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## Online Education in China during the Covid-19 Pandemic in Light of Constructivism Learning Theory

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# Online Education in China during the Covid-19 Pandemic in Light of Constructivism Learning Theory

Bingyao Zhang <sup>a</sup> & Wei Chen <sup>a</sup>

**摘要** 在新冠肺炎爆发期间，在中国教育教育部的号召下中国国内所有学校暂缓到校上课，在线教育席卷全国。本研究旨在分析在此特殊时期，在构建主义学习理论为基础的在线教育在中国的运用情况。试图通过分析在线教育的利弊来预测在线教育未来的发展方向。

**关键词：**新冠肺炎、在线教育、构建主义学习理论

**Abstract**- During the Corona Virus Disease 2019 Pandemic, all the schools in China were suspended under the requirement from the Ministry of Education of China, and then the online education were spreading all over China. This research is aimed to analyze the utility of online education in China during this time-sensitive situation in light of constructivism learning theory, try to find out the pros and cons of online education and then estimate the development of online education in the future.

**Keywords:** covid-19 pandemic, online education, constructivism learning theory.

## I. INTRODUCTION: BACKGROUND INFORMATION

The outbreak of Corona Virus Disease 2019 (COVID-19) made China lockdown in 2020. In order to avoid the spreading of the virus, the Ministry of Education in China has postponed the opening day of 2020 spring semester for school in China from the late January. And the time when schools will open again remains unknown. During this extraordinary period, the ministry advocated the policy that "although school is suspended, teaching and studying should not be." In accordance with this requirement, schools from kindergartens to universities and even after school organizations have shifted the classroom from offline to online. Many schools have organized excellent teachers to record course videos and then distributed them to students. Some top universities, such as the Peking University and Tsinghua University have provided free high-quality courses for those who want to learn the courses on well-known domestic sharing platforms. The nationwide "new online semester" began in February 2020 with teachers using the record lecture videos and webcast to teach and students using digital devices to learn.

Within a few weeks, the Chinese government transformed printed textbooks and recorded videos for

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various subjects that could be accessed through the internet or television. Despite initial reluctance, many parents in China began to appreciate the new possibilities of online learning. During the pandemic, Alibaba's learning software, DingTalk, was downloaded by a staggering 1.1 billion users in China.

Recently, according to an online article (How do you rate online course? <sup>1</sup>), the "Guiding Opinions on Online Teaching Organization and Management of General Colleges and Universities during the Pandemic Prevention and Control Period" issued by the Ministry of Education, it has been clearly mentioned that the implementation plan of online teaching during pandemic prevention and control should be formulated immediately under the following four principles:

1. To improve teaching efficiency and ensure teaching quality.
2. To complete teaching tasks.
3. To ensure that online learning is of substantially equivalent quality to offline classroom teaching.
4. To formulate policies for mutual recognition and transformation of online course learning credits to ensure that students' academics are not affected by the pandemic.

This research is aimed to analyze the utility of online education in China during this sensitive period, and try to find out the pros and cons of the online education. As online education is gaining overwhelming popularity in the world and all over China at the beginning of 2020, this research will analyze its future development based on the comparison of the pros and cons of online education.

## II. ONLINE EDUCATION

The research of online education is from the perspective of constructivism learning theory. Constructivism learning theory advocates that knowledge is not acquired by teachers, but achieved through the process of learning in certain social and cultural background. Constructivism advocates learner-centered learning under the guidance of teachers. "Sense construction": this is the ultimate goal of the entire learning process. In the Online education, teachers use modern information-based teaching methods to help students actively explore and complete the construction of meaning, and help students to achieve a deeper understanding of the nature and laws of things reflected in the current learning content as well

as the internal connections between the things and other things.

a) *The definition of online education*

Online education is a new type of education method which combines network, multimedia, and multiple interactive methods for systematic teaching and interaction. It consists of computers and basic network facilities, teachers, teaching platforms, teaching content, and learners. It has a wide audience and supports fragmented learning.

According to the American 2000: an Education Strategy published by the United States Department of Education (1991)<sup>4</sup>, online education 1, refers to the process of providing education and related services through the Internet. 2, Online education provides learners with a new way to learn, enhances the feasibility of learning anytime and anywhere, thereby providing the possibility of lifelong learning; online education changes the role of the teacher and the relationship between teaching and learning. Therefor the essence of education is also changed; 3, online education can help to achieve certain educational goals, but it cannot completely replace traditional classroom teaching, nor will it replace school education.

Online education is different from the traditional school teaching model. Online education breaks through the limitation of time and space. What's more, it takes the advantages of the Internet flexibility, allowing users to take control of the learning progress autonomously, as well as arranging time to meet the users' personalized needs. Through sharing online teaching videos, online education can meet the growing needs of users for high-quality education and allow users to enjoy better and fairer education<sup>2</sup>.

b) *The development of online education in China*

The online teaching can be traced back to the beginning of this century. One of the Massive Open Online Courses (MOOCs) professors Wang said in an article that the Ministry of Education of China started the construction of quality courses around 2004. Then the Ministry of Education have selected nearly 5,000 national-level courses, and tens of thousands of provincial and school-level excellent courses among those quality courses in 2010.

Li wei jian and other scholars<sup>2</sup> mentioned in their article that, in recent years, with the continuous improving of network technology, China's online education has grown rapidly, and the number of people who take the online education has shown an increasing growing trend. In 2014, the number of online education users in China was only 50 million, and it has reached approximately 140 million by 2018. According to Ai Media Consulting data, the number of online education users in China is expected to reach 296 million in 2020.

In recent years, with the prosperity of online education, the education mode becomes diverse. The

forms of Online Education mode applied in China can be classified as the synchronous online teaching mode, asynchronous online teaching mode, collaborative learning mode based on learning community, precision teaching mode based on academic analysis tools, online flipped classroom teaching mode, autonomous learning mode based on subject tools, exercises based on questionnaire survey tools teaching mode, subject-inquiry teaching mode based on learning resource websites, scaffolding teaching mode based on cognitive tools, and interactive teaching mode based on the Internet.

Over the past three years has been marked by significant growth and innovation in the development of online education in China. One major development in the online education landscape in China has been the proliferation of MOOCs. These online courses that are open to anyone, free of charge, and can be accessed by learners from anywhere in the world. MOOCs have been embraced by both learners and educators in China, with top universities and educational institutions offering a wide range of courses and degree programs.

Another important trend in the development of online education in China has been the rise of online learning platforms, such as Tencent Classroom and DingTalk. These platforms provide a comprehensive suite of online learning tools, including virtual classrooms, live streaming lectures, and interactive learning materials, enabling learners to access high-quality education from anywhere with an internet connection.

In addition, online education in China has seen the emergence of new technologies and pedagogical approaches, such as adaptive learning and artificial intelligence. These technologies have the potential to personalize the learning experience for individual learners, providing targeted feedback and support based on their individual learning needs and preferences.

c) *Constructivism Learning Theory*

Constructivism is a learning theory that emphasizes the active construction of knowledge and understanding by learners. It posits that learners are not passive recipients of knowledge but actively engage in constructing their own understanding of the world around them through a process of meaning-making and sense-making.

Constructivism emphasizes the role of social interaction in learning, arguing that learning is a collaborative process where learners engage in dialogue, negotiation, and cooperation to construct meaning and understanding. In addition, constructivism stresses the importance of the learner's active participation in the learning process, encouraging learners to take ownership of their learning and engage in self-directed learning.

Constructivism has important implications for teaching and learning. It suggests that effective teaching should focus on creating learning environments that support active participation, collaboration, and reflection. Teachers should act as facilitators, guiding learners through the process of constructing meaning and providing opportunities for learners to engage in self-directed learning.

### III. THE PROS OF ONLINE EDUCATION: HOW THEY FULFILLED CONSTRUCTIVISM LEARNING THEORY

As a developing teaching method with great promising, online education attracts numerous educators and learners with its advantages, which can be explicit as follows:

#### a) Convenience

The internet brings convenience for online education to establish connections between people in anytime and anywhere. Also, it makes the transfer speed of knowledge faster as well. With the continuous improving of online education facilities and the maturity of technology, the speed of online education is gaining rapid growth while also provides easily access to all people. The fragmentation and multi-dimensional features make it possible for online education to achieve a full range of interconnections between learners and knowledge. Online education in China offers learners greater flexibility in terms of time and place, which allows them to take more control of their own learning. This aligns with the Constructivist theory that learners should be active participants in their own learning.

#### b) Sharing Feature

In traditional education, most educational resources are placed under the school environment which is not accessible to others. However, Peng huan bu and Song wei hu<sup>6</sup> indicated that in online education, most of the high-quality offline education resources can be spread globally through Internet technology, which facilitates access for learners. In traditional education, the teaching content is difficult to complete or update in time, while in online education the internet and learning platform can absorb large amounts of knowledge and information in a short time and achieve global education with its huge storage, which enable the quick update of the online education content and global sharing. The connection of resources can monitor the information in real time and reflect the latest knowledge achievements, and then incorporate these knowledge achievements into the teaching content. Therefore, educational resources are no longer simply used but shared online in real time, which make it easier for students to explore and complete the construction of meaning and achieve knowledge.

The sharing feature of online education is fulfilled the principles of Constructivism learning theory. Constructivism emphasizes the importance of collaboration and social interaction in learning, and the sharing feature of online education provides learners with opportunities to engage in these types of activities.

In online education, learners can share their knowledge, experiences, and perspectives with others through various online platforms. This allows them to learn from one another, and to build a deeper understanding of the subject matter they are studying. This aligns with the Constructivist idea that learners should be active participants in their own learning, and that learning should be contextual and situated in real-world experiences.

The sharing feature of online education also allows learners to engage in collaborative learning, where they work together to solve problems and complete projects. This aligns with the Constructivist idea that learning should be social and collaborative, and that learners should be active participants in the learning process.

Moreover, the sharing feature of online education also enables learners to receive feedback from others, which can help them improve their learning and deepen their understanding of the subject matter. This aligns with the Constructivist idea that learning should be an iterative process, where learners continuously refine and develop their understanding of the world around them.

#### c) Pluralism

In the traditional one-to-many class teaching system, teachers can only teach for some students' needs, but fail to find a way that cater to each learner. Choosing to study in traditional school education is a very important but difficult decision. Peng huan bu and Song wei hu brought out that because of time and space constraints, learners have neither the right nor the options to choose which lesson to learn or what teacher will teach. However, online education can break this boundary. There are no classroom management problems caused by one-to-many teaching system. Online education can provide learners with personalized learning solutions through system testing, data analysis, and troubleshooting. A learner's status is hardly interfered directly with other learners, as each student learn by himself/herself on the personal learning device. Choosing which lesson to learn and what teacher will teach is no longer a problem for students, so they can attain diversified learning opportunities. This kind of learning mode is the learner-centered learning.

The pluralism feature of online education is fulfilled the principles of constructivism learning theory. Constructivism emphasizes the importance of diverse experiences and perspectives in learning, and the



pluralism feature of online education provides learners with access to a wide range of resources, perspectives, and knowledge.

In online education, learners can access resources from a variety of sources, including different cultures, disciplines, and experts. This allows them to explore diverse perspectives and approaches to learning, and to develop a deeper understanding of the subject matter they are studying. This aligns with the Constructivist idea that learning should be contextual and situated in real-world experiences, and that diverse experiences and perspectives should be incorporated into the learning process.

The pluralism feature of online education also encourages learners to engage in critical thinking and reflection, as they consider different perspectives and evaluate the credibility and reliability of different sources of information. This aligns with the Constructivist idea that learning should be an active process, where learners engage in problem-solving and critical thinking to construct their own understanding of the world around them.

What's more, the pluralism feature of online education also enables learners to develop cultural competence and empathy, as they engage with different cultures, languages, and ways of thinking. This aligns with the Constructivist idea that learning should be holistic and should develop learners' social and emotional skills, as well as their cognitive skills.

#### d) Efficiency

All the advantages brought by the Internet will eventually integrate into the efficiency advantages of online education. Online education can transform the original "inefficient" learning into online "efficient" learning. Compared with traditional school education, online education is different in content, time and space. In terms of content, the omnipotent characteristic of the Internet has enabled any Internet resources such as text, sound, pictures, and videos to be used in teaching content, which is extremely attractive to learners of all ages. In terms of time, it is entirely based on the learner's convenience, which is more conducive for the learner to arrange their own learning time. In terms of space, learners do not need to go to a special learning place to take the lessons, they can have the class wherever they want without leaving their home, but just through a computer, a mobile phone, or a pad to achieve efficient learning<sup>8</sup>.

Constructivism believes that when students want to understand a complex problem, providing many examples or detailed solutions to them is not the best way. Students need some examples that contain a lot of topic-related information, then they have to filter this information until they construct their own knowledge system. The online education resources provided to students are always real, but not outdated textbooks.

Through the Internet, students can directly contact experts, databases, and the latest reports. The problem-solving methods proposed by students can be evaluated online. This evaluation method can prompt students to make their own efforts to obtain satisfactory answer, rather than simply completing the task. With all the pros of the online education mentioned above, and in light of Constructivism learning theory, online education can promote the improvement of students' problem-solving ability and thinking level.

### IV. THE CONS OF ONLINE EDUCATION: HOW THEY WEAKENED CONSTRUCTIVISM LEARNING THEORY

#### a) Network, software and hardware restrict the implementation of online education

During the COVID-19 pandemic, a rapidly growing market demand has driven the online education to the "fast lane." The data shows that since the Ministry of Education proposed "online education", the Central Video Joint Learning and Ersi Online School has launched free live courses, with an average of more than 2 million real-time class attendees per class. More than 20 provinces, autonomous regions, and municipalities in China have joined the Ding Talk "Class at Home" plan, which covers more than 20,000 primary and secondary schools. It demonstrates that about 12 million students will be taught by webcast on Ding Talk. More than 80 online education companies have "donated lessons" to provide free courses for elementary and middle school students across the country<sup>9</sup>.

However, in actual operation, these "online educations" have also exposed some problems, which leads to heated public discussion.

First of all, the online teaching mode is obviously not as effective for many teachers and students as the offline mode. Unlike offline classes, teachers can only teach on the screen, and they cannot take effective interaction with students<sup>10</sup>. The students' actions can hardly be reported to the teachers in time, and that's why it is difficult for the teacher to grasp the progress of the teaching. This problem weaks teachers' ability to help students to construct knowledge<sup>11</sup>.

Secondly, network environment is the foundation for the online education, especially for live teaching, which bears with higher requirement on the environment. It can be said that the quality of the network directly determines the basis of online education. However, due to the different levels of economic development around China, the basic conditions of the network are far from equal with each other. It is difficult to apply online education to underdeveloped regions. Hu pan (2020) reported that in the first few days of the large-scale opening of online education, due to the surge in the number of online users, many regions have encountered "stuck" and

"freezes" during class, and some platform servers were also "failed". Especially for online live broadcast platforms, the occurrence of "stuck" remains frequent in the current network environment. The "stuck" is prone to cause discontinuities of teachers' teaching, which will affect the continuity of the entire classroom. On stable platforms, the occurrence of 'stuck' will not affect teaching process, while on unstable platforms, it often causes interruption of teaching, as well as weakens students' learning willingness. Constructivism learning theory emphasizes the interaction between people, while the "stuckness" of the internet cause trouble for students and teachers to interact.

The Global Times reported that "Some live steaming platforms were unable to handle large numbers of users at the same time and crashed. Guangdong-based platform Seewo apologized for its temporary crash on its Weibo on Monday as many live steam platforms including Seewo failed to offer stable services after 200 million users logged on, and the platform has never had such a large number of visitors."<sup>11</sup>

#### *b) Online education is a challenge for the teachers*

According to Constructivism learning theory, teachers should guide students to construct knowledge, however teachers' abilities to teach online are various, and the lack of capacity to handle the information technology restricts teachers' opportunity to guide students. The online education requires teachers to use the software on mobile phone or on computer to record videos or webcast and interact with students properly, which brings a great challenge and burden for many teachers. The new way to teach pops up too sudden for teachers to learn how to use the software and get accustomed to it. Teachers need additional expertise to conduct online education in the communication between teachers and students, as the use of teaching tools, and the evaluation of student learning effects in online teaching are different from traditional classrooms. Teachers need to be trained to grasp the online pedagogy, curriculum design, and how to evaluate students' learning conditions (Online teaching emergency manual). Teachers who are just about to design an online course generally based on the rough production outlines or fuzzy fragmented scripts. Although this is not a zero-based "improvisation", they are not fully prepared. Teachers with poor expression skills are prone to encounter varying degrees of pauses during recording.

Another challenge for teachers is that they cannot observe the students, so they fail to get the immediate response from the students. This fails to allow teachers to identify whether the students grasp and understand the knowledge in the learning process.

What's more, for some subjects, especially in medical, biological and physiological subjects, there are

many sensitive words which are restricted to be shown online. It is inevitable to talk about some words about organs or others in those classes; however, some courseware was blocked and even some teachers are restricted to log in.

#### *c) Online education is a burden for students and parents*

Constructivists believe that the key to success is the cooperation between all those who effectively participate in the educational environment. Unfortunately, the chances are less than 50% for students to meet a suitable teacher on an unfamiliar education platform. Many live broadcast platforms do not have a corresponding teacher management committee to monitor teachers' teaching quality, which is the main reason for the unsatisfaction on the teaching quality. And in some webcast classes, too frequent close-up switching of picture has also caused many problems such as too large teaching pictures with reduced clarity, or students may not understand the relationship between the displayed content and the rest of the screen. "A poll on Weibo on whether students would like to have the online courses showed about 386,000 respondents said "no", with only 99,000 respondents saying "yes". Those who said "no" said they had to do more homework than traditional schooling and were easily distracted by noise. Besides, online courses are bad for their eyesight and not fair for students in villages who have limited access to the internet", reported by the Global Times<sup>10</sup>.

In online education, some parents are the participate sometimes, especially for those lower grade students' parents. Online courses also bring a huge burden to the parents. For most of the primary school students' parents, they have to join various chat groups of different subjects, as the teachers assign homework in the parents' chatting group. In case of the students playing games or surfing on the internet instead of listening to the class, these parents have to accompany their children to take the online courses. What's more, the parents have to be tutors with the students' homework, mark the assignments and send them back to teachers. All of those have exhausted the parents, and also affected their participation to help their children to grasp knowledge.

## V. THE DEVELOPMENT OF ONLINE EDUCATION IN THE FUTURE: HOW IT CAN DEVELOP THE POTENTIAL OF CONSTRUCTIVISM LEARNING THEORY

During the pandemic, the advantages and disadvantages of online education triggered public discussion and thinking about the future development of this industry.



a) *Online education will be accepted by more people*

According to Peng Huan bu and Song Wei hu<sup>7</sup>, with the development of the STEAM education concept and a learning society, the emergence of mobile learning and the idea of learning is ubiquitous and has promoted the development of lifelong learning and the construction of a learning society. It has brought a whole new form of education that everyone can learn at anywhere and anytime. Online education provides technical support for lifelong learning, and the concept of lifelong learning continues to drive the online education forward and vice versa.

The purpose of education has shifted from focusing on the knowledge itself to the knowledge structure to satisfy the diverse needs and services of the learners. It is imperative that the focus of online education be developed. In the K12 education stage, due to the learners' irreversible growth, online education will attain huge popularity among the young people. Online education is undoubtedly the best choice for migrant workers who are lack of education and want to change their lives through education. General wage earners are more willing to choose online learning methods which fit their uncertain time, space and individual needs. Online education should also include home education, such as education for the elderly and infants. Driven by Internet technology, actions such as deep vertical development and the creation of sophisticated mature products have shown that the future of online education should continue to develop vertically<sup>6</sup>. Vertical development mainly refers to the deepening of educational content, that is, the diversified content cultivation according to different user requirements in a certain field or scenario. The vertical service model is aimed at learners at different levels and prepares the most suitable content and services for them in accordance with their various foundations and needs, thereby cultivating their user habits.

b) *Convergence and collaborative development of online education*

Online education is not the simple supplement to traditional education and Internet technology. It is the updating and deepening of traditional education methods through Internet technology, so that these two methods can develop in synergy. Peng Huan bu and Song Wei hu<sup>7</sup> talked that affected by the "synergy"  $1+1>2$ , online education should also be deeply integrated with other industries and developed in synergy. Online education should speed up the integration with the media so that it can provide personalized recommendations just like media headlines. Online education should also seek cooperation with enterprises to demonstrate their unique advantages. These two methods will cooperate with each other to achieve common development and resources sharing. Online education also needs to be

combined with traditional education. The advantage of traditional education is that teachers and students can interact at any time, while the pros of online education are the big data, personalized learning resource, and fragmentation. Online education and traditional education can achieve complementary advantages and coordinated development and then deriving a composite field industry. In recent years, cross-border integration has achieved all-round development. The cross-border development, cross-cultural integration, and cross-disciplinary integration of online education companies have promoted social synergy in the education industry. In the future, online education will have a new social scene, cross-border cooperation with multiple fields and perspectives, and establish a sound cooperative relationship of profound integration and coordinated development<sup>7</sup>.

c) *Interactive and intelligent development trends of online education*

Constructivism believes that teaching is not the transfer of knowledge, but the processing and transformation of knowledge. Teachers are not the presenters of knowledge, they should attach importance to students' own understanding of various phenomena, and guide students to enrich or adjust their own understanding. This requires exploring certain issues together with students, and communicating with each other in the process to understand each other's ideas. Individualization in online education can never be achieved in isolation. Education requires talents with teamwork and creativity. Individual learners, distributed in different time and space, bear with same learning needs can always form a common learning field through interaction, and eventually a learning community. This is a virtual learning team<sup>7</sup>. The interactivity of online education is essential for individuals. In addition, technologies such as chatbots have shown that potential "human" interactions in online education is beneficial for learning enhancement. At present, the immersive learning model attracts the public with its strong interactivity and interest learning methods. It can allow learners to learn directly or through a game, and let learners interact as much as possible, thereby improving learning efficiency. Artificial intelligence, such as voice interaction technology, enables people to communicate directly to software. It has transformed original machine learning to today's deep learning, which can simulate large-scale neural networks. In addition, the combination of virtual reality, augmented reality and real environment is continuously empowering online education<sup>7</sup>. What online education will achieve in the future is interactivity and intelligence. When sufficient data is available, intelligent recommendation, intelligent guidance, and intelligent assistance will come by naturally.

## VI. CONCLUSION

Online education is a new and independent industry generated under the rapid development of the Internet. In the future, online education under Internet thinking will inevitably be turned into a popular learning model around the world. At present, online education is still at the stage of continuous development, as the personalized network models have not been established, the artificial intelligence technology has not yet been perfected, the education system has not yet fully matured, and education resources are still uneven. But in the future, the changes and innovations brought by online education will continue to alter the meaning of education.

Online education provides a powerful fulcrum for the constructivist learning concept. Its interactivity, autonomy, and the characteristics of spanning time and space create conditions for students' subjective development. However online education is not a panacea, its vitality lies in the need for teachers and students to closely unite the virtual world with the real world, and the integration of independent spirit and cooperative spirit.

Although online education during the pandemic exposed some problems, it should be noted that online education is not a short-term emergency plan, and the development of online education will not stagnate due to these problems. In fact, before the outbreak, the market potential of online education has already been widely witnessed. According to CNNIC data, in 2020, the scale of online education users in China reached 342 million, a decrease of 81.25 million from March 2020, accounting for 34.6% of the overall internet population. The scale of mobile online education users was 341 million, a decrease of 79.5 million from March 2020, accounting for 34.6% of the mobile internet population. In the second half of the year, with the positive progress in epidemic prevention and control, primary, secondary, and high schools have resumed normal teaching order, and the scale of online education users has further declined. However, compared with before the epidemic (June 2019), it still increased by 109 million, and the industry development trend is good<sup>12</sup>.

In the first half of 2021, due to the stricter policies in the K12 market and the impact of the epidemic on the higher education market, such as study abroad programs, the overall market has cooled slightly, and the scale of online education users was 325 million, a year-on-year decrease of 55.67 million. However, overall, with the update of related technologies such as VR, AI, 5G, and the Internet of Things, and the gradual fragmentation of online education users' time, China's online penetration rate will gradually increase<sup>12</sup>.

Ai Media Consulting analysts believe that with the upgrading of consumption, the launch of the two-child policy, and the increasing awareness of parental

education in the post-80s generation, the demand for high-quality education has become more urgent. On the other hand, in recent years, with the increasing investment on Internet infrastructure in China, the capacity of broadband networks has been cultivated significantly. The advent of the 5G era has provided a solid foundation for various online services. It can be said that in the context of the Internet era, online education is destined to become an important trend in the future development of the education industry. It is worth noting that after the pandemic, the network foundation and hardware facilities will be improved, and online education is bound to experience homogeneous competition. Therefore, the quality of teaching will be the key to determine the competitiveness of online education companies.

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