

# On the Role of Online Courses in Higher Education during COVID-19 Pandemic

Li Ran Dong • Guo Chun Wan • Mei Song Tong\*

Tongji University, Shanghai, China.

\*Corresponding author. E-mail: mstong@tongji.edu.cn.

Accepted 3<sup>rd</sup> December, 2021.

**Abstract.** During the COVID-19 epidemic, online teaching began to flourish. This paper introduces the status quo of online courses in higher education China, the teaching methods under the epidemic, the advantages and disadvantages of online teaching, and how to make better use of online teaching in the future.

**Keywords:** Online courses, teaching, COVID-19 epidemic.

## INTRODUCTION

In the past few decades, the rapid development of the Internet has greatly changed our life. People are no longer restricted by time or space, enjoy more resources and enjoy more convenience. The rapid development of emerging technologies such as big data, voice recognition, live interaction, remote evaluation, and wearable devices have had a great impact on online education, which has expanded the teaching scene and opened up the way for knowledge dissemination. Internet has also had a tremendous impact on education, and the channels of knowledge dissemination have become more open Diane et al., (2013); Eugene and Eugenie (2015). culturally diverse context. The development of the Western work values theory is reviewed, and the relevance of an Islamic work ethic measure to this unique context is examined (Iresearch, 2020; Guo et al., 2019).

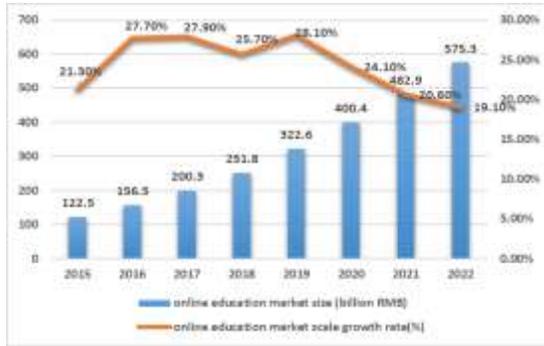
### The status quo of online education in China

Online education refers to the education form of learning and teaching through the Internet or other digital media channels. It makes full use of the conditions provided by network technology, breaks the limitations of time and

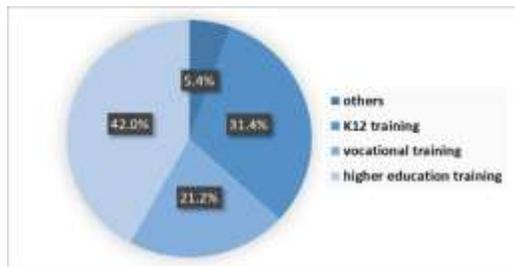
space, and forms a new education method different from traditional face-to-face instruction. According to Iresearch (2020), the scale of China's online education market in 2020 is about 400.38 billion yuan, a year-on-year increase of 24.1%, and the growth rate has slowed down in Figure 1.

According to the survey in the first quarter of 2020 (Iresearch, 2020), the structure of online education market in China is shown in Figure 2. Adults are the main user group of online education due to their strong self-control, clear learning goals, limited free time, and formed eyesight. Especially in scenarios such as improving academic qualifications, job hunting, and certification, the demand for education and training is stronger. In the K12 education market, parents and students are cautious about online education. As increased education awareness and spending ability of post-80s/90s parents, superimposing the natural familiarity with the Internet of new generation of post-00s/10s children's, the COVID-19 epidemic in early 2020 has accelerated the promotion of online education, and the acceptance of online education by K12 parents and student groups is growing rapidly. In the first quarter of 2020, the proportion of K12 increased to 31.4%.

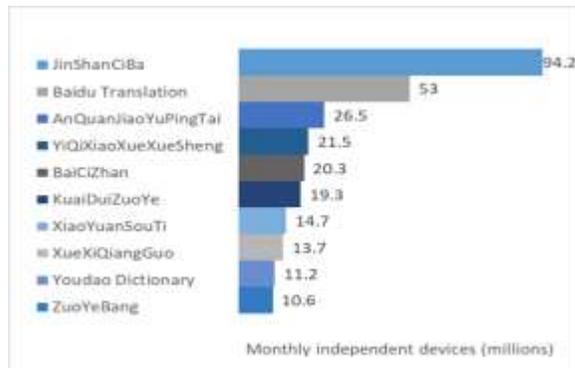
APPs about homework such as searching questions



**Figure 1.** Online education market scale and forecast in China, from 2015 to 2022



**Figure 2.** The scale and structure of China's online education market in the first quarter of 2020.



**Figure 3.** The top 10 independent devices of online education APP in March 2020.

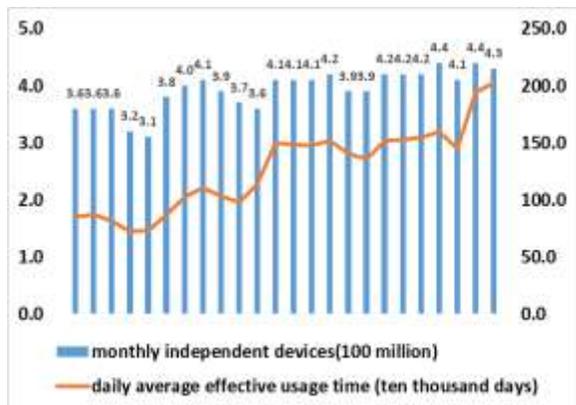
and correcting homework (ZuoYeBang, XiaoYuanSouTi, etc.) and APPs about words such as memorizing words and word translations (Youdao Dictionary, BaiCiZhan, etc.) have been the two kings of online education since 2012, and the first quarter of 2020 is no exception. Iresearch (2020) shows that in March 2020, ZuoYeBang ranked first with 94.237 million independent devices, followed by Youdao Dictionary with 53.017 million devices. From the perspective of user growth rate, APPs such as YuanFuDao, Xueersi have grown rapidly, with year-on-year growth rates exceeding 150%. The detailed data is shown in Figure 3.

### The development of online courses in Chinese higher education

In recent years, in addition to the traditional teaching methods in school, there are many network courses developed gradually. First, the well-established education and training platforms, such as Xueersi, New Oriental, ZuoYeBang, YuanFuDao and other well-known education training groups. They have their own websites, management teams and teachers. Students need to pay for class and take recording courses or live courses. Second, the shared-course platforms, such as XuetangX, lcourse, Wisdom Tree, etc. These platforms provide many recording courses, taught by teachers from many well-known domestic universities, and even foreign famous schools. They are committed to sharing resources and students can study for free, or pay for the qualifications from the relevant platform. Third, the live courses platforms. Those platforms are usually created by non-educational institutions, such as Tencent Meeting, ZOOM, and Dingding. They have perfect voice, video, shared screen, annotation, raising hands, speaking, group chat and other functions to ensure teachers can complete live lectures online. Fourth, some platforms that can play videos, such as Bilibili and Sina Weibo. Some users provide some course resources and share them on these video websites. In most cases, other users can obtain resources for free (Li et al., 2019).

### The status quo of mooc in China

In China, first-class universities carried out the construction of MOOC platform firstly. They joined the international first-class MOOC platforms actively, such as edX and Coursera, and began to develop native MOOC platforms. In 2013 and 2014, Chinese universities made a breakthrough in the construction of MOOCs. In 2013, Tsinghua University joined edX in May and released "XuetangX" in June; Peking University joined edX in May and joined Coursera in September; Hong Kong University joined Coursera in September; Fudan University and Shanghai Jiaotong University announced their joining in Coursera Alliance in July, becoming the first batch of mainland universities in the alliance. Shanghai Jiaotong University released "Good University Online" in April 2014. In addition, it is worth mentioning that East China Normal University established the "East China Normal University MOOC Center" in September 2013. Cooperation with more than 20 famous middle schools in China, the center established the "MOOC C20 Alliance" to actively promote the development and research of MOOC and remarkable results have been achieved. In addition to colleges and universities, many Internet companies such as Juhu.com, Yiyao.com and Netease, have also contributed to the development of MOOC in China (Eugene and Eugenie, 2015; Titan, 2016).



**Figure 4.** The monthly number of independent devices and user hours of online education APP in China during 2018Q2-2020Q1.

With the implementation of the "Internet +" Plan, education departments and institutions at all levels in our country attach great importance to the construction of MOOCs, and MOOCs and related platforms are widely popularized in universities. Taking Anhui Province as an example, the Anhui Provincial Department of Education has entrusted the Anhui Provincial Online Course Learning Center (e-learning) platform since 2015 to be fully responsible for the construction of the Anhui Province MOOC. In order to better promote the promotion and application of MOOC courses in universities, "e-learning" recruited and trained "MOOC campus ambassadors" in 28 universities in Anhui Province, carrying out "teacher workshops into campus" activities actively, and organized experts to help teachers to carry out mixed teaching and effectively improve the quality of MOOC courses. By the end of 2018, "e-learning" had opened 446 MOOCs, and the number of registered learners reached 241,000 people, with students in 178 universities across the country.

### Teaching methods during covid-19 epidemic

In January 2020, COVID-19 broke out in China. The epidemic has changed the live and activity of people across the country. In order to have a better control of epidemic and effectively block the spread of the virus, reducing the concentration of personnel is necessary. Therefore, all schools across the country have put off the start date of school in accordance with the requirements of the Ministry of Education. In order to weaken the impact of postponement on teaching and remind students not neglecting their studies, especially students facing the middle school entrance examination and the college entrance examination, the Ministry of Education has put forward one guideline "stopping school without stopping studying", requiring specifically the use of online platforms for teaching.

At present, there are three main teaching methods in universities. First, use ZOOM, Tencent Classroom, QQ Group Classroom and other platforms to take live courses. Teachers use shared screens to show their slices, use voice function to explain, and use the annotation function for writing and annotation. Students can post their ideas and questions in group chat, use raising hand function to raise questions, and use the voice function to speak. Second, use the existing recording courses on XuetaangX or lcourse. According to the teaching schedule, the teacher arranges students to watch relevant videos on time, and checks the learning situation by homework or reports submitted by students. Third, teachers use video recording software to record their own videos and share them with students through network cloud disks. Besides online platform used for teaching, teachers will also use QQ homework, Wisdom Trees, and other websites prepared by the school to arrange homework, collect homework, and publish exams.

As mentioned in what Iresearch reported (2020), in the first quarter of 2020, affected by the epidemic, the effective use time of users has increased significantly, as shown in Figure 4. In February and March 2020, the average daily effective usage time of online education APP reached 1.941 million days and 2.028 million days, respectively, with year-on-year growth rates of 69.9% and 35.5%.

### The pros and cons of online teaching

#### Pros

Health protection from virus. During the epidemic, gathering will increase the risk of virus transmission undoubtedly. Postponing the start of school can protect teachers and students from virus infection. In order to achieve "stopping school without stopping studying" and reduce the loss of knowledge caused by the delay, teachers began to make full use of online teaching resources. Under these circumstances, the advantages of online teaching to break through the limitations of time and space are fully reflected.

Advantages of recording course. If recording courses is used, students can choose the time to watch videos at any time they want. Also, they can choose the play speed according to their existing knowledge or skip some parts if they have mastered. For the knowledge that has not been understood, they can watch the video repeatedly. Recording courses are also convenient for students to review and organize their notes after class. For teachers who record their own course videos, they can also choose the time to record videos according to their own schedule.

Advantages of live course. For teachers, using the annotation function for writing and marking on the

screen is more convenient to clean up quickly, comparing with blackboard. For students, they can put forward questions in bullet screen or group chats promptly. In traditional courses, students are often too shy to ask questions in public, while in online courses the problem is effectively solved.

## Cons

Communication is delayed and communication resistance is greater. Since online teaching is not conducted face-to-face, compared with traditional teaching methods, questions, explanations and guidance cannot be carried out in time and efficiently. In the live course, because of the screen, teachers cannot see the students and don't know whether they are listening seriously, and can't see the any reaction to knowledge. The teachers feel like talking to himself or giving a lecture to the screen. For students, taking online lessons are just sitting in front of a computer, looking at the computer screen, and listening to the teacher. As we all know, although there are individual differences in the concentration time of people, the average level changes with age. The concentration time of 6-year-old children is about 10-15 minutes, and of 7-10 years old it is an increase of 5 minutes, in general, over 12 years old can exceed 30 minutes. If it is an offline course, after a long period of lectures, teachers can help students to relax their emotions through case analysis, discussion, exercises, etc., to refocus their attention, but the effects of methods in online courses are minimal. Moreover, sitting in front of the computer for a long time will cause sore eyes and back pain, which is harmful to health.

For the existing recording courses, the teaching content is fixed, and it is difficult to teach according to the aptitude. The most important feature of the online courses, especially the MOOCs, is that they are produced in advance. At the same time, because of their wide audience, teachers cannot be highly targeted when formulating teaching content. In order to better meet the needs of most people, some compromises have been adopted or only the most basic framework of the course has been retained. For higher education, this phenomenon is more common. Each university has their own training goals for students and students learning ability is not the same. This requires that the teacher need to reformulate or change teaching contents according to the students' actual conditions, professional characteristics and school's training goals. However, since the course resources are made in advance, it is impossible to have such a strong pertinence and teachers can't teach or adjust according to the aptitude of students.

The auxiliary resources for online teaching are still need improving. When teaching is through the Internet,

it is often necessary to equip corresponding teaching resources, such as practice questions, handouts, cases, materials about latest development trends, relevant administrative regulations, etc. Video recording is easy, but the construction of supporting teaching resources also takes a long time and a lot of effort. Imperfect supporting resources will also affect the teaching.

## Measures to improve online teaching

The epidemic is not completely over yet, and nobody knows when the school will be fully opened. Online teaching is still continuing. Here are some suggestions to improve the effectiveness of online teaching (Diane *et al.*, 2013).

### Multiple teaching methods

Use multiple teaching methods in the live class. After the teacher has given a period of explanation or watched a short video, some tests or talks can be arranged to help students shift their attention and alleviate the pressure of focusing attention on one place for a long time (Kuo *et al.*, 2012).

### Moderate duration

When using the recording course, try to choose a video with a moderate duration. After watching the video for a period of time, take a rest, look into the distance, and move the body. Teachers and students should pay attention to it consciously.

### Small project assignments

When the supporting resources are insufficient, some small project assignments that can be completed on the network can be appropriately arranged, and students are required to submit reports. In this way, not only the learning situation can be comprehensively tested, but the "learning by practice" will improve the teaching effect, and it also avoids the difficulty of finding exercises online.

## In the future, after the restoration of traditional teaching, how to use network teaching efficiently?

During the COVID-9 epidemic, before the nationwide implementation of online courses, online teaching has always been an auxiliary form of teaching, as a supplement to school teaching. Online course resources can be shared by all students as long as

one has Internet. It has played a positive role in the equity of education, to a certain extent. Students can also choose some courses that are not available in their school to study and expand their vision. For the knowledge that has not been grasped in time in the classroom, student can also learn again through recording courses or online schools, etc. Overall, the existence of online teaching has played a positive role in the dissemination of knowledge. Over the past ten years of development of online courses in China, to what extent have online courses developed? The advent of the epidemic has brought a real test to China's online courses construction (Yong and Feng, 2016).

When the epidemic is over and traditional education can be carried out normally, how can online teaching be combined with traditional teaching?

### **Supplementary for after-school learning**

In universities, due to the limited hours of teaching, sometimes teachers only talk about the basic content, and many expansive and applicable chapters will be cut off, which will lead to the incompleteness of knowledge framework. Students only master some preliminary theoretical knowledge and they can't not apply knowledge effectively. By using online course resources, teachers can explain important basic content in the classroom, and arrange an appropriate amount of online courses as supplementary for after-school learning.

### **Introducing the leading-edge parts of the field**

With the development and progress of knowledge, the textbooks used in some courses may not contain the leading-edge or most applicable parts of the field. Therefore, teachers can selectively arrange some online courses to supplement or replace some chapters to make the teaching better.

### **Suppling the pilot courses**

In some majors or in some schools, there may be an improper ordering of courses, or a lack of courses, resulting in obstacles to the learning of some later courses. Teachers can choose some online courses according to the actual situation to supplement the pilot courses.

### **The integration point of MOOC and teaching in university Policy support from school**

The smooth development of the MOOC is inseparable from the policy support of the teaching management

department in universities, such as stipulating the credits for MOOC courses; conferring the degree and certificate of learners; supporting practical teaching such as competitions and seminars during the MOOC learning process; providing necessary online examination monitoring and various student learning support services.

### ***Technology platform for MOOC***

Platform technical support is critical in the integration of MOOC and teaching.

Big data analysis and small machine tracking cannot be achieved offline: For example, in MOOC teaching, MOOC administrators set up virtual classrooms, classes and classrooms according to actual needs, set up class managers, collect every assignment, quiz, exam and discussion of students through the terminal database, and periodically send the results to the corresponding teachers, to facilitate teachers to reflect in time and improve the effectiveness of each lesson; study a certain topic at a fixed time, and more teachers and students can discuss this topic; set up a special discussion area and a note area, any problems and difficulties encountered by learners can be asked for help in the discussion area and teachers can respond as soon as possible. Teachers and students can write notes and share them in the note area, playing to the advantages of many-to-many inquiry by teachers and students fully, and support large-scale PK.

Make full use of the Internet to search for useful information and efficiently process information to provide efficient learning and exploration methods: The MOOC platform provides an advanced search engine to help users search for domestic and foreign learning resources related to the course. For example, it provides links to major MOOC platforms at home and abroad, major domestic browsers, Baidu Library, China HowNet, etc, and learners can get courses, valuable scientific research papers, teaching PPT and other valuable resources.

Provide social interaction and information sharing functions: Learners are encouraged to share information or posts of interest to social media sites such as QQ space, WeChat Moments, Sina Weibo, Douban, Tencent Weibo, and blogs to build learning networks.

### ***Refined instructional design***

The MOOC course has greatly changed the traditional teaching mode of "full house filling". Teachers are "knowledge imparters" and "resource providers", emphasizing the conscious initiative of students, the quality, effectiveness and interest of course content and teaching The method is novel and efficient, so refined

instructional design is essential. The following aspects should be paid attention to in the design of MOOC teaching:

Three stages in online course: After clarifying the course attributes, refining the course objectives and the teaching objectives of each unit, the three stages of preview, lecture and review of each unit are integrated into the online course.

Integrating the knowledge points: Integrate the easy-to-understand little knowledge points into the three stages of

preview, lecture and review of each unit systematically by means of video, practice in class, homework, examination, discussion, online lecture, etc. Knowledge arrangement should include three levels: basic concepts, flexible use, and vision expansion.

"Participatory" learning method: Always pay attention to the "participatory" learning method, that is, "student participation" penetrates all links and runs through. Such as multiple exchanges, multiple practices, multiple interactions, multiple personalized services, multiple flexible mechanisms, strengthen the channel of cooperation with others in learning, make the cooperative learning method more comfortable, each step has a forum for discussion, and the teacher team is in the platform discussion area. Provide assistance in answering questions, and actively encourage students to comment on the course quality and difficulty and post their personal experiences.

### ***Unique digital resources***

Each MOOC is a systematic and sustainable education system, integrating various electronic resources into a professional knowledge system, including videos, non-video resources, discussion posts, assignments, practice exercises, test questions, etc. In order to obtain an excellent comprehensive evaluation of MOOCs, in addition to its own high quality and meeting the basic and general needs of knowledge, digital resources also need to be distinctive and attractive.

Meet individualized learning needs: Knowledge points of each chapter are divided into subject knowledge and personal extended knowledge, or subdivided into superficial knowledge, inquiry knowledge and related knowledge. According to the platform data feedback, teachers and students timely understand the learner's overall needs and individual needs, formulate personalized learning programs, provide excellent digital resources that individuals need, and tailor learning strategies and learning methods. For example, if you set up a comment blackboard or discussion area, students' high-quality and valuable comments and special needs are marked and directed by team teachers in a timely manner. Learners create personal learning resources, including study notes, experience, video and audio, and

share them. Integrate the knowledge points: integrate the easy-to-understand little knowledge points into the three stages of preview, lecture and review of each unit systematically by means of video, practice in class, homework, examination, discussion, online lecture, etc. Knowledge points include three levels: basic concepts, flexible use, and vision expansion (Sahar, 2020).

Expand professional horizons: Incorporate professional knowledge and skills into the macro-knowledge system, and at the same time reflect pan-cultural factors such as economics, politics, history, language, ideas, values, human environment, and religion in the MOOC course, and integrate cultural values into the cultivation of professional knowledge and professional skills System, language, historical accumulation, social insights and interpersonal relationships, etc., in order to broaden professional horizons, introduce the learning process to a deep level, these contents can be regularly selected and recommended.

Improve students' interest in learning: MOOC learning relies more on the active participation of learners, so stimulating their interest in learning is the basis. Increasing their interest in learning can be to provide interesting knowledge information, such as various images, pictures, stories, anecdotes, or real-life events, etc., or it can be a variety of means to stimulate learning interest, such as games, competitions, discussions, and debates.

## **CONCLUSION**

The outbreak of the COVID-19 has a great impact on teaching and resumption of classes. Online teaching minimizes this loss, although there are some deficiencies in it, which needs to be improved continuously. After the traditional teaching is restored, the online course resources can be used as a supplement to improve the traditional teaching.

## **REFERENCES**

- Diane R, Yacob A, Smita B (2013).** An online revolution in learning and teaching. 2013 IEEE Frontiers in Education Conference (FIE), Oct.23-26, IEEE Xplore Press, USA, pp. 14-14.
- Eugene S, Eugenie CS (2015).** Online teaching: A comparison of on-ground, online, & facebook-linked teaching. 2014 International Conference on Interactive Mobile Communication Technologies and Learning (IMCL2014), Nov.13-14, IEEE Xplore Press, Greece, pp. 338-341.
- Guo CW, Wen JL, Li Z (2019).** Improvement of Capstone Project and Project-Based Learning Method Based on CDIO Mode. 2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE), Dec.4-7, IEEE Xplore Press, Australia, pp. 938-943.
- Iresearch (2020).** 2020Q1 & 2020Q2e China Online Education Market Data Release Report. Link: <http://report.iresearch.cn/report/202006/3599.shtml>.
- Kuo YL, Chang TY, Kuei-Hsiang C (2012).** Development of a Multiplayer Online Role-Playing Game-based Learning System for

Multiple Curriculums. 2012 IEEE Fourth International Conference On Digital Game And Intelligent Toy Enhanced Learning, Mar.27-30, IEEE Xplore Press, Japan, pp: 62-66.

**Li Z, Ruo XG, Mei ST (2019).** On the Significance and Measures of Promoting the Development of Female Researchers in Engineering. 2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE), Dec.4-7, IEEE Xplore Press, Australia, pp. 741-744.

**Sahar V (2020).** University Online Courses: Correlation between Students' Participation Rate and Academic Performance. 2019 International Conference on Computational Science and Computational Intelligence (CSCI), Dec.5-7, IEEE Xplore Press, USA, pp. 772-777.

**Titan F (2016).** A comparative study of teaching styles in online learning environment. 2017 International Conference on Information Management and Technology (ICIMTech), Nov.15-17, IEEE Xplore Press, Indonesia, pp. 25-30.

**Yong H, Feng MZ (2016).** A Social Network Analysis of Online Collaborative Learning Aspects in an Online Course. 2016 International Symposium on Educational Technology (ISET), Jul.19-21, IEEE Xplore Press, China, pp. 3-7.

<http://sciencewebpublishing.net/jerr>