Research on the Application of Online Education Based on COVID-19

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Abstract: Since the introduction of online education in China, after decades of development, its technology has been greatly improved, the market size has been expanded, and service quality has been improved. Online education brought a brand-new teaching mode, enabling students to study at home. Since the outbreak of COVID-19 in the end of 2019, the Chinese Ministry of Education required schools at all levels to carry out online education under the slogan "Suspended Class, Continue Learning". This hugely promote the development of the industry. Meanwhile, problems also exposed. How to regulate the online education industry for its healthy development is worth considering.

1. Introduction

Born in the 1980s, online education was first introduced to China in the 1990s. At the beginning, most of the online courses were carried out by distant education platforms. Later, educational institutions began to expand their online course business. Nowadays, many internet companies begin to expand their business in the online education industry. The online education industry achieved vigorous development in both China and the world over the past thirty years. Many scholars have analyzed the current situation of the industry and predicted the prospects of online education, thus providing guidance for the further development of online education.

Since the break of the COVID-19 pandemic in December 2020, the economy and people's livelihood have suffered lot. Schools are also temporarily closed on a large scale. To maintain the teaching work, the Chinese government has put forward the slogan of "Suspended Class, Continue Learning" to promote the development of the online education. Countries around the world have also launched policies to ensure the carrying out of online education.

Online education has brought a brand-new teaching model, providing students with more opportunities and time to learn. The online education industry now enjoys a prosperous prospect. However, there lacks unified standards and rules in the industry. Also, the pandemic has now promoted it but also brought challenges to it. Thus, online education should be improved to achieve healthy development.

The thesis will trace the history and the development of online education. Taking the background

of the COVID-19 pandemic, it will further analyze the advantages and disadvantages, and the opportunities and adversities of the industry. The thesis will provide guidance for the further development of the industry.

2. A Theoretical Review of Online Education

2.1. The Definition of Online Education

Online education, also called distant education, is a kind of teaching-and-learning process via internet [1]. It ensures various teaching activities by Internet, including the distribution of learning materials, the imparting of knowledge, and the interaction between teachers and students. It involves several ways of course delivering, including recorded videos, recorded audios and live streaming courses. With the access to the internet and electricity, it enables students to take courses outside traditional on-campus classrooms, thus saving the cost of class facilities and the time of commute.

2.2. The Development of Online Education in China

Online education was first introduced to China in the 1990s, and it started to develop gradually at the end of 1990s. The online education in China has basically gone through three periods: the rise of distant learning platforms, online courses launched by education institutions, and online education developed by internet enterprises.

In 2000, the of invention of three-part-separated screen courseware made it possible to use multimedia for online education. In the same year, the Ministry of Education of China launched the first pilot project of modern distant education in 68 colleges and universities. This marked the beginning of online education in China. It was also in 2000 that the New Oriental Education, a leading educational institution in China, took the lead to offer online courses. Since then, other educational institutions followed its example.

Later, US developed three major MOOC platforms, and this greatly impacted the traditional online education mode in China. After 2012, many internet enterprises began to realize that online education ensures promising interest. Therefore, giant enterprises of the internet industry in China, such as Tecent, Baidu, NetEase and Sina, all began to invest in this industry. Online education then boomed in China, with thousands of new online institutions setting up in 2013 alone.

In recent years, the school competition has become increasingly fierce, forcing parents to send kids to educational institutions or buy them online courses. Meanwhile, the idea of lifelong learning has been widely accepted. Therefore, the demand of online education industry is huge. Besides, thanks to the 4G technology, it is now possible for students to watch live streaming courses smoothly. All these are positive factors contributing to the prosperity of online education.

Currently, due to the COVID-19 pandemic, on-campus education is suspended. As a result, schools are required to carry out online courses to ensure regular teaching activities. This has brought both challenges and opportunities to the online education industry.

3. The Advantages and Setbacks of Online Education

3.1. Advantages of Online Education

First, the biggest advantage is to break through the limitations of time and space, and to expand the number of participants. To take offline courses, students and teachers have to spend time on commute, with is saved by online courses. Besides, many courses are recorded, so that students can choose whenever available to watch the videos. As for space, China has the world's largest 4G network,

covering more than 98% of the country's population, with 91.8% of all the households equipped with fixed broadband. Theoretically, all those having access to the Internet are able to take part in online education without going to schools or travelling to the universities. Moreover, online classrooms can ensure larger audience. It is even possibly to give a lecture to thousands of people, which is harder to realize offline.

Secondly, with various resources available online, hierarchical education is realized, which means that everyone can have their learning demand met online. To take the New Oriental Education, the first Chinese education institution to start the business of online education, as an example, till 2020, online curriculums offered by it include: English enlightenment courses for kids, all subjects courses preparing for the National College Entrance Examination, trainings for postgraduate entrance examination, courses on IELTs and TOEFL for those willing to go abroad, second foreign language learning courses, etc. It provides services for almost all people aged from three to thirty years old. In addition to profit-oriented training institutions, there are also free courses provided on learning platforms developed by Internet companies. Platforms like "NetEase Open Class" and "Superstar Online Learning Link" offer audience courses given by professors from worldwide renowned universities. Users could choose whatever they are willing to learn with free of charge. Therefore, as long as users have a desire or demand of learning, they can find the most suitable resources online.

Thirdly, different from the tradition teach mode of "teachers guiding the students", online education grants the autonomy to students so that they can decide their own learning pace. Before buying a course, many online learning platforms or educational institutions provide self-tests for users, so that users can clearly figure out what they know and what they do not. Thus, they can choose course best suiting them. Moreover, except for live lectures that cannot be played back, almost courses provide playback services. As for those unreviewable ones, one can also use the recording function of computers or phones to record the lesson. Therefore, students can play back the video for many times until they truly absorb the knowledge, or they can skip some parts if they have already mastered the knowledge. In addition, students attending courses offered by education institutions and schools during the COVID-19 period will be added to WeChat groups or QQ groups, in which a teacher will be assigned for management. Whenever students raise questions in the group, the teachers will answer in time. In this way, each student can follow his own pace of learning.

3.2. Setbacks of Online Education

First of all, currently, the online education industry in China lack unified standards, and the quality of the educational resources varies. According to incomplete statistics, till 2019, the overall distribution of the online education industry in China is highly fragmented, and the total operating income of online education is less than 2% of the total education income. In developed countries such as UK, US and Japan, education institutions are under the administration of a quality certification body of the government to ensure their quality. However, there is no such department in China. Nor is there a standard to test students' learning outcomes. All these have made it rather subjective for one to judge the quality of online education.

Secondly, the functions of online education products need further improvements. Taking Zoom and Tencent Conference as examples, both of which are leading products for living broadcasting services, each platform has its own strength and setbacks. For example, the screen sharing function provided by Zoom is stable and smooth, not easily affected by network speed. However, Zoom only supports cloud classrooms with less than 100 people, so it is not suitable for large-scale courses. Whereas, Tencent Conference can afford up to 300 participants making voice call simultaneously. However, its screen sharing function is not as stable and smooth, especially not suitable for playing

slideshows and videos. Generally, at presents there is not an online teaching product with comprehensive functions and perfect stability. Therefore, in online courses, time is often wasted on debugging equipment.

Thirdly, the strong momentum of online education gives many platforms and institutions a glimpse of huge profits, so some of them try to compete by unfair means to seize market share, thus causing a vicious competition in the market. For example, some platforms send unqualified frees courses or sell them at an unreasonably low price to attract consumers. Once these courses occupy the market, those platforms providing quality services fail to survive, thus ruining the online education industry.

Fourthly, offline education ensures students to make group discussions and cooperate with others to cultivate their social and communication skills. In contrast, online education deprives such opportunities, so in this sense, it is not conducive to the development of students. Therefore, how to develop both physical and mental health of students through online education is a problem for serious consideration.

4. Online Education and Flipped Classroom

4.1. What is Flipped Classroom

Flipped classroom, or inverted classroom, was first introduced in the 1990s by Maureen J. Lage and Glenn J. Platt of the University of Miami in the United States. It is a new instructional strategy. [2] A flipped course mainly consists of three parts [3]. The first is before-class preparation. Instead of imparting knowledge in class, the teacher assigns students preview tasks to learn theoretical knowledges before class, so that they can master most of the basic knowledge points and get prepared for the in-class teaching. The second part is in-class interaction. Students bring their questions to the class, and the teacher offers them answers and guidance. Then the teacher assigns exercises to see whether students can apply the knowledge they have learned to practice, and adjusts the teaching plan according to the students' academic performance. The third part is after-class review. Based on students' performance in class, they can decide their own pace of reviewing or studying. The teacher helps guide the students and supervise their learning progress. In a flipped classroom, teachers are no longer the superintendent but the guide of the students. Students change from passive knowledge recipients to active learners.

In 2012, the concept was first introduced to China, inspiring many scholars to put it into practice. They conducted in-depth research on the theory and also published many papers based on the practical results. In recent years, the rapid development of the internet has brought tremendous conveniences, such as providing abundant learning resources and ensuring good interaction. Therefore, many teachers think of using the internet to share teaching materials with students, so that they can preview the knowledge points before class, thus increasing the teaching efficiency. Based on that idea, they have carried out contain experiments of combining the Internet with education. Thus, the flipped classroom appears in China.

4.2. Online Education Combined with Flipped Classroom

In recent years, online education has developed rapidly. In the spring of 2020, due to the outbreak of the COVID-19, most schools in China started online teaching. Unlike training institutions whose aim is mainly imparting knowledge points, the aim of school education, especially college education, is to cultivate student' abilities. As a result, a combination of flipped classroom and online education has emerged. The teachers arrange preview work for the students before class, answer students'

questions and assign exercises to students in class. After the class, students summarize what they have learnt and evaluate their learning results, and then start the second round of learning. In this way, the one-lesson-per-week course is divided to various time periods throughout the whole week. Also, the Internet enable students and teachers to communicate in time, thus improving the learning and teaching efficiency.

4.3.　Comparison of Different Teaching Modes

In traditional offline class, teachers impart theoretical knowledge during the class time, while students listen to the teachers, take notes, and answer teachers' questions. The teachers assign homework after class and students finish it and hand it to the teacher for correction. The teachers will then analyze the homework in the next class. Therefore, in a traditional offline course, the interaction between teachers and students is not that much. The teachers act as the leader of the class while the students are passive learners.

In the traditional online education, the process of the teaching is basically the same as offline class. However, since online teaching allows no opportunities for face-to-face communication between students and teachers, the in-class interaction is much lesser. Especially after the class, there is almost no interaction. Therefore, in traditional online classrooms, the relationship between students and teachers is remoter, and the time students spend on studying is lesser.

As for the combination of flipped classroom and offline education, students learn theoretical knowledge before class and teachers respond to students' doubts in class. Students also consolidate their learning of knowledge after class. This lengthens the learning process and allows students more chances to apply knowledge into use. Also, more interactions are ensured.

As for the combination of flipped classroom and online education, both students and teachers make full use of the time before and after the class. Students independently study the knowledge points before class and take the lead to discuss or ask questions in class. Teachers act as listeners and guides to response to the students' needs. After class, teachers will arrange the next round of learning tasks based on students' feedback in class. At the same time, teachers and students can communicate in real time through the internet. This ensures an effective and efficient learning process and much interaction between teachers and students. [4]

5.　Online Education During the COVID-19 Pandemic

5.1.　Background

At the end of 2019, cases of COVID-19 were discovered in Wuhan, China. Later, the virus gradually spread throughout China. In January 2020, cases of COVID-19 were also discovered outside China and the virus gradually spread throughout the whole word. Till June 19, 2020, there are nearly 8.4 million people diagnosed with COVID-19, with a death toll of over 450,000.

Due to the severe pandemic, many social activities were forced to cancel. Till April 18, 2020, schools in 188 countries have closed [5]. Since the pandemic broke out in China, China took measures at the earliest to ensure the study of the students. On January 29, 2020, the person in charge of the Ministry of Education of China put forward the slogan of "Suspended Class, Continue Learning". On February 12, 2020, the Ministry of Education, and the Ministry of Industry and Information Technology jointly issued the "Notice on work arrangements for 'Suspended Class, Continue learning'. The notice required schools at all levels to ensure the teaching work with various online teaching resources.

Also, when the pandemic broke out in other countries, they all carried out various online courses

to ensure teaching work.

5.2. The Situation of Online Education During the COVID-19

In China, till April 3, 2020, there are in all 1,454 colleges and universities launched courses online, with more than 950 thousand teachers offering 942 courses. Students taking online courses reached 1.18 billion person times. Till May 11, there are in all 2.073 billion visitors visiting the national primary and middle school network cloud platform, with 1.711 billion person-time. At the end of April 2020, thanks to the effective prevention and containing work done by the Chinese government, the spread of COVID-19 was effectively controlled in China. In many provinces, students were able to go back schools and to receive face-to-face education. Also, there are some schools chose to keep on online teaching, considering that their school environment and medical equipment did not meet the standard of the prevention work.

In short, the nationwide online education has greatly promoted the development of China's online education industry, and also brought important inspirations for its further improvement.

In other countries, online education was also actively carried out. The education system of the United States has a long history and is well-developed. Many American colleges and universities have already established online teaching systems in the past years, so they can carry out online teaching as usual during the pandemic. In Germany, the government allocated 100 million euros to upgrade the digital teaching system. All states also committed to upgrading school facilities and to developing new products, in order to ensure the quality of online education. The government of South Korea also greatly supported online education. The Korean Ministry of Education launched a national wide online platform, which supported various functions including sharing teaching resources, roll calling and teaching evaluation. The platform ensures the efficiency of students' learning.

Besides the countries mentioned above, other countries also carried out online education on the basis of their own education systems, economic strength and the pandemic situation. In short, thanks to online education students around the world could still obtain knowledge as before.

5.3. Opportunities Brought by the Pandemic to Online Education

First, the number of participants in online education increased significantly. According to recent data, in China, there are 282 million students in schools at all levels. Due to the outbreak of COVID-19, all these students need to study online. As a result, the number of participants boomed. According to statistics, as for the "Homework Help" online teaching app, there were more than 20 million people signing up for its live broadcast courses [6]. Such huge numbers are unprecedented.

Secondly, the COVID-19 pandemic promoted online education to be applied in formal school education. In the past, online education was often carried out by institutions as supplements to school education. Students falling behind in class or willing to learn ahead of others would take online courses. Today, formal school education is carried out online. With experience learned these days, later, schools at all levels can further integrate online and offline education to create a new teaching model.

Thirdly, the pandemic pushed online education platforms to improve and to be more diversified. In the past, online education carried out by educational institutions mainly focused on imparting knowledge points though recorded courses. They neglected interactions with students. Nowadays, various forms of courses are taught online. Some need frequent interaction, and others may need demonstrations by teachers. In order to meet various demands, online education platforms have to improve their functions, such as audio playback, video playback, screen sharing and real-time

interactions, so as to achieve better teaching results.

Fourthly, the online education market expanded greatly during the pandemic. Many enterprises have flooded into this market to seize the profit given by online education. It is estimated that by the end of 2020, the online education users in China will reach nearly 300 million, and the market size will reach about 450 billion yuan.

5.4. Challenges Brought by COVID-19 to Online Education

First of all, online education depends highly on facilities. The economic development is unbalance in different regions in China, some poorer areas cannot afford quality facilities for online education. In some of the deeply poor regions in western China, families may not be able to afford computers because of poor Internet access, making online education less accessible than in developed regions. For example, some children of herders in northwest China need to keep wandering during online courses, searching for network.

Secondly, since nowadays most students study at home, they have to take care of their own study. In the past, students spent most time at school learning basic knowledge under the supervision of teachers. Online education was only a supplementary for school education. In contrast, students now sit in front of the computer screen at home, without teachers' supervision. It is easier for them to be distracted, and if so, they may fall behind in learning basic knowledge, which is a serious problem for them.

In addition, online education needs more home-school cooperation. Previously, in school, teachers took the responsibility of managing the students. However, nowadays, courses are carried out online. Even if teachers are willing to manage students, it is hard to do so. This lay much more importance on family education. Parents and teachers have to further consider how to check students' learning outcome and how to cultivate students' ability of self-controlling.

In short, the pandemic has stimulated stimulation the online education industry. In the future, it will continue to flourish. How to seize opportunities and face challenges is still a question that every participants of online education, either schools or enterprises or students, needs to consider.

6. Implication

Based on the development of the online education industry and the impact of COVID-19 to the industry, we can draw the following conclusions.

First, the industry needs unified standards and improved laws and rules. Although today's online education is developing rapidly, many enterprises are carrying out unqualified courses in the name of "online education" to make profits. Such unqualified courses lead to a vicious competition in the industry and hinder its long-term development. Therefore, the government should set standards and laws to ensure that enterprises are qualified to carry out online education.

Second, the model of education can be diversified. Offline education and online education both have their own advantages and disadvantages. The former meets the needs of teacher-student interaction and the latter saves time and money. Schools or educational institutions can combine the two with each other to meet various ness. Besides, since various courses are now carried out online, the demand is diversified. Online education platforms have to be more multifunctional to meet different needs including, teacher-student interaction, demonstrations, or student practices.

Finally, for middle and primary schools carrying out online education, the schools and parents have to communicate and cooperate with each other better. Before, in offline school education, teachers played the main role of guidance and supervision. Nowadays, with the vigorous development of online education, teachers have fewer chances and time to interact with students.

Thus, part of the responsibility lay on parents. They have the duty to cultivate children to take care of their own study.

In short, online education is not only a profit-making business, but is related to the growth of the younger generation. It needs to be supervised and managed to develop in a positive way.

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