Practice and Thinking of Online Courses Based on "Dingtalk + Chaoxing" in COVID-19 Epidemic Situation

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Abstract. Since the outbreak of Novel coronavirus pneumonia (COVID-19) at the beginning of this year, colleges and universities have actively responded to the call of "Suspension of classes and non-stop learning" by the Ministry of education, and have adopted online teaching methods to organize teachers and students to teach and learn. Under this background, the method of "DingTalk live broadcast + online interactive Chaoxing network teaching platform" is used for the online courses of "Single-chip microcomputer principle and interface technology" and “Database principle and Application”. Multiple ways combined the interaction are used to mobilize the classroom atmosphere in class, and homework and test are arranged to consolidate the learning points after class. Therefore, using this teaching mode can achieve good teaching and learning effect.

Since January 2020, coupled with the shutdown of many enterprises during the Spring Festival, novel coronavirus pneumonia (COVID-19) broke out nationwide, which greatly affected the industry, agriculture and service industry. Not only that, the teaching of students at all levels was affected. In order to stabilize the epidemic, the Ministry of Education issued a notice of “Suspension of classes and non-stop learning” on January 27, calling on schools to conduct online teaching.

In some provinces, online classes have started before the end of winter vacation. This is the first large-scale online teaching in our country, so most teachers and students lack teaching and learning experience in online classes. At the beginning of a period of time, various problems have appeared: the network is unstable and often disconnected. The teacher is not familiar with the live broadcast software in class, and some of them forget to turn on the microphone or forget to turn off the live broadcast after class. Students are also tired of listening to the class, because they are still on vacation and sometimes forget the class time, etc. Different courses are taught on different platforms. So students need to download various Apps and find out the operating routines and various clock-in (including attendance, homework, exercises and tests). Staring at the computer or mobile phone for a long time to learn, their eyes are tired, and learning efficiency is very low [1,2].

Under the call of the Ministry of Education, we are asked by the college to start online classes on February 17. This paper mainly introduces the specific implementation, experience and thinking of the online lectures of the course "Single-chip Microcomputer Principle and Interface Technology" and “Database principle and Application” taught by the author.
1 Course and learning situation analysis

1.1 Course analysis

There are 64 class hours in “Single-chip Microcomputer Principle and Interface Technology”, mainly for 145 undergraduates (includes 58 18th undergraduates and the 87 S19 upgraded students). It is the core course of the Internet of things engineering specialty. It includes hardware system design, software design and programming, the system simulation and realization (originally required to be a physical object). "There are 48 class hours in Database principle and Application", which introduces the basic principle, design method and application technology of database system, mainly for same S19 upgraded students. Students should effectively use SQL Server database management system, and master the design of database and the development mode of database application system.

1.2 Learning situation analysis

The 18th grade students of IoT engineering have a reasonable professional knowledge structure and have the foundation of University Physics and Electronic Circuit Technology. However, the S19 upgraded students of IoT Engineering are from different vocational and technical colleges, with incomplete knowledge structure and uneven foundation. But they have a serious and active learning attitude and are good at interacting with teachers. The 18th grade students of Computer application technology have a good overall learning atmosphere, and they also have “Practical Training of Computer Hardware” as the basis for this course.

2 Online teaching model based on "DingTalk + Chaoxing"

During the epidemic period, most of online teaching adopts the way of live broadcast + a network teaching platform. If we only change the place of teaching from classroom to online, and there is no fundamental change in teaching design, it is difficult for teachers to attract students and achieve better teaching results. Therefore, before online courses, we should prepare various materials of online courses, understand the strengths and weaknesses of online teaching, and design online teaching programs. We should take teachers as the leading role and actively interact with students in class. We should use network tools to answer questions and guide experiments, and then let students learn independently after class.

2.1 Innovating online teaching design

Before starting the online course, we should do some preparatory work and design innovative teaching method.

The first thing is to choosing live broadcast software and mode. Through testing and comparison, the effect of Chaoxing (Xuexitong APP) live broadcast is poor. After comparing DingTalk with QQ live broadcast, it is found that the comprehensive effect of DingTalk is the better. Secondly, the author worked with colleagues to test the live broadcast effect and familiarize with the live broadcast settings in the DingTalk group of the teaching and research section. After several tests, the basic network of more than ten people was smooth. So we decided to use the mode of “screen sharing + live video saving and playback + supporting for connecting microphone”. Thirdly, we created a DingTalk class training group, and conducted a 15-minute live trial one week before the class started.
As a result, the network can basically provide a more stable live broadcast effect. Through testing the live broadcast, we could learn about the student's network environment and their learning equipment nearby. In this way, we have obtained the relevant information for the later curriculum development (because of the early poor Chaoxing network, students’ participation was not ideal).

Then the author innovated the teaching design and avoided the teachers to explain the theory from the beginning to the end. We completed the task of initial course building on Chaoxing. That is, the author first managed the class, corrected the list of students, then created chapters and contents, uploaded various learning materials (including courseware and reference materials), prepared questions to be answered quickly, and homework or tests in class. In addition, according to the content of each class, we set up theme discussion, question and answer, group work and other forms of interactive method with students. For example, when we talk about SCM overview, internal structure, interrupt system, timer/counter and other contents, we should set up the quick answer or topic discussion, which not only enlivens the atmosphere, but also arouses the enthusiasm of students.

### 2.2 Diversified interactive online

The online courses of "SCM principle and interface technology" and "database principle and application" adopt the teaching mode of "DingTalk + Chaoxing", while the live broadcast adopts the mode of “screen sharing + live broadcast saving and playback + supporting microphone connection”. This is a teacher-dominated and student-centred online course. Teachers need to change the teaching content and schedule properly according to the real-time progress of online teaching. In addition, in the process of live broadcast, teachers need to interact very much to understand whether students listen carefully and whether students' listening effect reaches the expected goal. The following ways of interaction are used in online courses.

1. The teacher asks questions directly during the live broadcast, and randomly selects the student who enters text in the online group to answer the question.
2. The teacher asks questions directly during the live broadcast, and randomly selects the student who answers the question by connecting the microphone.
3. The teacher uses the video conference of DingTalk, and lets the student report the corresponding subject content as the host (All the staff are forbidden speech and then the host opens the teacher microphone).
4. The students rush to answer questions quickly in Xuexitong APP after the teacher sets the questions.
5. The students express their opinions around the topic in Xuexitong APP after the teacher sets up the topic discussion.
6. The students complete the questionnaire survey in Xuexitong APP (such as basic situation survey, network situation survey, etc.).

Comparatively speaking, the most commonly used method is the first one above, which is the most convenient and immediate method. Due to the limitation of Chaoxing network environment, the students cannot log in. Therefore, the most appropriate way to interact with questions and answers is the first method and the second method.

### 3.4 Sufficient online resources

Effective online learning is not only a live online course, but also sufficient online resources, which enable students to use the network to complete the corresponding learning points at any time after class.
Taking "SCM principle and interface technology" as an example, after the live broadcast online, it is generally required to complete the homework within the specified time (a few days to a week). Homework is generally matched the current classroom content. The teacher can use the homework library in Chaoxing platform to set the questions first, and then release homework before class or after class. Homework can be set up objective questions. After the score of each question type is set by the teacher, students will be automatically marked by Chaoxing after finishing the homework. If the homework is subjective questions, teachers need to manually review and correct them.

In addition to assignments, the "chapter" is the framework of knowledge structure of the whole course and specific content. There are not only matching courseware, but also relevant reading, topic discussion, video and inserted reference book chapters. Each chapter is set some task points, which require students to complete. The "materials" is also uploaded with complete electronic textbooks, all courseware, reference materials, FAQs, etc., which are convenient for students to download. After a period of online learning, the students should participate in a stage test for testing the learning effect and quality. The way with task driven requirements makes students not only need to watch the live broadcast well, but also spend time after class to independently learn the corresponding course content in various forms on the Chaoxing platform.

4 Experience and thinking

Since the online course, in the above specific implementation process, there are also some problems and some methods have been used to solve them. In this process, the author is also constantly thinking and constantly improving teaching methods and means according to the actual effect.

1. Attendance adopts the combination of "Xuexitong APP sign-in + watching DingTalk live broadcast statistics".

   The online lesson began on February 17, and the network concurrency problem was serious in the morning of that day. It was slightly better in the afternoon, but it also affected the sign-in in Xuexitong APP. The teacher finally uses the statistics of watching the DingTalk live broadcast as the attendance. After that, the teacher set the attendance time at least 10 minutes in advance before the class, and the attendance time period should be set appropriately for a long time. If there are still students who fail to check in due to network problems, the final attendance result will be combined the statistics of watching DingTalk live broadcast.

2. The network of DingTalk live broadcast is basically smooth, but it still needs to start a few minutes in advance.

   In the case of a large number of students, there will be a jam at the beginning when students enter the live broadcast, and the message in the live broadcasts room is delayed slightly to show, which will be smoother after a while. In addition, due to the different network environment of teachers and students, some students will also be stuck or disconnected during the live broadcast. When asking questions and interactions with each other, there will also be the slow network response and delayed messages. Even the situation of connecting microphone needs to wait for a while.

3. The experimental reports are more suitable to be placed on FTP, and then the teacher can review and download. Whether it is DingTalk, QQ, or Xuexitong, it’s generally not suitable for viewing a large number of subjective test, assignments and experimental reports. The teacher needs to download them for careful review. Therefore, students should upload their experimental reports to relevant folders on the campus FTP through VPN, which is convenient for teachers to collect and correct.
4. The teacher should choose a suitable time period to upload data on Chaoxing platform.

It will be slow or restricted to upload materials to the Chaoxing platform between 8:00-17:00 in the daytime. The teacher may upload some non-emergency materials at noon. Therefore, it is more appropriate to upload the courseware at least one night before class. The teacher uploads the data to Chaoxing's "Computer Sync Cloud Disk", and then imports the relevant materials into the various parts of the course, such as videos, pictures and documents into the chapter content. And the teacher also imports data into "Material" for student downloading in this way.

5. The interaction is diversified, and the online classroom atmosphere and enthusiasm are mobilized.

During the vacation, some of the students have conflict psychology. If multiple courses are taught in online classes, many students are prone to fatigue over a long period of time. In order to avoid the way that the teacher always speaks during live broadcasts, it needs active interaction in class. As mentioned before, the interaction can be diversified, and the form of random question and answer can also avoid students' absentmindedness. In addition to the above interactive methods, when students answer questions, especially software installation, operation and simulation, it is not enough to rely on text communicate alone. Sometimes, they cannot say the situation clearly or the words are not satisfactory. In these cases, the teacher can add students as pin friends and chat with them in private, then uses video conference to share windows for watching the students' operation. Maybe the teacher can find the solution in this way. According to the specific content, each class uses a specific interaction method, or a combination of multiple methods to better improve the learning effect.

5 Conclusion

Nowadays, some provinces have been under good control of the epidemic situation, and there has no obvious increasing cases for several consecutive days. Only if meeting the relevant conditions, schools can start one after another. However, the provinces that fail to meet the requirements still teach online. In this paper, the "DingTalk+Chaoxing" online teaching method is shared by the author under the epidemic situation. Although there are still some problems such as students' lack of enthusiasm for learning and occasional problems on the Internet, which is not good as the way face-to-face helping students solve problems. But it is still a reference online teaching method in the current epidemic period, and the empirical teaching effect is recognized by most students. Through this kind of practical experience, the author hopes it may help those teachers who are also taking online courses at the same time.

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References
