises.

1.7.7. Increasing pressure on schools that are still open

School closures in some areas are putting pressure on schools as parents and principals direct children to schools that are still open.

1.7.8. Blurred vision regarding the duration of the study suspension

Ensuring that children and young people return to schools when they reopen and continue to study, especially when it comes to prolonged school closures.

2. DISTANCE LEARNING INITIATIVES IN CHINA TO ADDRESS THE CORONA PANDEMIC

In response to the Corona pandemic, the People's Republic of China has undertaken several tele-education initiatives, which can be summarized as follows: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-1. "Course Supermarket"

Binbei School in Shandong Province opened a "Course Supermarket", which provides students with great flexibility in learning from home and helps them develop self-management skills. The topics of the courses offered by this "supermarket" range from photography, calligraphy, reading, housework, music, fitness and bodybuilding exercises. Examples of the course topics are presented in Figure 2.

Figure 2: Binbei School (Shandong, China) opened a "Course Supermarket" that offers courses with a broad range of topics



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-2. Free and open learning resources provided to students

The Ministry of Education of China coordinated 22 online learning platforms that totally offered 24, 000 free and open online courses at the national level. Schools and educational corporations at the province level also provided a huge amount of open learning resources so that the quantity and flexibility of resources can be guaranteed during the special period of the virus outbreak. The modality of the resources includes filmed lectures and educational games, as shown in Figure 2. Schools like Wenzhou Experimental Middle School further customized the public resources based on the characteristics of its students to fit their needs.

Figure 3: Parts of resources provided in different modalities

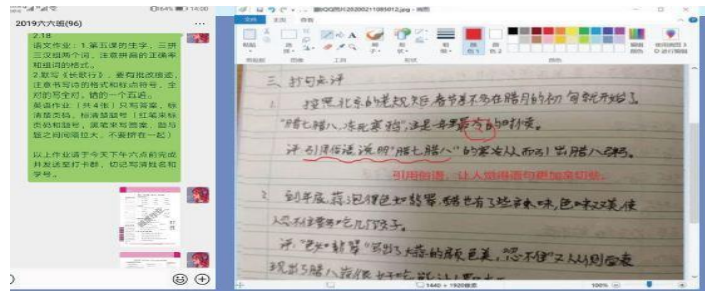


Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-3. Real time chatting tools facilitated assessments

The instructors at No.1 Primary School in Puyang, Henan province, required students who study at home to write their answers to the test questions on pieces of paper. Students should then take photos of their completed answer sheets and send them to their instructors via real time chatting tools, such as WeChat. Instructors' grading and comments were then manually added on the photos of the answer sheets by using the image processing tools like Drawing and then sent back to students, as shown in Figure 4.

Figure 4: An assessment delivery method by using image processing tools and real-time chatting tools



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-4. The Q & A platform of "Smart Learning Partner"

To address the needs of the students' non-real-time Questions & Answers counseling, Beijing has launched an online Q & A platform. By February 23rd, 2020, there had been 13,705 instructors registered for qualification checking.

All students of grade three in junior high school in Beijing can access the Q & A module of the "Smart Learning Partner" through their computers, mobile phone APPs, or the WeChat Subscription. They can upload and publish their questions as text or pictures. Teachers can give students ideas and methods to solve problems through text and pictures. Only one best answer can be adopted for each question.

Figure 5: Online supports for learners and instructors



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-5. DingTalk to deliver live-streaming classes

DingTalk is a multi-terminal platform (e.g., PC, Web and mobile devices) for free communication and collaboration created by Alibaba Group for Chinese enterprises. It also supports the mutual transmission of files between mobile phones and computers. Although DingTalk is originally designed for the enterprises, it has been widely used by a large number of primary schools and secondary schools in China to resolve school closures caused by COVID-19. More than 5 million students from more than 10,000 universities and primary schools in 17 provinces attend live-streaming classes via DingTalk.

In response to "Disrupted Classes, Undisrupted Learning", DingTalk further developed a distance education package that can help both teachers and learners. For instance, this package provides health reports on students, online class reports and live interaction. DingTalk also provides real-time class announcements, and school notices. Additionally, DingTalk provides free access to online and live classes for schools and colleges across China via computers and mobile devices, supporting more than one million students to learn at the same time. These online classes offer online teaching, online

homework submission and correction, online examination and other learning simulation scenarios. Finally, DingTalk provides free access to online conferencing for all teachers, managers, and principals, ensuring fast and normal coordination between all school members (teachers, directors, etc.).

Figure 6: The main functions provided by DingTalk to support "Disrupted classes undisrupted learning"



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 7: Creating and managing an online class by DingTalk on smartphones



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 8: Delivering live-streaming classes of Chinese, Maths and English by DingTalk



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-6. Providing appropriate learning resources on the National Public Service Platform for Educational Resources

National Public Service Platform for Educational Resources is an initiative of the central government of PRC in providing basic public services for education. The platform creates a network of communication, sharing and application environments for resources providers and users, and serves all levels of education. Large amounts of resources have been provided for teachers and students of schools at all levels, including digital resources that are synchronized with classroom teaching in primary and secondary school (e.g., teaching plans, courseware, teaching videos, course material), problem sets and tests database for the high school entrance examination and the college entrance examination. Additionally, the platform provides MOOCs for students, teachers and principals of schools at all levels, and resources for vocational education, safety education, moral education, education for physical, health and art.

In order to support the "Disrupted Classes, Undisrupted Learning" during the coronavirus outbreak, the ministry of education of PRC quickly launched the National Network Cloud Platform for Primary and Secondary School based on the National Public Service Platform for Educational Resources. To meet the students' learning demands in this special period, appropriate resources modules of 10 topics in time were added to the platform, including epidemic prevention education, moral education, curriculum learning, life and safety education, mental health education, family education, classic reading, trip learning education, film and television education, and electronic books.

On the first day of operation on February 17, 2020, the platform had more than 8 million clicks with millions of users covering 31 provinces of China. Users also from 47 countries and regions logged in to this platform. About 85 percent of visitors used mobile devices, such as smartphones and tablets.

Figure 9: National Public Service Platform for Educational Resources



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-7. Reliable communication infrastructure provided by CMCC to ensure “Disrupted Classes, Undisrupted Learning”

China Mobile Communications Group Company Limited (CMCC) is a mobile communication operator based on the GSM, TD-SCDMA, TD-TEL and FDD-LTE standard network. Over the years, CMCC has actively promoted the development of national education informatization through taking the lead in jointly releasing the campus broadband "doubling plan" with the Chinese Ministry of Education, and carrying out the campus broadband acceleration and fee reduction.

Figure 10: National Network Cloud Platform for Primary and Secondary School supported by CMCC and other companies



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

In order to support the "Disrupted Classes, Undisrupted Learning" during the novel coronavirus outbreak, CMCC assisted four cloud service providers to complete the IDC bandwidth expansion to 2.18T, reserved 12.95T resource for use, opened the SMS capacity of 16,000 pieces/ second flow rate, and expand the capacity of 414 mobile cloud hosts. On February 17, 2020, CMCC successfully ensured the smooth launch of the "National Network Cloud Platform for Primary and Secondary School", which served 180 million primary and secondary school students in China to study at home and provided 50 million students with online access at the same time. In addition, CMCC has also actively carried out network security and mobile cloud security of provincial public platforms for education resource service in Guizhou province, Jiangxi province, Beijing city, and Shanxi province.

Figure 11: A student was learning online at the remote village in Jiangxi province supported by CMCC



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

In Hubei province, CMCC strived to support the launch of "Air Classroom Based on Wuhan Education Cloud" and provided the "Hubei Synchronization School" service, which can provide synchronous curriculum resources on demand service for 6 million primary and middle school students in Hubei province. Supported by "Air Classroom Based on Wuhan Education Cloud", 700000 primary and middle school students in Wuhan city can simultaneously watch live online teaching videos at home. In Hebei province, CMCC, as the exclusive cooperation unit of the provincial department of education, undertook to build and guarantee the launch of an online teaching resource platform of primary and secondary education. The platform can serve 15,000 primary and secondary schools and 12 million teachers and students in Hebei province, In Jiangxi province, CMCC has also covered remote villages to enable children in the village to access the online courses of the new semester, ensuring inclusive learning where "no child should be left behind".

Figure 12: Air Classroom Based on Wuhan Education Cloud supported by CMCC and other companies



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 13: The online teaching resource platform of primary and secondary education in Hebei province supported by CMCC



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-8. Appropriate digital learning resources for all education levels provided by Tianjin municipality

Tianjin is a municipality directly under the central government in northern China. It has 16 districts, with a total area of 11966.45 square kilometers, a permanent resident population of 15.60 million, an urban population of 12.97 million, and an urbanization rate of 83.15%. There are about 1.17 million students in primary and secondary schools, and there are more than 100,000 students in junior three and senior three who need to take entrance examinations every year.

In order to support the "Disrupted Classes, Undisrupted Learning" during the coronavirus outbreak, the government of Tianjin quickly adjusted the teaching arrangement and launched relevant policies according to different demands of students in kindergarten, primary and secondary schools, colleges and universities. The Tianjian Municipal Education Commission provided guidance on learning, and physical exercise at home during this special period. The guidance on resource entry and selection has been instantly shared to students, teachers, and parents via WeChat.

For the students who need to take the entrance examination, groups of refresher courses were recorded in a short time. Each course was taught by two teachers with senior or above professional titles. These courses were broadcasted to the whole city through Tianjin cable television. At the same time, various types of learning resources covering the main subjects of primary and secondary schools were provided to all the teachers and students. These resources were stored on the Tianjin public service platform of education resources for primary and secondary education, the cyber-learning spaces, the personalized learning service system, and the digital library of primary and secondary schools.

Figure 14: Guiding students to choose appropriate resources through WeChat public account



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 15: The Tianjin public service platform of education resources for primary and secondary education



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 16: Cyberlearning spaces for connecting each student of Tianjin province



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 17: Digital library for primary and secondary schools in Tianjin province



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-9. Free electronic textbooks for primary and secondary schools provided by People's Education Press

People's Education Press (PEP) is a large professional publishing company affiliated to the Chinese Ministry of Education. It is mainly engaged in the research, compilation, editing, publication, and distribution of textbooks for primary and secondary education and other kinds of textbooks for education at all levels. It does not only publish paper medium books, but it also engages in electronic audio-visual and multimedia products publishing and printing, copyright trade, books, and related products logistics services, digital publishing and services.

In order to support the "Disrupted Classes, Undisrupted Learning" during the coronavirus outbreak, PEP has provided open and free access to all digital teaching resources on an APP named "PEP Touch & Read" to primary and secondary school students in China. The digital teaching resources involve texts of three disciplines uniformly compiled by the state and digital teaching materials compiled by PEP, coming with thousands of video and audio micro courses synchronized with the textbooks. In order to support the 6 million teachers and students in Hubei province, PEP provides free digital textbooks and digital application services for 3 months to the teachers and students of primary and secondary schools in Hubei Province. In addition, PEP provided free digital textbooks for the spring semester of 2020 to teachers and students of primary and secondary schools across compulsory education, senior high school education, secondary vocational education, and special education. The digital textbooks involve nearly 600 varieties of more than 20 disciplines.

Figure 18: The official website of People's Education Press



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 19: The staffs of People's Education Press are working overtime to make the resource on the APP named "PEP Touch and Read" free for all users



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 20: The interface of the APP named "PEP Touch and Read"



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 21: The unified entrance of all digital textbooks for education at all levels



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-10. Self-directed learning encouraged by Guangzhou Nansha No. 1 Middle School

"Self-directed learning" is a prerequisite for students to form good cognitive habits and a key factor of academic success. As early as January 27, 2020, the Chinese Ministry of Education issued a notice on the postponement of the spring semester in 2020 due to the spread of the epidemic, urging schools to use online platforms.

Yang, a senior 3 student at Guangzhou Nansha no.1 Middle School, said it was "important for her to keep up with the pace of study". Every day Yang gets up at 6 am, opens the learning application from 6:20 to 6:50 to practice oral English, read out loud, retell stories, play different roles highlighted in the application, and conduct special exercises by simulating tests scenes, From 6:50 to 7:20, she recites the Chinese ancient poems and famous quotes she knows. After breakfast, Yang sat at her desk at 8:00, waiting for the school's live lecture to start. For Yang, online classes not only helped her keep up with the pace of the college entrance examination, but also provided her with an opportunity to practice her "self-discipline" Learning.

Figure 22: High school students study independently during epidemic prevention



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Compared with traditional learning methods in schools and classrooms, learning methods in the era of "Internet+" are pluralistic and diverse. They can be either individual learning, or group and community learning; either based on learning tools or resources, or via terminal devices; either self-regulated learning for a specific subject or skill, or collaborative, interdisciplinary learning based on a specific project or problem. During the period of preventing the epidemic, according to the scale of participants and their cognitive levels during the learning process, schools at all levels and kinds guided students to choose appropriate learning methods on the basis of specific and applicable educational scenarios.

2-11. "Rain-Classroom" to deliver synchronous and asynchronous classes

Rain-classroom is a smart teaching tool jointly developed by Xuetang Online and the office of online education of Tsinghua university, with the purpose of comprehensively improving the classroom teaching experience, enhancing the interaction between teachers and students, and making online teaching more convenient. Rain-classroom integrates the complex information technology into PowerPoint and WeChat, establishes the communication bridge between the extracurricular preview and the classroom teaching, and makes the classroom interaction never offline. With the help of Rain-classroom, teachers can publish the pre-class preview courseware with MOOC videos, exercises and voice audios to students' mobile phones, so that the teachers can easily diagnose the problems of students' learning and give feedback in time. Rain-classroom also provides classroom live broadcasts, during which students can answer real-time questions and interact with teachers through "bullet screen". In addition, Rain-classroom provides teachers and students with complete three-dimensional data support, personalized reports, and automatic task reminders.

On February 17, 2020, Tsinghua University started its online classes on Rain-classroom. In the first week of the new semester, there were 264,000 teachers and students attending Rain-classroom, completing 10,635 online lessons involving 3,923 courses, with a total of 395,000 hours. Among these courses, 152 courses were undertaken by 73 foreign teachers from various schools and departments, and delivered in the United States, the United Kingdom, Japan, Canada, France, Australia, and Germany. This is the first time in the history of higher education in the world that a large-scale, real-time, interactive, long-distance and decentralized online teaching system has been implemented.

In order to make more teachers skilled in using rain classes, the teacher development center of Tsinghua University, together with the Xuetang Online, the academic affairs office and the graduate school, conducted live training on the use of Rain-classroom for teachers in the spring semester of 2020. Yinan Guan, who works in the online teaching and training center of the school, first guided the teachers to experience the basic environment and functions of the Rain-classroom as

students, and explained the methods of downloading, installing and using relevant software. The participating teachers conducted real-time interaction with Yinian Guan through “bullet screen” and posts, and got familiar with the teaching environment of the Rain-classroom.

Xinjie Yu, a professor of electrical engineering and who has a rich experience in using Rain-classroom, organized a training about "pre-class, in-class and after-class" arrangement of online teaching. As Yu pointed out, teachers should first change their teaching philosophy before class and "split" their teaching content. The original course should be divided into several 20- 30 minute paragraphs, breaking the big story into small stories, breaking the whole course into paragraphs. In order to achieve the ideal teaching effect, Yu suggested that teachers should take full advantage of the interactive advantage of Rain-classroom to intersperse with rich interaction between the three parts to keep attracting students' attention.

Figure 23(a): A teacher is interacting with his students on Rain-classroom



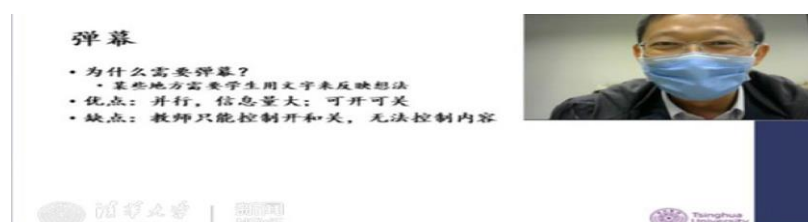
Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 23(b): Yinan Guan is conducting a live training on the use of Rain-classroom for teachers



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 24: Xinjie Yu is conducting a live training on the teaching application of Rain-classroom for teachers



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-12. Education enterprise “Squirrel AI”: Using AI teachers to create personalized learning system for students

Squirrel AI is the first AI unicorn company to apply adaptive learning technology in AI in K-12 schools. It has established more than 2,000 learning centers across the country. The Squirrel AI online learning system is different from ordinary live lessons. It not only supports online teaching and learning but also provides AI service to students' online learning. First, Squirrel AI sets a personalized learning path to locate students' weakness in learning accurately to shorten learning time and improve learning efficiency. Secondly, it can visually display students' learning status, monitor learners' learning behaviors in time, provide big data learning analysis, and support learners to real-time view their learning reports. Third, squirrel AI provides different functional views for teachers and principals to monitor and manage their live classes.

Figure 25: the characteristics of platform

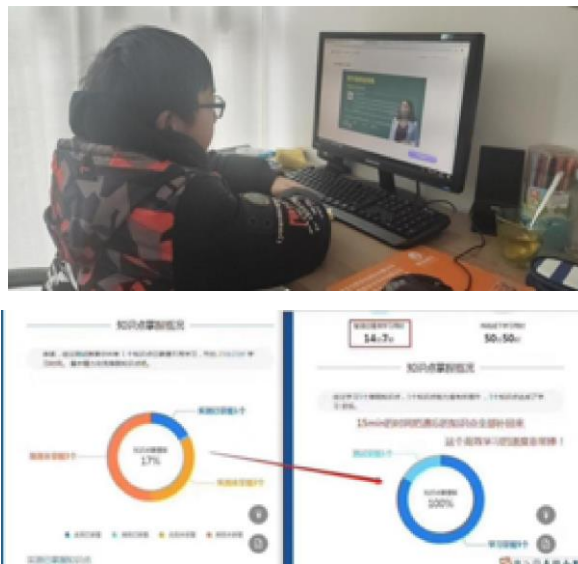


Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

After the outbreak of coronavirus in China, Squirrel AI responded quickly and provided 500 million free online learning courses for primary and secondary school students nationwide. On January 26, 2020, Squirrel AI conducted online training for public school teachers, compiled user manuals, organized account registration, and established guiding teams. At present, more than 160 public schools located in Shandong, Hubei, Fujian, and Jiangsu provinces are using squirrel AI for classroom learning, covering the subjects of Chinese, Math, English, Physics, Chemistry. In the course, more than 200,000 students across the country use squirrel AI accounts to study online. It is expected that the demand for squirrel AI student accounts will soon exceed 500,000.

During the epidemic, students and teachers talked about their feelings after using the squirrel AI classroom. Since the outbreak of COVID-19, students who have to take the entrance examination of senior high school or colleges have had too many difficulties and pressures. Xiao Zhang, a third grade middle school student, mentioned that he was not good in math, but Squirrel AI helped him improve, since detailed reports on his learning performance and recommended materials are instantly provided. In a face-to-face video interview, Xiao Zhang stated: "I didn't expect to learn like this! In the first class, the assessment system highlighted my learning weaknesses precisely. This kind of learning experience is so helpful and interactive."

Figure 26: Using Squirrel AI system to facilitate student's smart learning



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Teacher Wang, a public school teacher, who often uses the squirrel AI system in his class also talked to us about his feelings:

"The squirrel AI system classroom is indeed easier and more effective than regular classrooms! After logging in to the system, I can supervise my course. Although there are many students, I can quickly know the answers of each student through the generated dashboards. After a student finishes the pre-test, the system displays course questions that match his/her ability. After each question is completed, the student can immediately get feedback on each question and the process of solving it. After the class, the system will automatically generate a learning report of each student, and this helps me better monitor my students. "

Figure 27: Using Squirrel AI system to monitor students' learning process

Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-13. Diversified Support for Online Teaching and Learning

Effective support and services are important to ensure the quality of online learning. These services can be for both teachers and learners and based on the collaboration between governments, schools, enterprises and families.

The national cloud classroom (www.eduyun.cn) provides e-textbooks compiled by the education department. These digital e-textbooks are widely used in various areas and cover all levels of middle schools and high schools. The school can also use the authoring tool embedded in the platform to create a flexible curriculum by using the provided resources on the platform as well. Additionally, the platform supports online lecturing and interactive tutoring functions.

Besides, there might be limitations of the internet access in remote areas, therefore the ministry of education requested China Education Television to broadcast courses and resources through TV channels to meet the needs of students studying at home in these areas. The Ministry of Education also coordinated with both the education departments in Beijing, Shanghai, Sichuan, and Zhejiang provinces and schools affiliated to Tsinghua and Renmin University in China to develop high-quality open learning resources during the emergency.

At the same time, the People's Education Press provided the mobile application "Touching and Reading of PEP", which offers free digital teaching resources. During "Disrupted Classes, Undisrupted Learning," the government required education departments and schools at all levels to cooperate with each other. The Ministry of Education also encouraged a variety of social organizations to proactively offer more diverse learning resources with high quality for the public.

Figure 28: Teacher assigns and checks homework through the network

Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

The Handan Education Bureau has made efforts to support "Disrupted Classes, Undisrupted Learning" from two sides. It aimed first to help teachers to improve their online teaching skills. It aimed also to provide various resources to support, guide, and encourage students to carry out independent learning activities at home. Handan city further developed the platform "Classroom on Air" at the city-level. This platform is supplemented by the national primary and secondary school network cloud platform, China Education Television Station, and various excellent education resources platforms. It supports students to study independently at home. In some villages with limited internet connection, students can watch educational videos offline via the "Classroom on Air" platform and carry out asynchronous learning by using national and local resources. These resources help maintain the quality of learning, but also help develop the skills of self-regulated learning. To meet the needs of different students in both synchronous and asynchronous learning, filmed presentations were produced by well-known teachers and then broadcasted via "Classroom on Air". To enhance the quality of teaching, Handan Education Bureau also recruited teachers in each subject from all schools in the city to work together on course production for everyone.

Figure 29: Students study at home and some of them are accompanied by parents



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 30: Parents are supervising their children's independent study at home



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 31: high school student in a village, listens to lectures online on her mobile phone at home



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 32: Online homework correction, real-time guidance of students



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Figure 33: A teacher is recording a lesson for "Classroom on Air"



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

2-14. Governments & enterprises coordination: Technical services support improved

To support the “Disrupted Classes, Undisrupted Learning” initiative by the Ministry of Education during the COVID-19 outbreak in China, NetDragon, a global leader in building internet communities, announced that its online education platform “One Stop Learning” will provide a new free service plan for live-streaming of courses to over 10 million users.

“One Stop Learning” platform not only updates the latest information of COVID-19 and measures for public health, but also provides services including teachers’ class preparation and teaching, online assignments and exams, live-communication between schools and parents, academic research, and operational management that allow users to effectively accomplish their daily work.

Figure 34: Online Courses on “One Stop Learning” platform



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

On February 01, the Fuzhou Bureau of Education further published the “Guidelines on proper management of education for primary, secondary, and vocational schools amidst postponement of school semesters”. The guidelines state that “One Stop Learning” is chosen as the official platform in support of Fuzhou’s “Continuous Learning amid School Suspension” mandate. The platform will then facilitate online learning of over one million teachers and students as well as several million parents.

Figure 35: A pupil is studying on “One Stop Learning” platform



Source: (R.H, D.J, A, J.F, H.H, & and others, 2020)

Meanwhile, “One Stop Learning” platform has also been aiding the Department of Education of Hubei Province to support the national initiative entitled “Disrupted classes, Undisrupted learning”. In collaboration with Hubei Province, NetDragon established the “Hubei Education Cloud Platform”. After the construction and testing of the platform were completed (in three days), live trials were conducted on January 30, in three cities, including Macheng, Xiantao and Yangxin, and over 10 thousands live courses were carried out since then. The company has cooperated so far with Hubei, Fujian, Guangdong, Hunan, Shandong and other provinces to provide online educational services including live teaching and online courses.

3. CONCLUSION

The distance learning mechanism is one of the effective solutions adopted by countries in the light of the wave of crises and problems caused by the spread of the coronavirus that is taking place in the world today, where tele-education technology plays an active role in addressing the volatility and disruption that afflicts most of the educational systems of most countries, as well as its reliance on the interactive method of reducing the time and space gap between the actors in the educational process.

- **Results of the study:** Through this study a set of results was reached, the most important of which are:

Distance learning is a systematic activity that includes the selection, preparation and presentation of educational materials as well as supervision of supporting student learning, which is achieved by bridging the physical distance between the student and the teacher through at least one appropriate technical means;

The distance learning process reflects an integrated combination of three basic elements: individuals, technology, and policies;

Among the most important consequences of school closures around the world are the discontinuation of learning, education and social isolation, undernutrition and unequal access to digital learning platforms, as well as disparities in childcare, etc;

As part of the response to the Corona pandemic, the People's Republic of China has launched several tele-education initiatives, including: a supermarket for free courses and e-textbooks for primary and secondary schools provided by pep and Dink Talk to offer live broadcast lessons, etc.

- **Study suggestions:** Through this study a series of proposals were reached, the most important of which are:
 - The need to provide a good technological infrastructure for educational institutions in Algeria in order to facilitate communication and distance learning, as well as the success of the educational process;
 - The need to develop an integrated strategy to support distance education in view of the positive effects, especially at the time of the outbreak of epidemics and diseases such as the Corona pandemic that has ravaged the world today;
 - The need for training courses by specialists in the fields of technology and digitization for learners and teachers in order to adopt of various modern technologies and the successful application of them;
 - The need to conclude international agreements with leading countries in the field of technology and digitization in order to benefit from their knowledge and expertise on one hand, and to keep pace with the rapid technological development that the world is witnessing today on the other hand.

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