

# The Construction of Virtual Teaching and Research Section of Environmental Ecological Engineering

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**Abstract:** With the continuous development of information technology, the teaching management of colleges and universities has undergone great changes, giving rise to a new mode of improving the efficiency of teaching management. The construction practice of virtual teaching and research rooms has proven that they have the function of promoting cooperation and communication across schools and regions. It can improve the efficiency of utilizing teaching resources and innovate teaching and research forms to improve teaching quality. This paper takes the practical problems encountered in the construction of teaching and research section of application-oriented undergraduate colleges from these aspects: (1) constructing a highly simulated virtual experimental environment. (2) developing online courses in the field of environmental and ecological engineering, (3) establishing cooperative relationships with other universities, research institutions, and enterprises, (4) strengthening teacher training and further education to enhance their professional competence and teaching ability, (5) utilizing advanced simulation techniques and software tools. (6) organizing academic conferences, publishing papers, and showcasing projects. At the same time, teaching and research achievements can be transformed into practical applications through cooperation with enterprises, technology promotion, and other means, making contributions to social development and environmental protection.

**Keywords:** Construction; Virtual Teaching and Research Section; Environmental ecological engineering; Environmental; Ecological engineering

## 1. Introduction

Virtual teaching and research section since the

establishment of the construction mode of application-oriented undergraduate colleges [1], various colleges and universities are actively exploring and continuously improving their teaching management operation mode [2].

As an important unit of grassroots teaching management organization, in recent years, on the basis of the construction of traditional teaching and research section [3], the effective use of modern information technology and platform has pioneered the construction of virtual teaching and research section, and has achieved good results [4].

## 2. The Construction Status and Confusion of Teaching and Research Section of Application-Oriented Undergraduate Colleges

The professional teaching and research section of colleges and universities is a grassroots teaching organization under the direct leadership of schools, colleges (or departments), which undertakes the allocation, implementation, supervision, scientific research, project application, research discussion, teacher training, social service and other work. It can be seen that its job responsibilities cover the daily management and construction of various professional work plates and the overall work process of each link [5]. In the construction of application-oriented undergraduate colleges and universities, the construction of various professional teaching and research sections is the starting point of the construction [6], and its good operation mode and construction effect are of great significance to the construction of professional construction and colleges and universities (or departments). But there are still some problems in the actual construction and operation.

### 2.1 Insufficient Endogenous Motivation,

### **Formalization of Basic Activities**

Due to various reasons such as easy quantification, the teacher assessment mechanism of application-oriented undergraduate colleges and universities has been still focused on the scientific research ability and ignored the evaluation of teaching and research ability. In all kinds of assessment and evaluation at all levels and the formulation of some college policies, the scientific research indicators are strengthened and the teaching and research indicators are weakened. When implemented in the teaching and research section, there will be different degrees of "heavy scientific research and light teaching" atmosphere, the evaluation orientation tends to be utilitarian, and the teaching assessment indicators are softened, which eventually leads to the lack of enthusiasm of teachers in the teaching link, and then leads to the lack of endogenous motivation in the improvement of teaching and research level in the atmosphere of the teaching and research section. At the same time, the teaching and research activities carried out regularly are not clear in theme, rigid in form, seriously insufficient in research, lack of in-depth exchanges and discussions, and finally transform the important teaching and research meeting into a work arrangement meeting.

### **2.2 Single Subject, Out of Supply and Demand**

The vast majority of teachers believe that all kinds of teaching and research activities at all levels are conducive to improving the teaching level and comprehensive education quality of application-oriented undergraduate colleges and universities, and to improving their comprehensive professional quality. However, the actual results of the current teaching and research activities have not reached the above requirements. In the process of teaching and research activities, teachers often become the only subject of activities; there is a serious disconnect between supply and demand in the content of teaching and research. The training objectives of application-oriented undergraduate colleges and universities mainly focus on meeting the needs of local economic development and industry talents, with strong cross-border attributes; which requires the implementation of teaching and research

activities and the practical training of teachers for talent training, should have the participation of industry enterprises and actual operation experts. But the current situation is difficult to meet such requirements.

### **2.3 Teaching and Research Activities Deviate from the Teaching Object**

It is not established that any teaching and research activities should be carried out with the teaching object as the center. At present, there is a phenomenon of teachers "talking about themselves" in many teaching and research activities; When it comes to the analysis of teaching objects, it only simply explains the differences between students' source and enrollment, and ignores the scientific analysis of teaching objects to a considerable extent, resulting in learning activities "without a target", and teaching and research activities "ending without a disease".

### **2.4 The Guarantee Mechanism is not Perfect, and the Operation is not Smooth**

The construction of teaching and research sections is not only related to the guarantee of professional teaching level and teaching and research quality of colleges and universities, but also a platform for training teachers. The relevant guarantee mechanism of some colleges and universities is incomplete or empty [7]. In the actual operation, the responsibilities of various functional departments are not clear, the process is not clear, the input is not sufficient, and the constraints are not in place, leading to the operation of teaching and research sections is only "idling", and it is difficult to play a systematic role.

### **3. The Connotation and Characteristics of Virtual Teaching and Research Sections**

How to effectively improve the talent training level and comprehensive quality of application-oriented undergraduate colleges and universities is the ultimate goal of the professional construction work of application-oriented undergraduate colleges and universities, and it is also a big problem [8]. With the continuous development of information technology, the new team teaching and research activities supported by online and offline integration have given birth to a new organizational form of teaching and research

sections--virtual teaching and research sections.

### 3.1 The Basic Connotation of Virtual Teaching and Research Sections

Virtual teaching and research sections are an innovative teaching and research mode based on Internet technology and remote collaboration; It combines teaching, research activities and teacher professional development, and carries out online collaboration and communication through virtual platforms to improve the level and quality of education and teaching. To define the concept of virtual teaching and research office, we should first distinguish between virtual teaching and research activities and virtual teaching and research office. The former is a new form of teaching and research activities created with information technology platforms and resource databases in the new space and time of digital survival, while the latter is the grassroots organization form of this new type of teaching and research activities in universities. From the perspective of teaching and research, virtual teaching and research offices use advanced information technology and platforms as supports, virtually connect interdisciplinary, trans-school and even transnational teaching and research workers in cyberspace to form teaching and research teams to solve common and forward-looking problems in professional teaching of applied undergraduate colleges. From the perspective of practical teaching, information platforms can also be used to promote school-enterprise cooperation and integration of industry and education, and form practical teaching teams with enterprise experts.

### 3.2 Characteristics of Virtual Teaching and Research Sections

3.2.1 Virtual teaching and research Section are special teaching and academic "cloud communities"

The establishment of academic community is based on common academic interests and development visions, follows certain rules, and relies on similar academic behaviors to aggregate into groups. The connotation of virtual teaching and research sections should be more extensive. Relevant teachers rely on common teaching and research interests and intentions to form a "cloud community" in the

virtual space of the platform. Through mutual exchanges and joint work, they can promote the improvement of the effect of daily teaching activities, promote the improvement of their teaching level and teachers' comprehensive quality, and create a more excellent teaching atmosphere and teaching culture.

3.2.2 Virtual teaching and research sections are a new form originated from traditional teaching and research sections

The basic composition of virtual teaching and research sections is still teachers, who undertake teaching and research functions, but also serve educational and teaching activities. This mode is neither a simple replication of traditional teaching and research sections in the network space, nor a denial of traditional teaching and research sections, but a new form generated by the promotion of technological development and educational and teaching theory changes.

3.2.3 Different types of development exist in virtual teaching and research sections

With the development of educational information technology, a variety of virtual teaching and research sections have emerged, which have certain differences in form and function. One is the transformation and upgrading of traditional teaching and research sections, which conducts certain intelligent transformation and upgrading of teaching technology, but the basic teaching mode and order have not changed much. The second type is a simple integration with the existing traditional teaching and research office, which integrates different majors and even different courses online and offline, and at the same time properly promotes the construction of online school-enterprise cooperation. On the basis of the above two, a more comprehensive virtual teaching and research office mode involving the comprehensive penetration of the whole process of the professional construction and daily teaching work of application-oriented undergraduate colleges and universities [9], breaking the limitation of time and space, and presenting the diversity of participants has gradually emerged.

## 4. The Significance of the Construction of Virtual Teaching and Research Office for Environmental Ecological Engineering

The development theme of the current application-oriented undergraduate

construction is still around the comprehensive deepening of the connotation construction, the improvement of the quality of talent training for local economic development and the need for industrial development, and the realization of high-quality development [10]. The carrier is the construction of a high level of professional construction. The construction of virtual teaching and research office can be integrated with the process of professional construction.

#### **4.1 Realize Resource Sharing and Boost the Construction of a High Level of Professional Construction**

To achieve characteristic development, it is very important to scientifically build a high level of teaching team. Sometimes, the teaching staff of the school and the department is insufficient, and the virtual teaching and research office can break through the limitation of time and space, effectively integrate all kinds of resources, improve the efficiency and final effect of professional construction, and build a high quality teaching and scientific research resource reserve.

#### **4.2 Promote Mutual Learning and Cultivate High-Quality Teachers**

The cultivation of high-quality teachers can be efficiently supported on the platform of virtual teaching and research office. The use of virtual teaching and research office for effective online communication between teachers solves the problems of irrational knowledge structure, lack of practical experience, insufficient combination of concepts, technologies and teaching ability to a certain extent.

#### **4.3 Encourage the Integration of Production and Education, Effectively Improve the Level of Professional Construction**

On the platform of virtual teaching and research office, on the one hand, it improves the communication efficiency between colleges and universities and industrial enterprises, on the other hand, it can effectively promote colleges and universities to timely understand the characteristics of talent demand of industrial enterprises and the application technology of courses in the frontier of disciplines. In this way, colleges and universities and industrial enterprises can effectively reduce the cooperation obstacles

caused by different operating mechanisms, different value concerns and unsound communication channels [11].

### **5. Thinking about the Construction Path of Virtual Teaching and Research Section in Applied Undergraduate Colleges**

#### **5.1 The Construction of Virtual Teaching and Research Office should have Clear Goals and Value Orientation**

In the construction process of virtual teaching and research office, we should pursue the transformation from teaching to learning, from teacher-centered to student-centered, from pure knowledge and skill output to the transformation of cultivating high-quality talents. With the help of information technology, we can realize the rapid iteration and update of professional knowledge and skills, realize the focus on improving students' comprehensive quality, and put more energy into the correct guidance and cultivation of its humanistic connotation and value orientation, so that students can get more rich and pragmatic college education. At the same time, the three major functions of teaching, scientific research and social service can also be realized on the platform of virtual teaching and research office.

#### **5.2 Paying Attention to the Construction of Intelligent Information Platform**

To achieve the construction effect of virtual teaching and research office, the construction of information-based teaching and research platform is essential. Not only should it have full functions and convenient use of teaching exchange information platform, but more importantly, it needs a very rich data resource base to support. The network platform is the survival foundation of virtual teaching and research office. It should be able to apply advanced information technology such as big data to effectively obtain and sort out data information related to teaching and research, and also be able to use and display in a way suitable for teaching needs.

#### **5.3 Build a Teaching System under Deep School-Enterprise Cooperation**

The participants of the virtual teaching and research section are not only teachers, but also



entrepreneurs and managers in the same industry. We should effectively use the information platform of the virtual teaching and research section. On the one hand, we should try to set up direct online courses for practical teaching, and effectively improve the students' basic management practice ability. On the other hand, we should improve the participation of industry personnel in the construction of professional teaching system, from the formulation of professional training programs, the construction of curriculum system to the compilation of textbooks and the implementation of curriculum teaching, so as to try to improve the pertinence and effectiveness of the professional construction of applied undergraduate colleges.

#### **5.4 Constantly Innovate the Specific Mode of the Virtual Teaching and Research Section in Practice**

5.4.1 Teaching resource sharing platform the virtual teaching and research section can establish a teaching resource sharing platform. Teachers can share and communicate their own teaching resources on the platform, which can avoid the waste of teachers' repeated production of teaching resources and improve the utilization rate of teaching resources.

5.4.2 Teaching collaboration and communication platform

The virtual teaching and research section realizes online collaboration and communication through network technology, which can make teachers communicate and collaborate in teaching anytime and anywhere, without the limitation of time and space. Teachers can share their own teaching experience, teaching skills and teaching methods on the platform, and also make teaching evaluation and feedback.

5.4.3 Research results sharing platform Virtual teaching and research offices can also establish a platform for sharing research achievements, on which teachers can share their own research achievements and promote the exchange and cooperation of educational research. At the same time, it can also make teachers understand the latest teaching research achievements and teaching methods through online seminars, academic lectures and other forms, so as to improve teaching level and teaching quality.

5.4.4 Teacher professional development

platform

Virtual teaching and research offices can also become a platform for teacher professional development, through online courses, learning resources and other forms, so that teachers can conduct online learning and professional development, and improve their professional ability and quality. In a word, the innovative mode of virtual teaching and research offices, with the support of network technology, can make teachers conduct online collaboration and communication anytime and anywhere, improve teaching level and education quality; at the same time, it can also promote the exchange and cooperation of teaching research, improve teachers' professional quality, and has broad application prospects.

#### **References**

- [1] Lv Zhiguo, Qi Meng, Shao Hongxiang. Research on the Construction of Virtual Teaching and Research Offices in Colleges and Universities. *Internet of Things Technology*, 2022, 12(12): 116-118.
- [2] Feng Lun, You Weijing. Research on the Construction Path of Virtual Teaching and Research Offices in Higher Vocational Colleges. *Science and Education Guide*, 2022(34): 20-22.
- [3] Sang Xinmin, Jia Yimin, Jiao Jianli, Xie Yangbin, Hu Yiyuan. Exploration of the Theory and Practice of the Construction of Virtual Teaching and Research Offices in Colleges and Universities. *China Higher Education Research*, 2021(11): 91-97.
- [4] Zeng Jianchao, Wu Shuqin, Zhang Chunxiu. Virtual Teaching and Research Office: Innovation Exploration of Grassroots Teaching and Research Organization in Universities. *Chinese University Teaching*, 2020(11): 64-69.
- [5] Zhang Dongming. Exploration and Practice of Industry Education Integration Model in Transportation Engineering Major of Applied Undergraduate Universities. *Science and Technology and Innovation*, 2021(7): 85-86
- [6] Qi Yuansheng, Liu Shilu, Gao Su, Wang Xiaohua, Zhao Shiyong. Design of a talent training system for mechanical engineering in the printing industry based on the integration of industry and education. *Digital Printing*, 2021(4): 8-14
- [7] Sang Xinmin, Jia Yimin, et al. Theoretical

- and practical exploration of the construction of virtual teaching and research rooms in universities Chinese Higher Education Research, 2021(11): 91-97
- [8] Xie Jin, He Ji. The Transformation Landscape of Teaching and Research Rooms in the Era of "Intelligence+": Virtual Teaching and Research Room: Taking the Virtual Teaching and Research Room of the "Circuit Principles" Course at Tsinghua University as an Example. Modern Educational Technology, 2022(5): 102-109
- [9] Zhan Dechen, Nie Lanshun, Tang Dekai. Virtual Teaching and Research Room: A New Form of Collaborative Teaching and Research. Modern Educational Technology, 2022, 32(3): 23-31
- [10] Chen Jing, Xie Changfa. The logical framework and promotion path of virtual teaching and research room construction under digital transformation. Research on Electronic Education, 2023,44(6): 54-59
- [11] Zeng Jianchao, Wu Shuqin, et al. Virtual Teaching and Research Room: Innovative Exploration of Grassroots Teaching and Research Organizations in Universities. China University Teaching, 2020(11): 64-69