

# Research on the Design of Hybrid Learning Mode based on the Concept of New Engineering

Nana Feng

Tianjin University of Technology and Education, Tianjin 300222, China

## Abstract

**"New engineering" is the upgrading and inheritance of "old engineering", which is the new concept, new mode, new quality, new system and new structure of engineering education. This research combines the connotation of new engineering and education concept, according to the actual needs of the current university teaching reform and development and the needs of the society for the new generation of information technology talents, designs a hybrid learning mode based on the new engineering concept, in order to provide reference for the application of new engineering construction and hybrid learning in Colleges and universities.**

## Keywords

**New engineering; Engineering education; Personnel training; Blended learning; Pattern design.**

## 1. Introduction

Since the emergence of new engineering, it has been an unprecedented pursuit, and has become a "cutting-edge hot word" in China's higher education. Each university has set up corresponding new engineering majors. The construction of new engineering has become the focus of Engineering Education in our country. How to strengthen the construction of new engineering has become the main task of each university. What is the first task of building new engineering? China's new engineering construction project was officially launched in 2017. In the second half of 2018, it entered an accelerated stage. The institutions of higher learning participating in the construction of new engineering are roughly divided into three types: innovative research-oriented, research application-oriented and application-oriented. The basis, path and effect of the reform of new engineering in these three types of institutions are different, but one should be the primary one, which is the training party of new engineering talents. In the revision of the plan, new engineering talents are required to be cross, practical and applied, which is quite different from the traditional talent training plan. Therefore, the construction of new engineering needs to revise the talent training plan first. [1] With the arrival of the new generation of information technology revolution, in order to change the current situation of talent shortage in the intelligent industry, what kind of teaching mode is needed in the construction of new engineering is also an urgent problem to be solved in Colleges and universities. In 2017, the Ministry of education also proposed the reform and innovation of teaching mode in Colleges and universities. New engineering requires that we should pay attention to the two main bodies of teachers and students in the teaching process, and learning should be based on the development of students and the learning center of students, so as to make the cultivation of students more personalized and modern, and focus on the cultivation of a new generation of information technology talents with innovation ability and adaptability. This study combines the concept and characteristics of new engineering teaching, and reconstructs the mode and teaching process of blended learning, in order to provide reference for the related theoretical and practical research of new engineering construction.

## 2. Overview of New Engineering

### 2.1. The Origin and Connotation of New Engineering

With the arrival of the fourth industrial revolution, the new generation of information technology industries, such as data science and big data technology, robotics engineering, Internet of things engineering, electronic information science and technology, smart grid information engineering and intelligent science and technology, are growing rapidly with a shortage of talents, which forces the higher engineering education in China to undergo corresponding reform and innovation. Under the support of new technologies such as Internet, Internet of things, big data, artificial intelligence and virtual reality, new engineering is supporting a series of major national development strategies, such as national innovation driven development, China made 2050 and Internet plus, in order to take the initiative to cope with the new round of technological revolution and related professional talents shortage, with new industries, new economy, new technologies, new formats and new technologies. The model is developed against the background. The concept of "new engineering" also indicates that the education and teaching reform in the field of Engineering Education in China is not only following the steps of western countries, but also embarking on a new road that can grasp the development trend of world economy, science and technology and adapt to China's national conditions.[2]

The connotation of new engineering is to cultivate diversified and innovative excellent engineering talents in the future, with morality as the guide, coping with changes and shaping the future as the construction concept, inheritance and innovation, intersection and integration, coordination and sharing as the main way.[3]

### 2.2. Development and Construction of New Engineering

Since the concept of "new engineering" was put forward in 2016, there has not been a precise definition, but everyone has reached a consensus on the basic category of "new engineering". In order to promote and strengthen the construction of new engineering, China has successively formed "trilogy of new engineering construction", namely "Fudan consensus", "Tianda action" and "Beijing Guide", and then released "Research on new engineering" successively. And practice, on promoting research and practice projects of new engineering, notice of the general office of the Ministry of education on announcing the first batch of research and practice projects of new engineering and action plan of artificial intelligence innovation in Colleges and universities. So that the construction of new engineering leads the reform of engineering education to become the consensus of colleges and universities, opens up a new path for the reform and development of engineering education, and points out the direction for the innovation and development of Engineering Education in the future, so as to better respond to the current environmental changes of Engineering Education in China.[4]

The construction of new engineering is mainly aimed at the specialties of emerging industries, with Internet and industrial intelligence as the core. The research and practice projects of new engineering are carried out around the five new namely new structure, new quality, new concept, new system and new mode, and are divided into three groups to carry out research and pilot, namely, the group of universities with advantages in engineering, the group of comprehensive universities and the group of local universities. Students need to learn from a wider range of professional cross cutting and integration.[5]

### **3. Advantages of New Engineering Construction Concept Applied to Blended Learning**

The innovation of new engineering reflects the new situation and demand, and emphasizes the new concept and action. [6] the development of new engineering must be based on the needs of the industry, have a strong goal orientation and problem orientation, understand the current situation of the industry development, find out the existing problems of the industry, and then cultivate engineering talents in line with the development of the times and the requirements of the industry. [7] through the research of new engineering construction and blended learning, the author found that the new engineering construction concept can be more effective to carry out blended learning, and the application of new engineering construction concept to blended learning has the following advantages:

#### **3.1. The Teaching Method is More in Line with the Requirements of the Internet Era and can Better Serve the Teaching of Colleges and Universities**

Big data, artificial intelligence, Internet of things, etc. will accelerate the deep integration of industry, and technological innovation will also promote the improvement of education system. The development of new technology is closely connected with the development of Internet. The construction of new engineering is generated in the rapid development of new technology, and its main purpose is to let learners adapt to the changes of current environment, and to the development of students and society Demand as the center, so that schools to cultivate innovative talents in line with the needs of social development, in the real implementation of teaching process guide students to think, cultivate students' innovative thinking.

#### **3.2. Emphasizing Student-Centered Learning is Beneficial to Improving the Effect of Blended Learning**

The construction of new engineering requires the implementation of the student-centered education concept, which emphasizes that the whole teaching process should pay attention to students' learning methods and contents, so that students are really at the center of the whole teaching activities. In the process of teaching activities, we should fully consider the differences of students' learning styles and learning methods. Teachers should adopt modern, information and intelligent teaching media, choose learning methods suitable for students development, and inspire and guide students to study actively and actively in the teaching process.

#### **3.3. The Innovation and Change of Teaching Idea is Helpful to the Cultivation of Students' Thinking Ability**

New engineering pays more attention to the cultivation of students thinking ability, including the cultivation of students learning ability, production ability, creativity, individual skills, interpersonal skills and innovation ability. The innovation and change of teaching concept is helpful to improve the learning efficiency of students, and can better cultivate the innovation and creativity of learners in the implementation of the whole teaching process.

### **4. Design of Hybrid Learning Mode based on New Engineering**

The hybrid learning mode from the perspective of new engineering is the integration and innovation of traditional classroom teaching mode and online learning mode. According to the characteristics and connotation of blended learning, the path thinking of the construction and development of new engineering and the connotation of new engineering, this study puts forward the design principles and designs the model under the guidance of the principles.

## 4.1. Design Principles

### 4.1.1. Take the Two Main Bodies of Teachers and Students as the Core

Through reading a large number of documents, the author found that the urgent problem to be solved in blended learning is how to support learners, how to make students become the main body in the learning process, and how to carry out the corresponding "personalized" teaching around students learning characteristics. Although scholars have been calling for the transformation of education and teaching from "Teacher centered" or "knowledge centered" to "student-centered" since the 1990s, in many countries, including the United States, this transformation has not really occurred effectively in teaching practice.[8] the hybrid learning mode from the perspective of new engineering makes the learning of learners not limited by time and space, and tries to take "students as the center" in teaching practice, so that learners can freely communicate and interact online and offline, support learners' personalized learning, and meet learners' learning needs, which can make learners change from passive recipients to active learners

### 4.1.2. The Goal is to Cultivate Students' Innovation Ability and Adaptability.

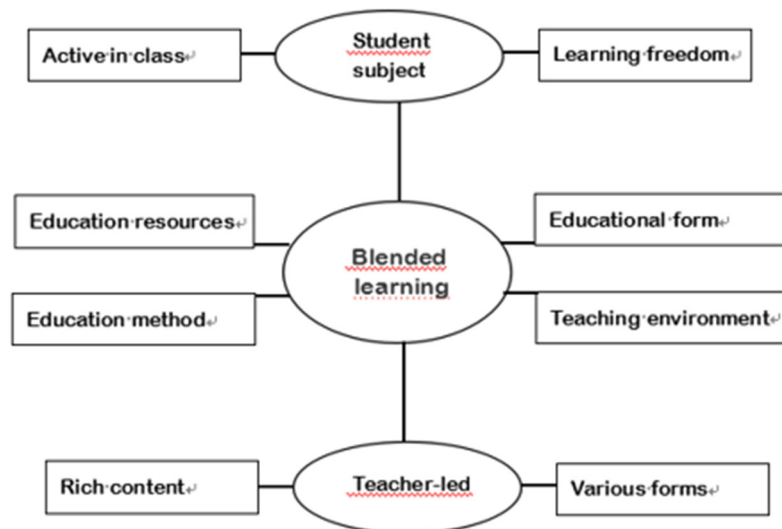
Cultivating talents to lead the future is the mission of first-class universities, and also the meaning of the construction of "double first-class universities" in Chinese universities. The report of the 19th National Congress of the Communist Party of China points out that "innovation is the first driving force for leading development and the strategic support for building a modern economic system". [9] the new concept of training talents in new engineering is to adhere to the "development of students as the center", stimulate students' learning ability, creativity and innovation ability to the maximum extent, and break the wall of cultivating innovative talents in Colleges and universities with new educational concept and teaching mode. The mixed learning mode from the perspective of new engineering follows the educational concept of new engineering. In the process of teaching design, it focuses on cultivating students' innovative thinking, which is beneficial to students' development.

### 4.1.3. To Stimulate Students' Interest in Learning

As we all know, blended learning is a kind of learning method combining online learning and face-to-face learning. Its idea and thought have a relatively complete system. However, with the rapid development of Internet+technology, various problems of blended learning have become increasingly prominent. "Internet+education" has given the connotation of blended learning in the new era. It is no longer a mixture of single online learning and face-to-face learning, but also a combination of learning effects and learning characteristics. The hybrid learning mode from the perspective of new engineering, the design of each teaching process should be in line with the requirements of the current environment, make good use of new technology, make teachers teaching methods meet students learning needs, stimulate students learning motivation and interest, and make technology serve teaching.

## 4.2. Learning Model Design

According to the above design principles, combined with the design of hybrid learning mode at home and abroad, this study designed the following hybrid learning mode in the perspective of new engineering. From the perspective of new engineering, blended learning is still a "leading subject" teaching with students as the main body and teachers as the main body. The learning form is no longer the mixture of single traditional learning and online learning, but the full use of the network, so that teaching resources, teaching forms, teaching environment and teaching methods are properly integrated, so that the teaching effect is optimized, as shown in Figure 1.



**Figure 1.** hybrid learning model from the perspective of new engineering

## 5. Summary

In the era of network intelligence, teaching methods must keep up with the trend of the times. In the process of teaching, new ideas should be incorporated into every link of teaching in time. It is very important to use new technology properly and carry out "personalized" teaching according to students' learning needs. From the perspective of new engineering, blended learning is no longer a single indoctrination of knowledge, but a personalized learning based on new ideas and new models to meet the development needs of students and cultivate their innovative thinking and adaptability.

## References

- [1] Niu Zhixin, "new engineering" to "pain point" or "turning point"?, [EB/OL]. [2019-03-13]. [http://sczg.china.com.cn/2019-03/13/content\\_40687505.html](http://sczg.china.com.cn/2019-03/13/content_40687505.html).
- [2] Wen Quanlin, Wang Zhaoan. On the improvement of students' engineering practice literacy under the background of "new engineering" development [J]. *Sichuan cement*, 2019(08):298.
- [3] Li Zhengliang, Liao Ruijin, Dong Lingyan. Construction of new engineering specialty: connotation, path and training mode [J]. *Higher engineering education research*, 2018(02):20-24+51.
- [4] Gu Peihua, new engineering and new paradigm: concept, framework and implementation path [J]. *Higher engineering education research*, 2017(06):1-13.
- [5] Wang Qinghuan, focusing on new engineering: where is the new? Foreign countries are all inclusive, and history returns to the original and opens a new chapter, [EB/OL]. [2017-04-03]. [http://www.sohu.com/a/131791508\\_498091](http://www.sohu.com/a/131791508_498091).
- [6] Liu Jizhen, Zhai Yajun, Xun Zhenfang. Connotation analysis of new engineering and construction of new engineering--Also on construction of new engineering in university with industry characteristics [J]. *Higher engineering education research*, 2019(03):21-28.
- [7] Lu Guodong, Li Tuoyu. Path thinking of new engineering construction and development [J]. *Higher engineering education research*, 2017(03):20-26.
- [8] Feng Xiaoying, Sun Yuwei, Cao Jieting. Blended learning in the Internet + era: learning theory and pedagogy foundation [J]. *distance education in China*, 2019(02):7-16+92.
- [9] Gao Song. Implementation of "new engineering plan", training of leading talents in engineering [J]. *Higher engineering education research*, 2019(04):19-25.