

# Research and Practice of MOOC Based Innovative Education in Universities under the Background of “Internet Plus”

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**Abstract:** In this era of “Internet plus”, how to integrate and use existing cyber source to develop online education has become a problem that all schools and teachers have to face. MOOC, as the product of “Internet plus education”, has gradually manifested its advantages in online education. As an indispensable part of college education, innovation education is very suitable for the online education of MOOC because of its characteristics of large number of students, high demand for teachers' resources, and wide range of knowledge involved in the cultivation of innovation ability. This paper expounds from three aspects: research background, educational practice and educational effect. In the part of educational practice, it introduces in detail how to make teaching objectives, reconstruct teaching content, build multi-disciplinary background teaching team, and mix teaching based on MOOC. The teaching activities based on MOOC have improved the number of educated people, improved the enthusiasm of students, and achieved better teaching results. This provides a reference for universities to carry out innovative education in Universities under the background of “Internet plus” based on MOOC.

## 1. Introduction

According to the statistics of the 45th “statistical report on the development of Internet in China” of CNNIC, by March 2020, the number of Internet users in China was nine point zero four Billion, the Internet penetration rate has reached 64.5%. By the novel coronavirus pneumonia in early 2020, online teaching activities increased sharply, and the size of online education users increased at the end of 2018. 110.2%. The scale of online education users has reached four point two three Billion, the utilization rate of Internet users reached 46.8%, as shown in Figure 1 [1].



Fig.1 Scale and Utilization Rate of Online Education Users from December 2015 to March 2020

At the beginning of this year, due to the delay in the opening of primary and secondary schools across the country, 265 million students in schools generally turned to online courses, resulting in a blowout in user demand. The Ministry of Education organized and launched 22 online course platforms;

office software such as WeChat, Tencent conference and Zoom became the platform for live teaching. According to the data of teaching informatization and teaching method innovation teaching index Committee of colleges and universities, up to April 2020, the four basic forms of online teaching for college teachers include MOOC teaching, live teaching, video teaching and remote guidance, of which MOOC teaching accounts for 40%, as shown in Figure 2, MOOC Teaching has become the mainstream.

At the same time, innovation education in Colleges and universities has a large number of people, and the cultivation of innovation ability involves a wide range of knowledge fields, which has a high demand for teachers from quantity to quality<sup>[2]</sup>. It is urgent to change these situations through the online teaching form of MOOC.

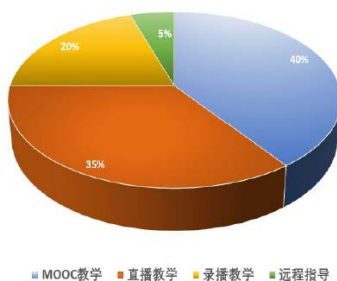


Fig.2 Four Basic Forms of Online Teaching

## 2. Innovation Education Practice in Colleges and Universities Based on MOOC

### (1). Set Learning Goals

As we all know, innovation ability can't be obtained by learning only one course. It needs constant practice and iteration in different professional courses. However, there are methods and processes for innovation. Students must learn and master these methods before they can innovate more efficiently and purposefully. Therefore, the MOOC course of "Innovative Design Thinking" can be set up to help students learn the methods and processes necessary for innovation. Specifically, the learning objectives of the course are as follows:

Goal A: Students can understand the basic concepts and common tools of innovative design thinking.

Goal B: Students can understand and master the basic principles of innovative design thinking.

Goal C: Students can skillfully use innovative design thinking related tools.

Goal D: Students are able to analyze innovation cases and come up with their own ideas.

Goal E: Students can achieve independent innovative design.

### (2) Reconstruction of Course Content

In the specific teaching process, according to the teaching objectives and the process of innovative design thinking, the teaching content is reconstructed and divided into eight modules. In the first session of the course, students will put forward their own creative seeds - the generation of creative seeds through their usual observation and thinking. Then, through the course learning, they will modify their own creative seeds, use the tools of innovative design thinking to build a creative prototype - Creative landing and iteration, and then through team cooperation to continuously improve, and finally achieve creative works and display - creative display. The whole process starts with the end and continues to iterate, as shown in Figure 3.



Fig.3 Reconstruction of Course Content

### (3) Building a multi-disciplinary teaching team

Innovation ability includes scientific thinking ability, understanding and communication ability, management ability and application analysis ability, so it is necessary to form a teaching team with relatively complex discipline background. The main members of this team gather together by interest, and their professional background covers software development, circuit electronics, Internet of things, communication network, human resource management, psychology, innovation and entrepreneurship, etc. In addition, Dr. Lu Bainian, chief architect of business innovation in Greater China of SAP company, was invited as teaching consultant. At the same time, a pool of teaching team members has been set up to bring together many other professional teachers, teachers of cooperative enterprises and some social people who are interested in it. When students encounter difficulties or questions in the process of realizing creativity, they can get targeted guidance from teachers in relevant fields.

### (4) Hybrid Teaching Based on MOOC

In order to achieve the teaching objectives more efficiently, the course adopts online and offline Hybrid Teaching Based on MOOC.

Before class: use online research platforms such as questionnaire network to release questionnaires, use diagnostic evaluation to understand students' interest in learning the course and their understanding of basic concepts; split and fragment knowledge points such as tools and processes of innovative design thinking into 60 small knowledge points, and record them into MOOC teaching videos in advance and publish them on the ZHIHUIISHU online network platform, so as to facilitate students' learning before class, Watch it over and over again. At the same time, in MOOC, formative evaluation and summative evaluation such as quiz, chapter test and final test are set to help teachers understand students' learning status in time, adjust teaching methods and progress in time, and strengthen students' mastery of knowledge through tests.

During the course: it mainly uses the interactive and experiential offline learning mode to match the online course content, for example, through Sherlock Holmes derivation activities, to help students flexibly use brainstorming and other thinking tools to spread innovative thinking; to provide students with colorful pens, LEGO toys, 3D printers and other rich equipment and materials to make prototypes, so that they can complete creative design through team cooperation; group Organize student group to report and reply, display creative works, etc.

After class: if the teacher finds that the students can't open their minds, or can't use the tools they have learned, he will invite the students to the office respectively according to the group, or directly conduct 1v1 individual tutoring through the online platform, to constantly inspire and encourage the students to put forward more creative and perfect solutions. In addition, the online teaching platform Tronclass is used to complete the arrangement and submission of online assignments, share and discuss online cases, and finally realize hybrid teaching through the combination of online and offline before, during and after class.

Among them, learning goal 1 and 2 (mainly including understanding and mastering the process and tools of innovative design thinking) are mainly completed through online MOOC learning. Learning

goal 3, 4 and 5 (to be able to use innovative design thinking tools to put forward creative ideas, complete creative design, etc.) are mainly achieved through offline interactive teaching.

### 3. The Effect of Innovation Education in Colleges and Universities Based on MOOC

#### (1) Using MOOC Teaching to Improve the Number of Educated People

It can be seen from the operation data “Innovative Design Thinking” course of wisdom tree MOOC platform from October 2019 to may 2020 that in the past half a year, 4027 people from 22 universities in China have taken this course, accumulating 10400 times of interaction. It has greatly increased the number of students taking courses.

#### (2) Using the MOOC + Online Teaching Platform Tronclass to Improve Students' Learning Enthusiasm

There are many advantages of MOOC course. From the proportion of the average viewing time of the course video (the proportion of the average viewing time of the video = the average viewing time of the video / the length of the video itself, as shown in Figure 4), it can be seen that the average viewing time of the video is basically more than 100%, indicating that the students have the behavior of repeatedly watching the video, and the MOOC course can be played back and reviewed at any time, which can effectively help Students take the initiative to learn.

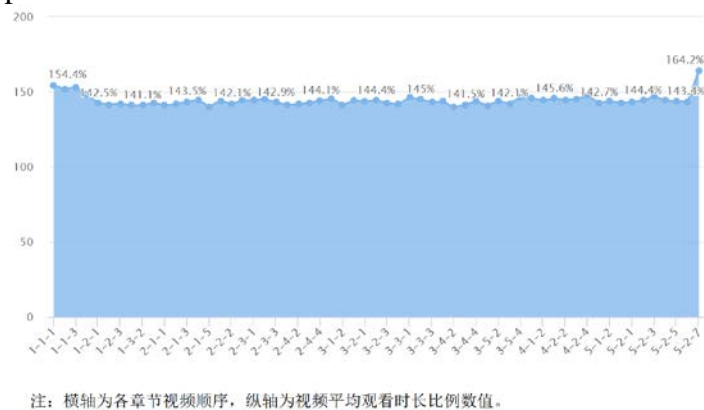


Fig.4 Proportion of Average Viewing Time of MOOC Course Video of “Innovative Design Thinking”

The Tronclass platform is an online teaching platform, on which teachers can publish learning reference materials, course assignment requirements, collection and correction of assignments, and students can share innovative ideas and after-school discussions with each other, as shown in Figure 5. It can be organically combined with MOOC to improve students' enthusiasm for learning, so as to achieve better teaching effect.



Fig.5 Overview of Tronclass Students' Learning Analysis

At the same time, MOOC course platform and Tronclass can monitor the learning progress of each student in the background, help teachers pay attention to the learning status in time, remind or help students, as shown in Figure 6 and Figure 7.



Fig.6 MOOC Platform Student Learning Progress Query

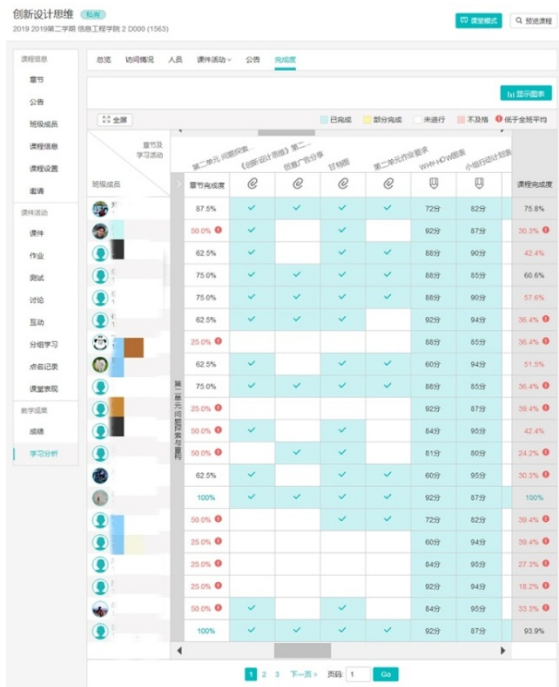


Fig 7 Student Learning Completion of Tronclass

### (3) Student learning effect

Through the mixed teaching based on MOOC, some changes have taken place in the students' thinking mode. They began to learn to think from the perspective of innovation, and their innovative thinking ability has been improved to a certain extent. At the same time, after class, teachers iterate the excellent works of students, organize and guide students to participate in various national and provincial innovation competitions, and have won 10 national awards and 21 provincial awards, achieving good learning results.

## 4. Conclusion

“Innovative Design Thinking” is not only a course, but also a way of thinking and thinking tools, so it has a very strong necessity and popularity. It can be used as a starting point for the integration of professional courses, and support students to carry out cross professional innovation and entrepreneurship activities so as to better carry out innovation education in Colleges and universities. At the same time, the use of MOOC teaching can effectively improve the popularity of innovative education, give full play to the role of different types of teachers, and better integrate various related knowledge, which is worthy of wider promotion.

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