

Exploration of the "Four in One" Online Teaching System for Higher Education in the Post-Pandemic Era

Xiaojuan Cao^{1,*}

¹ School of Culture & Media, Eurasia University, Xi'an, Shaanxi, China

*Corresponding author. Email: caoxiaojuan@eurasia.edu

ABSTRACT

Based on the investigation of the current situation of the online teaching system of higher education during the pandemic, through in-depth interviews and other methods, it is found that there are "four major imbalances" in the current online teaching process of higher education. The main reason for these problems is that a closed-loop online teaching system has not been formed, and the deep root lies in the transformation of education and teaching concepts, which are reflected in the role positioning of each link of the education elements and the transformation of teaching models. Only through a closed-loop system of "four in one" online teaching of educational philosophy, platform selection, educational process, and teaching evaluation can online teaching implement the online education of colleges and universities to the practice.

Keywords: Post-pandemic era, Higher education, Online teaching, Teaching system.

1. INTRODUCTION

The concept of using technology to promote learning is a design that has been adopted by developed countries (Rafael Pastor; 2020). Chinese scholars have been paying attention to the extensive use of information technology education and modern education methods (Liang Chuntao, 1986). Online education is to expand high-quality teaching resources (Zhong Binglin, 2014) and realize the sharing of high-quality teaching resources by the whole people (Zhong Binglin, 2015). "SARS" has made online teaching a hot spot (Jiang Hongcai, 2003), and basically achieved "suspending classes without suspending learning" (Xue Wenzhi, 2004). In the face of the COVID-19 pandemic, "suspending classes without suspending learning" has become an inevitable choice (Zhou Baorong, 2020). Online teaching is the initial presentation of "socialized learning" in higher education (Feng Li, 2020), which requires people to redefine the teaching system of education, school and learning. Based on the analysis of the current situation of online teaching in higher education during the pandemic, this research attempts to reveal the changes in the teaching system brought

about by online education and its implications for future education.

2. INVESTIGATION ON THE CURRENT SITUATION OF ONLINE TEACHING IN HIGHER EDUCATION AGAINST THE BACKGROUND OF DEFEATING "PANDEMIC"

As a public health emergency, the raging novel coronavirus places high demands on the governance system and governance capabilities of higher education.¹ Online teaching has become an inevitable choice for colleges and universities in the spring semester of 2020. At the beginning of the new crown pneumonia epidemic, the Ministry of Education proposed to use the online platform to "suspend classes without suspending learning" on January 29, 2020, and issued documents in early February.² The

¹ Liu Xiaoming, Wei Fayun, Path Arrangement for Think Tanks to Play the Role of Think Tanks in Epidemic Prevention and Control in Colleges and Universities [J]. Journal of Huaibei Normal University: Philosophy and Social Sciences, 2020(2).

² Guiding Opinions of the Ministry of Education and the Office of the Leading Group for Response to the Novel

Ministry of Education requires colleges and universities to make full use of high-quality online course teaching resources and rely on various online teaching platforms to actively carry out online teaching activities such as online teaching and online learning to ensure the teaching progress and teaching quality during the pandemic prevention and control period. Online teaching for all people has since started. However, because of the suddenness of the pandemic, almost 90% of online education is like "heavenly mission", and it is inevitable that there are certain problems in the design of the teaching system.

The research team used the "index library" of the questionnaire management system of the "MYCOS" platform to use teaching methods, teaching content, learning input, and learning evaluation as indicators to extract 16 questionnaires in eight dimensions referring to online learning form (tool), online education interactive channels, online learning initiative, online education implementation, online learning resources acquisition, online course design, online course learning effects and online course evaluation standards, etc., forming "Online Learning Status Survey (Student Edition)" and "Online Teaching Status Survey (Teacher Edition)". Through the WJX.cn platform, the research team carried out the survey on the acceptance of online teaching by students and the survey on the development of online teaching by teachers.

2.1 The Current Situation of Online Learning of College Students Against the Background of the Pandemic

A questionnaire survey of Online Learning Status Survey (Student Edition) found that online learning has become the norm in colleges and universities during the pandemic, and online learning presents five characteristics:

2.1.1 The Online Teaching Platform Is Relatively Stable, but There Is a Certain Distance from Students' Expectations

In the online learning process in China, Tencent Conferences, Zoom platform, MOOC platform, DingTalk, WeChat group, Wisdom Tree, and other platforms coexist. However, during the pandemic, there are certain differences between the online

learning platform students expect and the online learning platform actually used. In a sense, this reflects that in the online learning process during the pandemic, the choice of learning platform is still based on teachers as the leading factor. The teaching platform is selected for teaching and learning is performed on the designated platform.

2.1.2 Online Teaching Resources Are Abundant, but the Willingness to Learn Actively Is Not Strong

From the questionnaire survey, it can be seen that during the pandemic period, the teaching resources for online teaching in various colleges and universities were relatively sufficient, which could guarantee the basic learning requirements of students. During the pandemic, students often participated in online learning activities during the online learning process, which can ensure the smooth development of teaching work. However, in the online learning process of college students, compared with more sufficient online learning resources, only 17.64% of the students always actively complete online learning and actively participate in the live broadcast of the course, the download of course resources and online interaction. Their initiative is not particularly strong, even some students occasionally (6.34%) or never (1.37%) participate in online learning activities. This reflects under certain circumstances that in the process of online teaching, students' enthusiasm and initiative need to be fully mobilized, otherwise it will affect the teaching effect.

2.1.3 In the Process of Online Learning, There Is More Communication Between Students but Less Interaction and Communication with Teachers

The survey results show that during online learning, students are basically able to communicate and interact with other students. This is due to the fact that post-90s and post-00s college students who are "digital natives" can make full use of social media to communicate and learn with their classmates. In the process of online teaching, the communication and exchange between students and the teachers is much less than offline communication. One-third of the students (30.7%) never communicate and exchange with the teachers during online teaching.

Coronavirus Infection Pneumonia Epidemic on Doing a Good Job in the Organization and Management of Online Teaching in Regular Colleges and Universities During the Period of Epidemic Prevention and Control [EB/OL], http://www.gov.cn/zhengce/zhengceku/2020-02/05/content_5474733.htm

2.1.4 The Teaching Activities Are Carried out Smoothly, but the Teachers' Teaching Methods Are Relatively Simple

From the survey results, it can be seen that in the process of online teaching, each school has ensured the smooth development of online teaching activities, and teachers are also actively involved in the process of online education activities. However, in the process of online teaching, teachers are relatively rigid and lack the diversity of teaching methods.

2.1.5 Students Are Generally Satisfied with the Online Teaching Organized by the School, but their Satisfaction with the Effect of Participating in Online Learning Is Not High

The results of the questionnaire survey show that students are highly satisfied (80.7%) with the schools' current online teaching methods, and only a very small number (3.22%) are dissatisfied. Students are not very satisfied with their online learning during the pandemic. Only 9.47% of students said that they have all mastered all the learning content of online teaching.

2.2 The Current Situation of Online Teaching of College Teachers Against the Background of the Pandemic

In the survey of Online Teaching Status Survey (Teacher Edition), it is found that online teaching is an inevitable choice during the pandemic in colleges and universities. Online teaching also presents four characteristics:

2.2.1 There Are Many Choices of Teaching Methods, but the Platforms to Choose from Are Limited

The survey results show that the teaching methods of college teachers in the spring semester of 2020 include live teaching (42.64%), recorded teaching (15.59%), the teaching based on online teaching mainly, and supplemented by offline teaching (37.1%), and the teaching based on offline teaching mainly, and supplemented by online teaching (4.67%). The existence of these teaching methods is related to the pandemic situation in the area where the university is located, and is also closely related to whether the school supports students to return to school. Among them, colleges and universities which the students have not returned

to school mostly use live teaching, some teachers or some courses use recorded teaching, and colleges and universities which the teachers and students have returned to school in the later period of the pandemic carry out the form of a combination of online and offline teaching. The survey results show that in the process of online teaching platform selection, teachers who are the main educational body have little room to choose. Generally, colleges and universities make comprehensive selections based on actual conditions and software usage. Teachers are designated to use a fixed online teaching platform (77.42%), and some teachers choose an online teaching platform that is comfortable (8.6%) or that students like (9.41%). In the spring semester of 2020, college teachers selected a more appropriate online teaching method based on the basic situation of the region and the institution, which ensured the smooth progress of the spring semester and achieved "suspending classes without suspending teaching". However, in the process of online teaching, teachers' choices of teaching forms and use of teaching platforms are similar (the forms and platforms of the same institution are highly consistent). This convergence is conducive to students' proficiency in online learning technology, but it also brings learning "visual fatigue" in a sense. This phenomenon provides certain thinking for the development of online teaching in the future.

2.2.2 The Teaching Content Is Rich, but the Teaching Progress Is Relatively Slow

In the process of online teaching, the amount of lessons prepared by teachers has increased significantly (74.46%). In order to fully ensure the full development of online teaching activities, teachers have prepared a richer course content, including pre-class testing, in-class interaction, classroom sharing, and after-class review. At the same time, the courseware, audio-visual materials, and learning guidance can all be reflected in online teaching activities. Compared with the offline teaching model, the content is more complete and substantial. However, in the process of online teaching, teachers generally believe that the teaching progress is too slow (78.23%). The existence of this phenomenon is necessarily related to the inability of online teaching to achieve "face-to-face" communication.

2.2.3 The Teaching Knowledge Is Imparted Smoothly, but Communication Is Hindered

The survey results show that in the process of online teaching, teachers can use the online teaching platform to smoothly impart knowledge to students, which has the effect of "preaching and teaching". However, in the process of online teaching, the interaction between teachers and students is hindered, and the teaching effect of "solving puzzles" cannot be achieved. This requires in-depth interpretation in cause analysis.

2.2.4 Teaching Evaluation Focuses on Process Assessment, and the Result Assessment Is Difficult

In the process of education and teaching in the spring semester of 2020, the widespread development of online teaching has led teachers to generally choose procedural assessment in the selection of assessment methods. This will inevitably bring about profound changes in education and teaching models and assessment methods, especially theoretical courses. How to highlight the assessment of knowledge points and core concepts in the process assessment has become a major problem.

3. PROBLEMS IN THE ONLINE TEACHING SYSTEM OF HIGHER EDUCATION AGAINST THE BACKGROUND OF DEFEATING "PANDEMIC"

In the research process, it was found that the teaching tasks of the colleges and universities in the spring semester of 2020 were carried out smoothly. However, whether it was a survey of college students or teaching teachers, they all reflected certain problems in the online teaching process. In order to reveal these problems, this research team conducted in-depth interviews with individual teachers and students to understand the opinions of students and teachers on the problems in the online course evaluation process, which deeply reflected the basic problems existing in the current online teaching system.

3.1 There Are Many Online Education Platforms, but the Main Body of Education Is "Selected"

In the process of interviewing teachers, it is found that the currently widely used online teaching platforms include Tencent Classroom, DingTalk, WeChat Group, QQ, zoom, MOOC, Wisdom Tree, etc. These platforms have their own advantages in the online teaching process, but also certain shortcomings. In the interview, both teachers and students affirmed the advantages of the online teaching platform currently in use, and made complaints about their shortcomings. In order to prevent students from installing number of APPs on their computers or mobile phones while studying, schools generally make agreement on online teaching platforms. However, this kind of agreement is a typical "third-party agreement", whether it is a student who is a user or a teacher who uses it as a teaching method, and does not have too much say, which belongs to the type of "being selected". This has led to the two subjects that may be teaching in the process of use: teachers and students, showing a complex mood of "seeing each other and getting bored" on the online teaching platform, which affects the smooth implementation of online teaching.

3.2 Online Teaching Has Various Forms, but Is Limited by the Current Situation of the Pandemic Situation

From the results of in-depth interviews, the online teaching models currently selected by teachers mainly include online live broadcast by class teachers and recording, interaction, discussion, and selection of open resources on the teaching platforms. These online teaching models basically make full use of online high-quality teaching resources, and can make targeted supplements based on students' academic conditions and the characteristics of education and teaching. However, under the intensive complaints by teachers, during the period of pandemic, many courses in colleges and universities do not have readily available online resources. In this case, the teachers can only accept the result of "catching the duck on the shelf" and move on to the "net celebrity" by choosing live teaching or recording teaching videos and uploading course videos to teach.

3.3 Online Teaching Is Progressing Smoothly, but Process Control Is Difficult

From the online teaching process control method feedback from the teacher, there are generally pre-class sign-in, random questioning, question discussion, quiz, platform questionnaire, student screen recording, mic-connection interaction, requesting students to send learning experience from time to time, background data statistics, etc. Most methods are feasible and effective. However, from the online teaching situation feedback from students, they basically participated in the whole process of online teaching, which also objectively reflects the "cutting corners" in the teaching activities.

3.4 Online Teaching Resources Are Abundant, but the Teaching Effect Is Not Very Good

From the results of the questionnaire survey, it can be seen that students are relatively satisfied with the online course teaching offered by the schools during the pandemic period and gave high evaluations. Teachers have also spent a lot of effort in the online teaching process to ensure the content of online education. The richness of the online teaching resources has been guaranteed and the online teaching resources have been expanded, but teachers say they cannot monitor the students' learning status in the classroom and lack communication.

During the practice of online education during the pandemic, college teachers tried to choose the appropriate online education platform, construct multiple teaching content (course live broadcast, online teaching resources, video resources and other elements), active classroom interaction and effective course evaluation, to form a benign closed-loop online teaching system. However, the reality is that students' learning enthusiasm and learning effect are not ideal, and exploring the essential reasons for this phenomenon has become a problem that must be solved in online education system research.

4. "FOUR IN ONE" HIGHER EDUCATION ONLINE TEACHING SYSTEM IN THE POST-PANDEMIC ERA

Online teaching is not a new form, but the sudden outbreak of the epidemic has made online teaching a new normal. For online teaching to achieve good results, it is necessary to establish a "four-in-one"

online education and teaching closed loop, and to get through the "checkpoints" that plague all aspects of the online education system, in order to ensure the quality of online education and teaching.

4.1 The Educatees as the Main Body of Education and Educators: Reexamination and Redefinition

The core concept of online education is constructivism, which advocates the concept of "student-centered" education and teaching. The traditional classroom teaching is a "teacher-led" passive learning model. Therefore, the core of development of the higher education online teaching system is how to change the teaching concept.

4.1.1 Opportunity: Educatees as the "Digital Natives"³

At present, the main target of higher education is the post-90s and post-00s group. They are called "digital natives" and they show great enthusiasm for online platforms. How to use "Internet +" to improve their learning and education, use the network environment to effectively stimulate their thirst for knowledge and expression, and to shape a new learning ecosystem are issues that should be fully considered in current online education.

4.1.2 Redefinition: Educators who Adapt to Role Transformation

In the process of online teaching, the "online" technology of the educatees is higher than that of the educator, and the educatees can smoothly adapt to the online education environment. In this environment, teachers as educators should quickly change their roles⁴, from the traditional "preaching and teaching "evangelist" to the "puzzle-solver" of online teaching. The online education process acts as a navigation system for students (providing students with learning maps and telling students learning paths), students' database (providing students with reference materials and telling students what they can learn), students' "Baidu Know" (answering the perplexity in the study, exchanging learning feelings) and the "barometer" of

³ Duan Peng, Research and Judgement of Online Teaching Operation Mechanism in Colleges and Universities Under the Epidemic Emergency System [J]. China Higher Education, 2020 (5).

⁴ Zhu Chaocai, He Liangjing, Ma Jie, Research on Cultivation Strategies of Students' Online Autonomous Learning Ability During the Epidemic [J]. Journal of Tonghua Normal University, 2020(4).

students (evaluation of students' learning effects), It is necessary to highlight the "guidance and supervision" of students in the teaching process, and improve students' autonomous learning ability.

4.2 As the Carriers of Technology and the Platforms, Online Teaching Resources and Teaching Platforms Should Be Organically Unified

The pandemic has given various Internet companies an opportunity: to develop an education support system. Subsequently, DingTalk, Tencent Conference, WeChat Learning Group, etc., have joined the industry that assists online teaching, providing alternative platforms and educational resources for online teaching. However, the current online education platform has two extremes: the online education live broadcast function of the main educational resource sharing platform is poor, while the platform that can conduct online education live broadcast lacks high-quality online education curriculum resources. This dilemma brings difficulties to online education in colleges and universities. A major breakthrough point for online education in the future is to realize the organic combination of online teaching resources and teaching platforms, and to create an online education platform that integrates educational teaching resources and online education.

4.3 As an Online Education Process: All Links in The Online Teaching Process Should Be Connected Effectively

Under the traditional classroom model, teachers impart knowledge to students in a linear way, similar to the group communication model of "square speech", but in the process of online teaching, a single linear communication cannot realize the effective dissemination of knowledge. Only by constructing the process of knowledge dissemination as a closed-loop "organization dissemination" process can it be more effective. This requires effective connections between the various links of dissemination. Problems in any link will affect the teaching effect. In the teaching process, it is a necessity to highlight the effective connection and interaction of each link before class, course and after class to play a role of mutual support and coordination. (See "Table I")

Table 1. Effective connection of all links in the online teaching process

	Specific measures
Before class	Including chapter study guide, course related theory interpretation, bibliography, study guide, etc.
During class	A contextual learning environment should be created through the multiple functions of the online teaching platform, which effectively compensates for the lack of presence in the classroom, making online classroom communication and exchanges tend to be the "sense of presence" in face-to-face teaching in the classroom.
After class	Tracking the implementation of students' learning effects, promptly evaluating and guiding students' testing conditions, and establishing an information feedback mechanism for colleges and universities.

4.4 Feedback and Evaluation of Online Education: Construction of Multiple Evaluation and Evaluation System

In the past, the assessment and evaluation of classroom teaching in colleges and universities was mainly based on summative evaluation, which was carried out in the form of final exam. In the process of online teaching, more attention is paid to students' teaching participation, independent learning ability in all aspects of teaching, and timely feedback of teaching effectiveness. Therefore, post-evaluation is transformed into real-time dynamic evaluation.⁵ However, the procedural assessment has various forms and different indicators. According to the characteristics of course teaching, it is necessary to choose the appropriate online learning assessment and evaluation indicators, and adhere to the diversification of assessment standards and the principle of procedural assessment. At the beginning of the assessment, teachers should formulate specific assessment items, assessment standards, assessment subjects and incentive mechanisms.⁶ In order to achieve the effects of timely "error correction", timely feedback, and immediate incentives, the assessment results should be regularly calculated and announced.

5. CONCLUSION

Online education during the pandemic is not only a helpless choice, but also an opportunity for higher

⁵ Wang Guohua, Zhuo Zeming, Zhou Guanghui, Construction of Online Teaching Quality Monitoring and Evaluation System Under the Background of Big Data [J]. Journal of Huaibei Normal University: Philosophy and Social Sciences, 2020(6).

⁶ Bi Jiantao, Yu Xiuli, Yan Huijuan. Research on the Whole Process and Diversified Curriculum Assessment System Based on Ability [J]. Management Informatization in China, 2014(2)

education reform. During the "live broadcast" online teaching process of all colleges and universities during the pandemic, exploring the construction of an online teaching system, making full use of the advantages of online teaching, and promoting the reform of learning methods will be problems that college education must face in the post-pandemic era.

Management Informatization in China,2014(2)
(in Chinese)

AUTHORS' CONTRIBUTIONS

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