

Thoughts on Large-Scale Long-Distance Web-Based Teaching in Colleges and Universities Under Novel Coronavirus Pneumonia Epidemic

A Case of Chengdu University

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Abstract—The outbreak of Novel Coronavirus pneumonia epidemic brings a great challenge to China's higher education. All teachers and students were confined to their homes in order to cut off the spread of the virus and prevent further spread of the disease. All of a sudden, the large-scale long-distance web-based teaching activities have put forward new requirements on the platform operators, educational management of colleges and universities as well as teachers and students. In this paper, three aspects including the construction of the platform, the educational administration and the teachers and students are analyzed, the problems in the teaching operation are given, and moreover, the solutions are proposed. The author hopes that this paper can provide enough help for the teaching activities under the current epidemic situation.

Keywords: *web-based teaching, online teaching, educational administration, network teaching platform, pneumonia epidemic*

I. INTRODUCTION

At the end of 2019, the Novel Coronavirus pneumonia was broken out in Wuhan. When the country is in a state of first-order response as a whole, students have no chance to return to school as planned, so that the country's primary and secondary schools have to postpone the start of school. On January 27, 2020, the Ministry of Education issued a notice to postpone the start of the spring semester in 2020, requiring the departments to postpone the start of the school, and the start-up time of local colleges and universities and primary and secondary schools is deployed by the local government uniformly. [1] On January 29, 2020, the Ministry of Education called for "never stop teaching and learning even though the classes are suspended" by using the Internet platform. [2] On February 11, 2020, the Ministry of Education further pointed out that "never stop teaching and learning even though the classes are suspended" is a temporary emergency measure for responding to the epidemic currently, and pointed out that "it not refers to the online classes in the simple sense, not just school curriculum

learning, it is the learning in a broad sense, as long as it helps students to grow and progress." At the same time, the Ministry of Education pointed out that "it is not necessary to generally require teachers to record courses in online teaching work." and "we need to make full use of national, local, and schools' existing high-quality network curriculum resources." [3] With the urgent measures of education departments at all levels and the departments in charge of colleges and universities, colleges and universities began to carry out the construction of online teaching system and personnel training in succession, and at the same time, colleges and universities greatly mobilized the enthusiasm of the teachers for the content construction of online teaching system. However, in the pre-construction and implementation process of all-staff switching to online teaching, many problems are also exposed, which is worth thinking deeply.

II. IMPLEMENTATION CONDITION OF LARGE-SCALE LONG-DISTANCE WEB-BASED TEACHING

The large-scale long-distance web-based teaching already has a good implementation condition. 1. Web-based teaching resources are already quite abundant. The Ministry of Education has promoted the state-level high-quality courses constructed over the years and created more than 10,000 online courses at all levels. As of February 2, 2020, the Ministry of Education had organized 22 online course platforms to open more than 24,000 online courses free of charge, covering 12 subjects of undergraduate programs and 18 specialty categories of junior college and higher vocational education. [4] In the meantime, the construction of educational informatization in colleges and universities in China has been going on for many years, and the web-based teaching platform has gone deep into every link of teaching, which has also prompted colleges and universities to build a large number of online teaching resources. 2. Cloud platform technology can support web-based teaching. The web-based teaching platform server of many colleges and universities is constructed in the internal computer room of colleges and

universities, without the use of cloud platform technology, it is difficult to support the tens of thousands of students to attend the online classes in the entire school. And Tencent classroom, XueXiTong, ZhiHuiShu and other web-based teaching platform basically use cloud platform technology, so that they can achieve high concurrent teaching requirements. What's more, these platforms are designed for long-distance online teaching and are better suited to the current epidemic. Consequently, Chengdu University quickly purchased the XueXiTong platform of Chaoxing Company and carried out construction and training. 3. Optical fiber and 4G network communication technology can support large-scale web-based teaching. In the current epidemic situation, most of the students live at home, which definitely leads to the high demand for network communication technology and access bandwidth. Today's urban users basically achieve the state of fiber to the home, even if there are quite a number of students live in the countryside, their mobile phones basically support 4G network, and the domestic villages and towns have already achieved the full coverage of 4G network, and therefore, students can basically attend online classes through their mobile phones. Generally speaking, in terms of teacher's teaching resources, teaching platform hardware and software and network communication technology, the implementation conditions have been satisfied. Under the current epidemic situation, it is possible to carry out large-scale long-distance web-based teaching.

III. THE DIFFICULTIES IN THE IMPLEMENTATION OF LARGE-SCALE LONG-DISTANCE WEB-BASED TEACHING

Under the epidemic situation, all colleges and universities in China are engaged in long-distance web-based teaching simultaneously, and the platform operators and the teaching departments of colleges and universities have not fully foreseen the scale of its explosion. Such a huge increase in the scale of web-based teaching platform, university management as well as teachers and students has caused greater problems.

A. The expansion speed of web-based teaching platform is unable to keep pace with the demand of teaching

From the web-based teaching platform operator, their pressure is very huge before term begins. In every course, the average storage space of the teaching resources occupied including PowerPoint, teaching video, test paper, homework, etc. needs to be calculated according to GByte. ChaoXing XueXiTong, for example, under the pressure of the large number of users in the country, 420 servers are needed for video transcoding every day, and the teaching resources need to be stored with the speed of additional 2 storage servers every day. The number of daily active users (DAU) increased fast to 7.78 million on February 15, 2020 from 6.51 million on February 10, 2020. The number of daily clicks has increased dramatically. As shown in Figure 1, the number of daily clicks has increased sevenfold over the same period. This leads to the problems such as frequent platform crashes, web page failure, as well as video transcoding failures. To cope with the pressure of the service, ChaoXing

company is urgently ordering services from Aliyun and rapidly expanding the capacity of its servers.

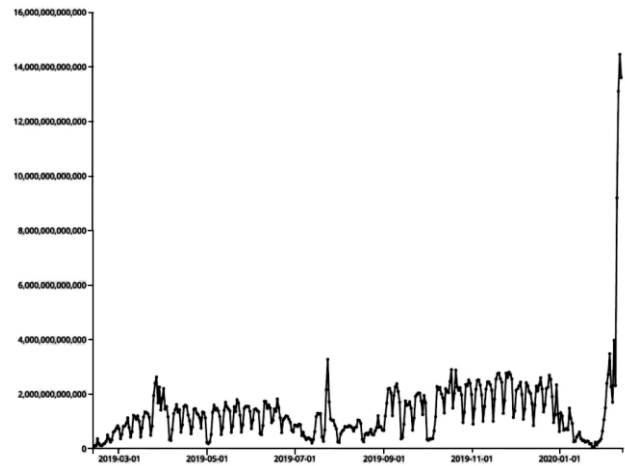


Fig. 1. Daily Clicks Quantity Chart of Chaoxing XueXiTong.

B. Online teaching poses a severe challenge to the educational administration in colleges and universities

It has become a brand-new subject of the educational administration department for how to maintain the teaching order, to ensure that the whole country's teachers and students can enter the network classroom for teaching and learning at the same time, and to ensure the quality of teaching. The way of online educational administration management system and on-the-spot inspection of teaching site are the common working mode of educational administration departments in colleges and universities for maintaining the orderly running of teaching. The on-the-spot teaching inspection adopts the combination of on-the-spot inspection by the Educational Administration Office of the university and inspection by the Educational Administration Office of each colleges and departments of the university, and the universities and colleges responsible for ensuring that all classes that are held on the day are inspected. In this way, the teacher's teaching materials and class style can be inspected in real time, and also, the students' attending rate and learning effect can be checked, thus it makes the inspection more convenient and intuitive. However, in the long-distance web-based teaching, the teaching staff can't intuitively check the teaching effect, it becomes difficult to grasp whether all the teachers teach online as schedules, and what's more, it cannot check whether the students are listening carefully in class.

C. Teachers and students are not adapt to teaching activities in China

In the epidemic situation, all family members live at home, thus the teachers and students are forced to carry out teaching activities at home, but first of all, everyone need to be prepared psychologically. After all, it is the first time for most teachers and students to carry out long-distance web-based teaching activities at home. Home is the main place of life, and suddenly, we need to make the home have the

function of the classroom, it really needs each teacher and student to be well prepared in psychological level in advance. And moreover, the mutual interference between family members also make the normal teaching activities even more difficult. We've learned from various social media that in live teaching, a teacher's family members shown in the teaching video, and when a student is answering a question, there are sounds like snacking or cock crowing and duck quacking. And in addition, in the link of interaction between teachers and students, the face-to-face communication is more convenient and effective. However, in the way of long-distance video, the small picture of this fixed perspective makes people receive less information through visual sense in the communication process, and consequently, it results in information transmission error.

IV. IMPLEMENTATION SUGGESTIONS OF LARGE-SCALE LONG-DISTANCE WEB-BASED TEACHING

The large-scale long-distance web-based teaching leads to the rapid change of teaching mode, teaching environment as well as management mode. This has caused a lot of problems for teaching platform, educational administration as well as teachers and students. In this paper, some appropriate suggestions are given for reference.

A. *Suggestions on web-based teaching platform*

As for the web-based teaching platform, it is the basic guarantee of the long-distance web-based teaching for that the operator maintains the capacity and the stable operation of the platform. As a result, even though the traffic and capacity are increased dramatically, the operators should always ensure the service margin of the platform's capacity. Operators should complete capacity expansion before capacity shortage, otherwise, operators will always be in a passive position. Teachers should also make full use of platform resources to reduce platform pressure. For instance, they should try to use the existing teaching videos on the platform so that they are not demanded to transcode the videos. Moreover, they can also consider uploading instructional videos to the cloud first, only storing video links on the web platform of XueXiTong. This will greatly reduce the pressure of the platform and also improve the stability of the platform.

B. *Suggestions on educational administration*

First of all, the large-scale training work of long-distance network course shall be advanced as soon as possible. The educational administration departments at all levels of the school shall, under the unified leadership of the Educational Administration Office, give full play to their subjective initiative and strengthen the training work of the network platform for teachers and students. Require teachers and students to study by themselves through the release of training documents, and meanwhile, organize network live training frequently. The contents of training on teachers should not just focus on the teacher's function part of the long-distance web-based teaching platform, it should also include the function of the students and the educational

administration, so that the teachers can have the whole field of vision and master the web-based teaching well. In the end, a week before the beginning of the classes, a teacher-student exercise shall be carried out for each class, so as to promote the smooth switch of the school from the meeting classes to the web-based classes.

On the other hand, although Tencent classroom, XueXiTong, ZhiHuiShu and other web-based teaching platforms relying on cloud are inherently designed for long-distance web-based teaching, these platforms only provide a variety of query functions in support of educational administration, they failed to provide schools with multi-dimensional and multi-angle large-screen graphical data display function in the current courses, for example, the staff of Educational Administration Office can quickly learn about the number of courses teaching currently and the number of courses should be taught currently, and moreover, the staff of Educational Administration Office can quickly find out the information of the courses not opened and the corresponding teachers. Nor does it provide a virtualized check feature that allows administrators of Educational Administration Office to enter every ongoing online classroom as inspectors, to learn about ongoing classes, while teachers and students are unable to sense the inspector's entry, as is the case with a real-world check. Therefore, the Educational Administration Office is suggested to negotiate with network platform operators to develop or open real-time large-screen functions and virtual inspection functions, so as to improve management efficiency and provide escort for teaching quality.

C. *Suggestions on teaching and learning between teachers and students*

First of all, both teachers and students should enhance the building of family environment, they shall coordinate with their families in terms of space and rest time, so as to avoid conflict and interference produced. Second, both teachers and students should take the initiative to learn web-based teaching platform, pay more efforts and make more preparation in the earlier stage, thus both of them can make less mistakes or make the classes more prepared in the formal course. In the end, both teachers and students should do appropriate exercise to keep physical and mental health, after all, we all received too much negative news during the epidemic, which has more or less adversely affected the psychology of both teachers and students. So, doing proper exercise and making the attention shift to the web-based teaching can help the teachers and students' life to turn quickly to the normal track.

V. CONCLUSION

Under the situation of Novel Coronavirus pneumonia epidemic, all colleges and universities are required to enter the long-distance web-based teaching mode, and all of a sudden, the large-scale long-distance web-based teaching activities have put forward new requirements on the platform operators, educational administration in colleges and universities as well as teachers and students. In this paper,

three aspects including the construction of the platform, the management of teaching affairs and the teachers and students are analyzed, the problems in the teaching operation are given, and moreover, the solutions are proposed. The author hopes that this paper can provide enough help for the teaching activities under the current epidemic situation.

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