



Research on the Development of Digital Online Education in Colleges and Universities During the Period of COVID-19

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Abstract. Digital online education makes up for the shortcomings of traditional education. In the face of the impact of COVID-19 (Corona Virus Disease 2019), digital online education can better ensure the continuity of students' learning and evaluation. At present, the sharing of digital resources is the top priorities of digital online education, and there are still some problems to be solved. In the context of COVID-19, this paper analyzes the significance and development status of digital online education in colleges and universities, explores its sharing mechanism to improve the sharing and utilization of online resources, and puts forward corresponding countermeasures for promoting the construction and development of high-quality video open courses. It is of great significance to promote the modernization of higher education.

Keywords: COVID-19 · Digital Online education · A mechanism of sharing

1 Introduction

From the nature of education, digital online education is an important supplement to traditional education in terms of effect retention. As shown in Fig. 1, In 1946, American audio-visual educator Dell put forward the "Tower of Experience" theory, which divided the learned experience into three levels: Abstract experience, observation experience, and experience of doing, the lower-level experience are often much more efficient than the upper-level retention. In addition to abstract experience, digital online education can also obtain intuitive observation experience through video images and other methods [1]. This kind of experience is easier to be remembered and retained by students, which greatly improves the efficiency of learning, breaks through the limitation of only abstract experience in traditional teaching, and makes up for the deficiencies in traditional teaching. It can be seen that digital online education has great potential in future higher education. Broad development prospects.

From the background of the times, digital online education is an emergency education model in the post-epidemic era. With the spread of the new crown pneumonia in the world, it has caused a great impact on the flow of people and the on-site class of students,

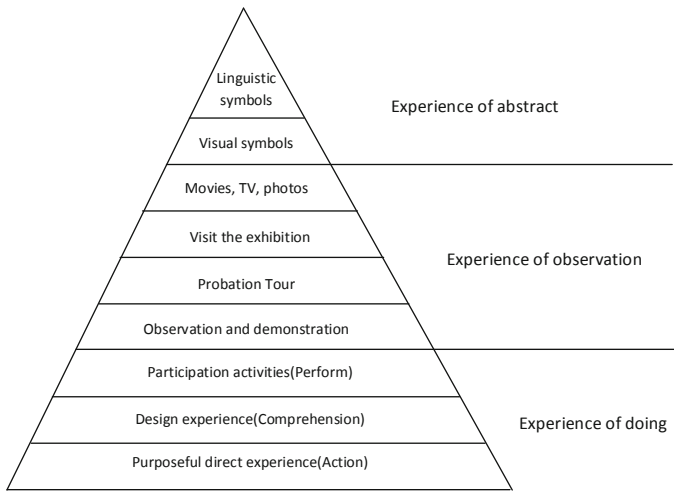


Fig. 1. Tower of Experience [Owner-draw]

Table 1. OEDC research framework

| method | content |
|---------------------------------|--|
| Most urgent and priority issues | Ensure students’ academic cohesion |
| | Ensure the integrity and sustainability of student learning evaluation |
| | Ensure food supply for students |
| | Ensuring the health of students |
| | Provide professional support to teachers |
| | Ensure the physical and mental health of Teachers |
| Response and response | What teaching resources are available to support students to continue their studies at home during school suspension |
| | What resources can be provided to teachers to support their ability improvement during the epidemic impact period |
| | What are the positive or unexpected impacts of the epidemic on Education |

According to United Nations statistics, as of April 2020, 188 countries around the world have stopped classes, and the education of hundreds of millions of students has been seriously affected [2]. In this context, the Organization for Economic Co-operation and Development has conducted research on a global scale. A total of 330 representatives from various countries participated in the survey [3]. The research framework is shown in Table 1. It can be seen that the key is to understand the current real needs and actions that can be taken in the education system of each country. Through this investigation, it

can be seen that ensuring the integrity and coherence of students' academic evaluation in the context of COVID-19 is the current education system. The priority of the demand in the school, and what digital online teaching resources are available during the school closure period have become the focus of responding to this demand. Therefore, the development of large-scale digital online education has become an important measure for the reform of education systems in various countries under the current COVID-19 background.

2 The Outbreak of the New Crown Pneumonia Has Greatly Promoted the Digital Online Reform of Traditional Education

In 2013, Chen Jining, President of Tsinghua University, pointed out at the large-scale online education forum conference that the revolution of higher education is accompanied by the expansion of university functions. Online education is a revolution in which the realization of university functions has undergone profound changes. Triggering a fundamental change in the traditional form of university learning, changes in the mode of knowledge imparting, the way students learn, and the form of teaching will inevitably lead to a comprehensive update and adjustment of educational concepts and educational systems [4]. But at the same time, this is also a double-edged sword. While the diversity of education, diversity of learning, and freedom of study develop in an all-round way, students' choice of cultural diversity and learning may be challenged in an all-round way. Therefore, it can be seen that digital online education has promoted the reform of the development model of universities and colleges, and the emergence of MOOC, a subversive innovative model of higher education, has broken the previous teaching model, allowing students to learn what they need by themselves through the Internet. Professional skills, greatly improve the efficiency of education and promote the speed of knowledge dissemination [5].

Combined with the OECD's research, we can see the specific measures taken by governments and universities and their support for digital online education during COVID-19. The survey results show that relevant government departments in many countries, including China, have formulated online education in the context of COVID-19. Strategies and specific implementation plans for educational development. For Chinese universities, digital online education is in the stage of active exploration and rapid development [6]. In the report of the 18th National Congress of the Communist Party of China, 19 expressions mention information, informatization, information network, information technology, information security, and other related terms, which shows that the state attaches great importance to the current situation and future of informatization development. That is, videos of featured courses in domestic colleges and universities have begun to be published online. At the same time, Chinese colleges and universities show a great demand and concern for higher education teaching resources. Digital knowledge dissemination not only improves educational concepts and content, educators' roles, and management methods, but also guides the experience of new media, high-quality, and academically strong curriculum openness, to promote the rapid formation of the resource chain of colleges and universities. The outbreak of COVID-19 has also provided conditions for the rapid development of MOOCs. "MOOC learning platforms"

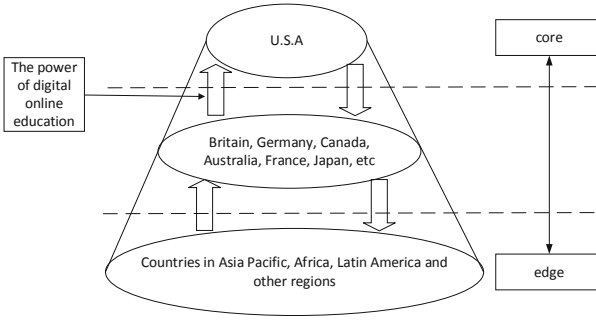


Fig. 2. World education development pattern [Owner-draw]

have begun to appear on the homepages of many universities, including a variety of video teaching courses, open courses, online communication platforms, and other incentive mechanisms, becoming a model of digital online education platforms in colleges and universities [7]. In addition, the different development ideas of various countries for digital online education will change the current development pattern of education in various countries, as shown in Fig. 2, The strength of the world’s higher education institutions is divided. The development of traditional education in various countries presents a three-tier structure of “center-periphery” [8]. Most of the most competitive first-tier colleges and universities are concentrated in the United States, and the second-tier is composed of major universities. The English department is composed of major countries in education, and the third echelon is composed of most non-English-speaking countries [9]. This article believes that under the current COVID-19 background, different educational reform measures taken by different countries in response to COVID-19 will change the current education pattern, and countries that attach importance to the development of digital online education will be on the rise, otherwise, their status will decline.

3 Problems Existing in the Sharing of Educational Resources

At present, under the background of COVID-19, the development of digital online education in various colleges and universities is inseparable from cooperation and resource sharing [10]. How establish a reasonable resource-sharing mechanism has become the top priority of the development of digital online education in various countries. The sharing of digital online educational resources means that within a certain area, educational institutions break the existing time and space boundaries and realize the shared use of resources, including environmental resources, educational data, documents, teaching instruments and equipment, media resources, etc. [11]. The sharing of digital educational resources can greatly improve teaching efficiency and promote the all-around development of talents. This paper first analyzes the problems existing in the sharing of digital online educational resources and then gives the corresponding countermeasures.

3.1 Lack of Digital Education Resource Sharing Platform Between Schools

A survey of colleges and universities shows that 100% of colleges and universities currently use campus networks for teaching, scientific research, and administrative work. Some colleges and universities have taken the lead in upgrading 10G campus networks. Most colleges and universities provide campus network access environments, and 93% of colleges and universities connect student dormitories to the campus network [12]. Therefore, hardware and technical conditions are no longer the main obstacles to digital educational resources. However, due to the lack of overall regulations, the construction of digital resources in colleges and universities is mostly independent and isolated. The resource platform built is only for the use of the school, and the scope of use is very limited. So far, there is no real inter-school digital education resource-sharing platform.

3.2 Insufficient Awareness of Digital Resource Sharing and Lack of Policy Guidance

Insufficient awareness of digital resource sharing and lack of policy guidance. In addition, the establishment of a digital resource-sharing platform requires practical and favorable policy support to continue. Due to the different situations and development histories of colleges and universities, it is difficult to have a unified construction model and application type. How solve the practical problems faced by each college is a difficult point in the construction process. The innovation of construction mode, mode, and mechanism is guarantee construction effectiveness, and the emphasis is on seeking truth while maintaining stability. Ultimately, the informatization construction must be rationally planned, measures should be put in place, and the effect is obvious.

4 Research on Incentive Mechanism of Digital Online Education Resource Sharing

Universities with digital educational resources share incomplete information, which leads to inaccurate judgments of shared benefits by both parties, which increases the difficulty of negotiation between the two parties [13]. Each university tends to protect its high-quality resources, resulting in a certain degree of unbelief that the shared benefits are positive. Some colleges and universities have weakened their enthusiasm for participating in sharing because of the relatively high cost of sharing. Moreover, there is a disadvantage to sharing, and colleges and universities are reluctant to take the first step of sharing to seek to share with other colleges and universities. The adjustment of the sharing of digital educational resources in colleges and universities cannot be accomplished solely by a certain method. The introduction of reasonable incentives can improve the efficiency and quality of sharing, and maximize the benefits of sharing subjects. This paper designs the overall structure of the incentive mechanism for digital online education, as shown in Fig. 3. The state and government use reasonable incentives to encourage the development of digital online education in colleges and universities, and the final development effect will be affected by subjective and objective factors, which will be fed back to relevant organizations such as the government and the state,

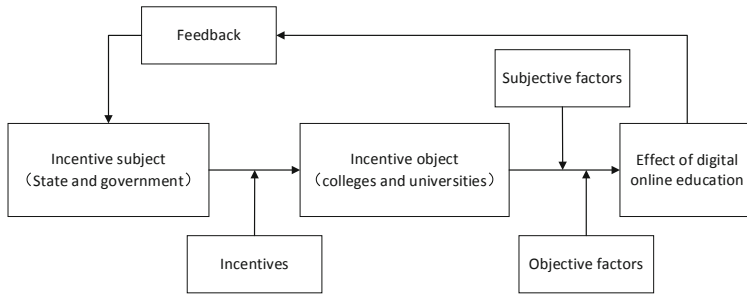


Fig. 3. Overall architecture diagram of the incentive mechanism [Owner-draw]

and the incentives will be continuously improved. And based on this continuous cycle, continuous development.

The design of the incentive mechanism for sharing digital educational resources should focus on the following:

The starting point of the incentive mechanism design is to meet the needs of the main body of digital educational resources in the process of sharing, involving various forms of behavioral incentives, thereby forming an inducement factor.

The direct purpose of the incentive mechanism is to mobilize the enthusiasm of the participants in the sharing. Its ultimate purpose is to realize the sharing among the subjects, to maximize the benefits of the students and teachers, and to guide the efforts of the participating subjects through an effective mechanism.

The core of the incentive mechanism is the distribution system and behavioral norms. The distribution system links the inducement factors with the overall efficiency of the sharer and the effort level of the participating individuals and redistributes the benefits of the participants in the sharing based on the principle of fairness. The code of conduct is to establish a reward and punishment system to connect the behavior of the sharing subject with the overall goal of the sharing system, and it is the regulation for the sharing behavior of the participating subjects.

The design efficiency criterion of the incentive mechanism is to make the operation of the incentive mechanism efficient. The efficiency criterion is to choose the one that achieves the best overall goal of the shared system and costs the least among multiple alternatives.

5 Conclusion

In the future, the digital online education model will have a greater impact and penetrate the teaching of colleges and universities, making greater contributions to the education of colleges and universities around the world. At this stage, we should strive to expand the advantages and achievements of digital online education, vigorously implement a digital online education sharing mechanism among colleges and universities, increase resource collaboration between colleges and universities, and promote the cultivation of higher talents. In addition, due to the important position of open video courses in digital online education, the development, management, and review of open video courses

should be strengthened to promote the development of online high-quality open video courses. Only in this way can the majority of students and teachers be able to acquire the knowledge and skills they need through self-study, and improve their learning efficiency.

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