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Research of Online Classes for Music Courses in Higher Education in China During Covid-19

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ABSTRACT

The spread of COVID-19 has prevented college students across the country from starting school as scheduled. Under the call of the Ministry of Education, 'not to suspend teaching and learning', universities around the country have widely broadcasted live online teaching. However, live teaching under the COVID-19 is different from traditional online teaching. In order to ensure the quality of undergraduate teaching, this study distinguishes the different characteristics of live undergraduate teaching courses and traditional undergraduate 'online + offline' mixed courses and online live teaching music courses under COVID-19, taking theoretical courses as an example.

Keywords: COVID-19, Online Class, Music Course, Higher Education, Traditional Teaching.

Introduction

Existing problem

With populations affected by the COVID-19 since spring of 2020, distance education has become important means of teaching to deal with special periods, and the education model has faced new challenges in unprepared and actual struggles. Moving the traditional teaching model to the internet for online teaching is both a change and an innovation. This study uses network software to analyse the use of modern universities and discern the differences between traditional teaching and network teaching.

Small teaching scale

The number of students in a single university course is less than 300, and the team of teachers is generally composed of about three instructors. Implementing strict classroom access and attendance systems is a typical single point of contact (SPOC) teaching paradigm, completely different from the massive open online courses (MOOC) and live broadcasting platform for paid training courses. Long teaching time: Compared with all online courses (such as micro courses), live teaching should strictly implement a class hour plan, so a single course is about 90 minutes long. The longer the teaching time, the more boring courses with theoretical content. The lack of the collectivism and interaction for collective classroom learning can easily lead to a high classroom attrition rate.

Learning interest: All kinds of public science and paid training broadcasts have stable demands, interest and self-control. Also, most ordinary college students generally lack learning initiative and urgency, especially

in a distance-learning environment, under the absence of teachers' supervision. It is unavoidable: 'Live webcast, people do not listen to' online lack of management behaviour. Offline difficulty: With the effective control of COVID-19, fully hybrid online teaching will eventually return to physical classes. Some students in online classes cannot keep up with the progress of offline classroom teaching. Some teachers are not good at adjusting to online and offline transitional relationships, which leads to extreme irregularities, and some teachers even give up mixed teaching, resulting in students who cannot adapt. The experiment is difficult: The author's courses can still use a virtual simulation platform to carry out experimental teaching. However, a large number of practical courses cannot be carried out due to the lack of environment, instruments, equipment and collaboration, resulting in the separation of theory from practice.

Poor network environment: During the COVID-19 period, about 300 million online students nationwide participated in online learning. As of February 13, 2020, live streaming platforms, including Tencent Conference, Rain Classroom, MOOC and Super Erya, led to no access and affected the smooth progress of online teaching. The above particularity and differences more or less affected the quality of teaching, so it is particularly important to carry out targeted, careful teaching organization and design under COVID-19.

Classroom teaching organization and design when the COVID-19 situation was offline was due to the general lack of enthusiasm and self-control for active learning. Also, there was a lack of classroom collectivism and teacher supervision, as well as often an online mixed situation of 'live broadcast and people are not listening'. Also, 90 minutes of online teaching time is difficult to ensure students' efficient learning continuity. Therefore, ensuring the vividness and interactivity of 90-minute classroom teaching and designing organizational relationships before, during and after class have become the keys to the success or failure of the online flipped classroom and teaching quality assurance. This section employs a music-teaching course as an example. The three-paragraph classroom teaching method is designed to improve the classroom retention rate and teaching quality.

In order to ensure the stability and durability of online teaching, the main work of the teaching preparation stage is: First, select appropriate teaching materials and guidance materials. Integrate online quality resources, edit and organise and prepare materials for the formal development of the course. Secondly, considering the fluctuation of the network, choose more than one live broadcasting platform and teaching tool, be proficient in live broadcasting and interactive functions of the platform and prepare the standby teaching platform to ensure orderly and stable teaching progress and quality. Finally, focus on the key difficult points and practical courses, according to the classification and integration of pre-class previews, in-class teaching and testing, after-class exercises and reviews, knowledge and skill expansion and detailed explanation of the key and difficult points, to organically organise the relationship between classroom teaching and self-study after class.

Three-stage classroom teaching stages

The basic consideration of three-stage live classroom teaching is as follows: Due to the long interval, it does not conform to the fragmented and random characteristics of network teaching. Ninety-minute and long teaching often makes students feel audio-visual fatigue, resulting in low concentration and high classroom loss rates. The basic idea is to divide the 90 minutes of class time into three teaching time periods, which are set at about 25 minutes according to the Tomato working method. The interval is about 7 minutes of knowledge expansion and barrage communication. The display link increases the interaction and relaxes the mood, while its intuitive display is shown in Table1.

Due to the three-stage division, the original offline classroom content cannot be fully considered. Therefore,

Table 1. Three-stage classroom teaching stages

Preparation teaching	Before-class preview	Online class			After-school review
Selection of teaching materials	Basic concept push	Key 1	Key 2	Key 3	After-class exercises test and submission
Understand platform functions	MOOC video preview	Teach courses+ Online testing 25 min	Contribution and explanation +barrage communication 25 min	Teach courses+ Online testing 25 min	
Teaching material organization	Preview test feedback	Knowledge exchange 7 min	Science and technology knowledge sharing 7 min		

Source: Studied the flipped classroom teaching method based on online live streaming under the COVID-19 epidemic.

removing the course, redefining the classroom teaching content, and highlighting the emphasis are necessary. If multiple knowledge points are involved, the basic concepts and application promotion content should be pushed offline through MOOC study.

Review stage after class

After the online classroom teaching, teachers will release after-class exercises promptly and assign after-class expanded reading tasks through the Rain classroom to guide students to consolidate the key and difficult points in time. They should set up a research group at the same time for the group to complete a self-study research report, through contributing functions to realise each group's mutual rating, plus teachers define basic score way accounting group can review results; students can finish the review task after class that can be discussed in a Dingding group. It should facilitate teachers to, in a timely manner, help students geared towards gaining their level of knowledge and teach blind spots. For the experiment, the virtual simulation environment is generally adopted. The teacher puts forward the design requirements in the form of the task book. The task team completes the network design and configuration in the virtual environment, such as a Packet Tracer, and finally uploads the experimental process. They record and project documents through the Dingding group. The theory of the computer network curriculum is closely related to practice. Experimental phenomena should be introduced for the key contents, such as protocol and routing, and experimental questions should be arranged in advance after class to encourage students to observe the phenomenon. This is so that the teachers in the class are targeted to introduce the theory and answer questions (Cao, 1999).

Offline teaching that has resumed after the COVID-19

With the effective control of the COVID-19, it is inevitable to return to physical classes, with both online and offline recording. Live broadcasting leads to the teaching workload of teachers. Some teachers do not adapt well to the teaching method of facing cameras, are eager to get rid of it and even simply give up mixed teaching. This results in students who are unable to adapt, while some students with online mixed credit hours result in an inability to keep up with the progress of the offline classroom teaching. Therefore, in the teaching restoration of the physical classroom, SPOC flipped classroom teaching based on Rain classroom. Secondly, the teaching content organization before the adjustment is restored in a timely manner. Again, many questions left in the online classroom should be answered in the interactive environment of the classroom (Feng, 2018).

Research Methodology

This study used two research methods, an open questionnaire survey and online classroom observation. According to the identity of the sample object, the questionnaire was divided into student and teacher versions. Due to the small sample, the questionnaire was conducted by one-time dialogue through telephone and WeChat Voice. The classroom observation was done by the author, who participated in the online teaching as an auditor and observed the situation in the online teaching process. For this study, the researcher observed five courses, each lasting for 50 minutes. Taking the Department of Music Education of the Conservatory of Music as an example, the author briefly introduces the types of online courses and online teaching methods.

Results and Discussion

The modernization of education is not only the iterative development of science and technology but also the modernization of the teaching concept, quality and standards. International Chinese online teaching is also constantly innovating and improving its practice and exploration. In the post-COVID-19 era, to make good use of what teachers and teaching units should actively think about and explore, make good use of the WeChat public accounts that are easy to operate, cover the current shortcomings of the platform construction and improve the communication power of international Chinese.

Professional small courses

Professional minor courses mainly include piano performance, vocal music singing and other instrumental music performance courses. This operational, skilled 'one-to-one' course is usually taught face-to-face. During COVID-19, most teachers chose WeChat, QQ, Dingding and other convenient 'one-to-one' voice or video connection software for teaching. Many teachers chose to use the '"Practice Together' app for 'one-to-one' or 'one-to-three' group class teaching. Due to the particularity of music professional skills courses, the existing online teaching software technology cannot

fully meet the needs, such as 100% restoration of sound quality, details when teachers demonstrate the key and sound synchronization when cooperation is needed between teachers and students. Therefore, teachers begin to think and try different teaching models from traditional classroom. The traditional classes of music majors pay great attention to the face-to-face teaching of performance and singing techniques, and teachers often spend much time demonstrating and explaining. In online teaching, teachers expand their teaching content from singing and performance skills to work analysis and music humanities.

First, the students send the practiced, good assignments to the teacher as sound or video recordings done before class. Then, in class, the teacher comments on and demonstrates the recording or video, analyses the assignment from the perspective of harmony and music style, and explains the assignment from the perspective of the composer's background and the style of the creation period. Finally, the corresponding homework is assigned to ask the students to conduct a more in-depth study on the work. In this way, students should not only practice their playing or singing skills frequently after class but also complete related learning tasks such as literature reading and work analysis (Rao, 2019).

Theoretical courses

Theoretical courses include music history, musical work appreciation and music education psychology. Most teachers use multiple online teaching platforms for mixed teaching. Superstar Learning Pass (referred to as 'Learning Pass') is an online teaching platform used by many major class teachers, which can conduct classroom sign-ins, live broadcasts, record teaching, assign teaching tasks, share teaching materials, teaching evaluation, issue notices and other teaching activities. Before the class, the teachers can edit the weekly teaching tasks, upload the teaching materials, assign this week's homework and set the release time under the course portal of the platform. Some teachers record teaching videos in advance, upload them to the Learning Pass platform, ask students to learn independently and then answer questions online through platforms such as Learning Pass or Dingding. Many teachers choose live teaching, with weekly designated classes. Although the learning pass platform has a live broadcast teaching function, the function only supports one-way picture output for teachers. Students cannot interact with teachers face-to-face via video and can only leave messages at the bottom of the screen. As a result, many teachers choose to switch between teaching between Learning Pass and other platforms. For example, in the face-to-face video conference hosted by Dingding or QQ class groups, teachers can simultaneously have video or voice dialogue with all students and play PPT, video or audio. Such live teaching is closer to the real classroom. Another popular platform is the boutique MOOC platform, where teachers can choose relevant MOOC, recommend them to students to watch their learning and then have online discussions on platforms such as Learning Tong or Dingding. For example, in music education psychology, the existing resources are not completely consistent with the name of the course. From the perspective of interdisciplinary teaching in the 'MOOC' platform, select two quality MOOC resources, 'Into the Children's Psychological World' (Zhejiang University) and 'Music Psychology' (Shanghai Normal University), for teaching (Su, 2015). When preparing the lessons, one studies the two MOOC courses by himself, selects the chapters related to his teaching content for the students to learn, and designs the teaching problems to discuss with the students. Before the class starts, the author publishes the teaching tasks, teaching materials (such as relevant articles, videos, audio, etc.) and homework on the Learning Pass platform. After all the staff learned the MOOC independently and simultaneously, they entered the Dingding video conference for face-to-face teaching between teachers and students. The process is divided into three levels: 1) Detailed interpretation of MOOC, 2) open questions that stimulate students to think actively and 3) derivative discussion of content and knowledge related to music education. After the discussion (i.e., after class), students can study independently and upload their homework according to the teaching materials shared by the teachers on the learning platform and then it is reviewed by the teacher. In the opinion, the hybrid teaching cloud classroom of 'Learning Through + Chinese University MOOC + Dingding' really opens up a new world for the major theoretical courses of music education (Tang, 2015).

Practice of major courses

Practical courses mainly include teaching methods, visual and singing ear training, chorus and conductor. Most of these courses adopt the same cloud classroom operation mode as the theory courses, that is, multiple online platforms for mixed teaching, among which learning is still necessary. What is relatively different is that practical courses pay attention to practical operations. Teachers' demonstrations, case analyses and students' practice account for a large part of the teaching content. Most teachers use the form of 'recording + live broadcast' for

online teaching. The homework that the teacher assigns is for the students.

Analysis

Online teaching platforms mainly include resources such as Love Course (MOOC), Wisdom Tree and School Online, suitable for students' self-study and online teaching. Tencent Conference, Dingding and Enterprise WeChat are: 1) suitable for the current COVID-19 prevention and control situation, 2) easy for students to operate at home and 3) can meet the requirements of online classroom teaching, conduct online previews and assign and correct homework (especially in the Rain Classroom platform). Lastly, online teaching communication platforms, such as Enterprise WeChat, WeChat and QQ Online Layout, can answer questions and supervise and evaluate the students' independent learning in class.

The full ideological preparation for teachers and students is, firstly, to ensure the smooth progress of online teaching. However, there is no doubt that the online teaching conducted by teachers and students during this COVID-19 is a 'war of encounter' without sufficient ideological preparation. According to a study, nearly 80% of teachers had not conducted online teaching before COVID-19, and nearly 60% of students had not participated in online teaching before COVID-19. Specifically, according to the 5,443 teacher questionnaires collected as of March 17, 2020, the results of 118,191 student questionnaires showed that 1,112 teachers had conducted online teaching before the COVID-19, accounting for only 20.43% of 4,331 teachers. Thus, 79.57% teachers had not conducted online teaching before COVID-19, online classes had 51,674 students which is 44% and offline classes had 66,517 students which is 56%. However, more than 97% of teachers and students had experienced online teaching after the outbreak. Among them, 97.5% of teachers conducted online teaching, and 97.37% of students received online teaching. In order to further understand the proficiency of teachers using various platforms, the survey divided teachers' proficiencies into five levels: 'best', 'good', 'normal', 'generally', 'bad' and 'worst'. From the survey results, the mean for the teacher option was 3.75. Among them, 608 teachers chose 'best', accounting for 11.17%. Next, 3,027 teachers chose 'good', accounting for 55.61%. These two options accounted for 66.78%. Then, 1,678 teachers chose 'generally', accounting for 30.83% (Wang, 2019). It can be seen that most teachers have mastered the technology of various online teaching platforms between 'general' and 'skilled'. One can see whether teachers and students have accepted online teaching. Table 2 shows all kinds of functions network teaching platforms have played accordingly. Live video, live language, and other teaching methods have been widely used to solve the sudden major problems that occur when the students cannot learn questions, as shown in Figure 1, 2.

Choose the appropriate web learning software

Choose the appropriate web learning software questionnaire also investigated the online and offline teaching interaction, teaching effect and classroom activity comparison. The results show that 'completely offline' teaching is better than 'completely online' in terms of teaching interaction, teaching effect and classroom activity for teaching (see Table 2).

Through the public platform, learners can effectively and conveniently use the fragmented time to easily master the basic knowledge of the Chinese language, expand their cultural vision, improve their self-study ability and stimulate their interest in learning. Therefore, in terms of the platform aspect, the builders should combine the implementation conditions in two ways. First, they should reasonably plan the teaching objectives using the four

Option	Number	Ratio
Live streaming	120	45.63%
Voice live	65	24.71%
Network setting self-study	78	29.66%
Total number	263	

Figure 1. Online Classes.
Source: Stage characteristics of large-scale online teaching in Chinese universities is based on the empirical research on the questionnaire survey of students, teachers and academic administrators

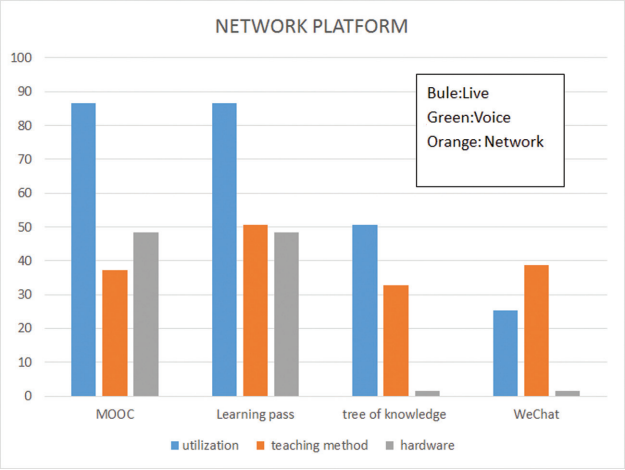

Figure 2. Network Platform data.
Source: Course Analysis of the current situation of online teaching in colleges and universities under the epidemic situation

Table 2. Online and offline effect comparison

	Best	Good	Normal	Bad	Worst
Online teaching interactivity	8.2%	21.6%	43.3%	20.2%	5.5%
Offline teaching interactivity	25.4%	48.5%	26.1%	0.0%	0.0%
Online teaching effect	0.0%	35.1%	38.8%	26.1%	0.0%
Offline teaching effect	35.1%	52.2%	12.7%	0.0%	0.0%
Online class activity	10.5%	26.1%	35.1%	26.7%	1.5%
Offline classroom activity	13.4%	24.3%	52.2%	0.0%	0.0%

Source: Course Analysis of the current situation of online teaching in colleges and universities under the epidemic situation Course

levels of language knowledge, skills, culture and emotion. They should highlight the key points and systematically design the courses by themes and modules. Secondly, the builders should focus on designing the teaching content, strengthening the repetition rate of new words and sentence patterns and optimizing the publicity effect of input resources such as listening and reading. They should give play to the functional advantages of the public account platform through technological innovation and spatial imagination and use such input teaching funds.

In order to attract the readers, finally, they must speed up the frequency of updates, and highlight the convenience of mobile learning platforms and the importance of the construction of learning resources.

The network teaching platform, Blackboard LLC (Bb Platform), was born in 1997 (XL, 2020). After several years of trial, research and development, the Bb Platform was officially launched in various primary and secondary schools in the United States in 2005. Its main function was to build a fast platform for teachers and students to share teaching resources with the help of the internet. For example, before the beginning of each semester, college teachers can arrange teaching components, such as the teaching syllabus, teaching schedule and teaching content (including the teaching steps of each course, auxiliary teaching materials and related teaching materials, homework and requirements), measurement and evaluation (including homework assigning and collecting, scoring, tests and examinations) and other materials which are uploaded to the platform, which will be sent to students by email. In addition, teachers and students can also have online discussions on the platform. Today, such online platforms have become a necessary basis for teaching in China universities, including all art schools. Traditional music courses in colleges and universities are carried out more frequently with step-by-step procedures according to the teaching material and schedule. Now, more conventional things are broken, which is also a test of teachers' wisdom and ethics. What works are used to influence students, and what ways are chosen to influence students? Are they worth thinking about in current life education, love education and growth education? How can one overcome difficulties, and how can one be integrated into the music class? In this researcher's opinion, daily teaching requires more attention to the professionalism of music. Now, the internet makes teachers pay more attention to the ways and content of students they think are more attractive and that are more conducive to their future development. This cognitive improvement of education is also growth for teachers. First, set up the teaching plate and refine the teaching classification. Teachers can classify the teaching tasks through the function of the public account 'Topic Label', which can not only be summarised according to the language structure, function and culture of the language but also be planned and designed from language knowledge and skills. On the one hand, a reasonable setting allows learners to find teaching resources quickly. On the other hand, it also reflects the scientific and systematic teaching task arrangement. Second, it expands the communication form, enhancing the interest and readability of teaching. The WeChat public account material editing function includes components such as text, pictures, and audio, video and link insertions. Although the teaching method of 'text + pictures' in the existing platform construction statistics accounts for the vast majority, this is not the only form of communication. Teachers should expand the editing form and increase the sound and animation presentation proportion. Through the insertion of class, song playback, poetry recitation, film and television segments and other contents, one can improve readers' self-study interest, along with some obscure knowledge points through audio and video. In addition, it can be inserted into the outer chain of small program learning, as it can broaden the teaching methods and stimulate learners' interest in learning. Expanding teaching ways, while optimizing feedback. The circle functions and group functions of WeChat reflect the internet era (Xiang, 2017). The WeChat public platform is attached to WeChat, which can effectively use these two functions

to optimise teaching feedback and services. Based on the single interactive communication method of slow reply and inconvenient operation in the comment area of the public account, the builders can establish a user WeChat group based on the public account through the WeChat group function to promote the communication between its users and other users. In view of users' learning problems, a builder's timely reply in the WeChat group uses the voice input function to correct students in a timely manner, and one can do a good job in teaching feedback and services. In addition, in the post-COVID-19 teaching era of networking, teachers should still maximise the creation of a language teaching environment. In addition to diversity in the content, which shows the Chinese teaching environment, teachers can also make full use of WeChat circle functions and encourage learners in Chinese to communicate information in time. Through friends who can give a dynamic thumbs up, provide comment interaction that increases language skills output frequency, can strengthen learning interaction between individuals, intermediaries and other individuals; and finally create a real language-use environment. Finally, the data's statistics are used to promote the quantitative analysis of teaching reflection. The WeChat official account has the function of background data statistics, which can analyse users, content, menus, messages and other data. The content analysis part can create statistics on the reading times, sharing times and reading completion rate of a single or multimedia push, while the user analysis part can summarise the users' gender, age, growth and regional attribution. Timely data statistics is conducive to teachers for observing the characteristics of teaching objects, understanding the attention and effect of teaching content, and in a timely manner, improving and updating the teaching design. Universities began to value teaching. Currently, in the platform construction of international Chinese WeChat public accounts, the proportion of individuals as the development subjects far exceeds that of enterprises, universities and institutions. However, from the overall planning, time management, content editing, scientific, professionalism, and accuracy perspective, the international Chinese teachers or volunteers as the main public account still have many deficiencies. As occupying the main position of international Chinese teaching, universities should give full play to their comprehensive strength in the post-COVID-19 era and support and guarantee the platform construction in terms of human, material and financial resources. Based on the students, volunteers are collected to maintain the platform, improve the update frequency and ensure stability. At the same time, the background comment area and group chat function are used to enhance the timeliness and accuracy of readers' feedback and reply and to improve the interaction and evaluation of teaching.

For another example, Universities start from the international colleges, organise the platform to create a team, teachers and students work together using cross-professional cooperation, connect theory to practice and use the various functions and group advantages of the WeChat public account to strengthen the optimization and construction of the international Chinese teaching official public platform. Finally, colleges and universities regularly hold teacher training to effectively cultivate teachers' online teaching skills and improve the professional quality of teaching resource builders. Through multi-party cooperation, the government will enrich and improve the construction and use of the teaching resources and database of the internet platform and improve the quantity and quality of international Chinese teaching platforms based on WeChat public accounts (Zhou, 2020).

The advantages of online education

The advantages of online live broadcast teaching include the freedom of time and space and the strong interaction of live broadcast teaching. These can well stimulate students'' interest. Live broadcast teaching can be preserved, and knowledge acquisition can have a 'maintenance' effect.

With the freedom of time and space and the transformation of online live broadcast teaching forms, many problems in the past face-to-face teaching and recording have begun to be solved. Compared with traditional face-to-face teaching, online courses have greater freedom in time and space and are no longer confined to one small, fixed space. As long as the network is covered, students can listen to lectures online through their mobile phones, iPads, computers and other tools. In the past, students in remote areas had no access to excellent educational resources in big cities, but now they receive the same quality of teaching wherever they are. Live broadcasts that stimulate interest in learning has strong interactivity. The interactive function of video forms a more intuitive interface. Rich text and text content can effectively promote students' interest, encourage students to have a desire to learn and thus form a learning motivation. Sound and the picture's impact allow students to keep their attention focused, and they can acquire knowledge more efficiently. Psychologist Chertra testified that 83% of information comes from vision and 11% from hearing. Online live

broadcasting builds an ideal teaching environment of audio-visual integration and interactive communication, leaving a deep impression on students. This mode is more conducive to students acquiring and digesting the key points of knowledge.

Teacher-student interaction is fuller. The one-way live broadcast mode can provide a more relaxed environment for students. The so-called one-way visual is a class where only the students can see the teacher, and the teacher cannot see the students. In such a case, the state of the students is more relaxed. When there is a problem, they need not interrupt the teacher in the eyes of the public or stand up to ask questions. In the discussion or question area, they can type questions, with teachers or class teachers on duty replying, thus greatly reducing the threshold for students to ask questions. This provides teachers and students with more smooth communication. In traditional face-to-face teaching, teachers and students often ask one-to-one questions, and communication is limited. However, in the live broadcast mode, students can ask their questions, and teachers can have an overall understanding of the students' status and explain it intensively, guaranteeing each student's right to ask questions.

The key to online education

No matter how online teaching resources develop, teachers cannot supervise students as they do in the classroom directly. The key question to understand is that teaching through the internet and live streaming systems is not about moving offline classes directly to online.

This is not an understanding of the essence of online education, but such online teaching does not have offline advantages. Therefore, one should change the teachers' thinking habits of controlling all things in the classroom. Teachers should make full use of the convenience of online teaching, provide personalised guidance to students and parents, and enrich the form and content of home-school cooperation.

Conclusion

Strengthen teachers' teaching literacy

Strengthening teachers' teaching literacy is the key to this network teaching. Through research, the teachers' teaching concept is only held back at the ideological level and not fully implemented in the actual network teaching. Teachers need to constantly implement the correct teaching view in practice as helpers and facilitators for students to construct the knowledge system, be the organiser and instructor of classroom teaching, and help students to acquire knowledge systems better and more solidly to achieve the "student-centred" implementation of teaching activities truly. Secondly, teachers should adopt various forms of teaching methods in the teaching process to attract students' attention and promote students' classroom participation. They should not only focus on teaching methods, but adopt more mature ones under the constructivist teaching mode. Finally, teachers should continue to learn and train, as teaching oneself is a 'teaching and learning' process so that teachers pursue 'life-long learning' careers. Strengthening information technology training and learning is an important part of the construction of network teaching for teachers. Therefore, the school can arrange for teachers to systematically learn network knowledge to be more skilled in operating the teaching platform, and avoid low efficiency due unfamiliarity with the platform in the teaching process.

Cultivate students' independent learning ability

Students learning motivation, the state of learning and information literacy play an important role in network teaching. In order to enable students to absorb and construct their knowledge system in network learning efficiently, teachers and schools must intervene in students' independent learning properly. First, the students need to guide the external learning motivation into the internal learning motivation under the teacher's hand. Teachers need to be student-centred to meet the problem of students' poor states, and schools and teachers need to monitor students to regulate their learning status externally. Teachers, students and parents can jointly participate in independent learning monitoring as external monitoring, building a diversified autonomous learning monitoring system, and gradually standardising the students' independent learning attitude. At the same time, communication with classmates, teachers and parents can also cultivate their spirit of cooperation in self-learning. Finally, the school can arrange a lecture series such as 'How to Choose Information in the Information Age' to teach students the skills of how to choose information. Meanwhile, teachers can also demonstrate and screen information for students in the network teaching process, cultivate students' information selection literacy and improve their ability to screen information.

The school can establish long-term cooperative relations with several stable curriculum platforms in terms of the teaching platform. First, it can provide later technical support for school teachers and students. Second, when one platform has problems, other teaching platforms can be used as alternatives. At the same time, school teachers and students can also be encouraged to freely plan the course schedule and study at different peak times. In terms of teaching software, schools can collectively purchase some of the teaching resources or electronic textbooks offered by the platform to provide solid and rich teaching resources guaranteed by this network teaching. Constructivist learning theory points out that the teaching environment restricts knowledge construction. Different teaching environments should make different teaching plans, affected by the proliferation of network teaching, which are different from teaching in school. Thus, it cannot directly relate to school learning schedules without modification and is applied to network teaching. Otherwise, it will cause emotional anxiety for teachers and students, while some practical classes may not apply to network teaching. This is because network teaching cannot provide the music courses' required conditions and environments. In this view, the school can appropriately optimise the curriculum in COVID-19, shorten class hours and optimise online courses.

Online Classes, MOOC, SPOC and other teaching methods have become the main models of educational reform in China and has achieved remarkable results. However, under the pandemic outbreak, while being fully isolated from physical classes, the live broadcast modes based on the MOOC and multimedia teaching tools for online interactive teaching have become a pressing task for all teachers. According to this researcher's own access to the relevant information, and as of this writing, for the first time, this paper clarifies the difference between the COVID-19 live undergraduate teaching courses, traditional undergraduate 'online + offline' hybrid courses and online live teaching courses. It also gives the design idea and design process of the typical online live classroom teaching of science and engineering courses taking the computer network as an example under the COVID-19 situation. It is of important reference value for teaching managers to carry out live teaching under the COVID-19 situation.

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