New Engineering Curriculum Construction Based on the Innovative Model of "Intelligence Plus" Virtual Teaching and Research Section

Zhongyong Wang[1,a], Yingjing Xu[2,b,*]

[1]School of Automation, Guangdong University of Petrochemical Technology, Maoming, China
[2]Foreign Language School, Guangdong University of Petrochemical Technology, Maoming, China
[a]383858484@qq.com, [b]38205321@qq.com
*Corresponding author

Abstract: From the perspective of mechanism innovation, this paper studies the construction of "Intelligence Plus" virtual teaching and research section, and conducts research on construction standards, operation modes, and other aspects to improve the teaching effectiveness of power system virtual simulation, continuously improve the level of curriculum and specialty construction, and continuously innovate the professional talent training mode for new engineering disciplines.

Keywords: Mechanism innovation; Intelligence+; Virtual Teaching and Research section; specialty construction

1. Introduction

In traditional teaching and research section, communication and discussion among teachers are usually limited to the same specialty or institution. Different from a single teaching philosophy and style, the virtual teaching and research section breaks down communication barriers, through utilizing modern information technology and relies on the Internet to promote cross temporal and spatial teaching and research activities among teachers from different regions. It is a method of exchanging teaching achievements and experiences with each other anytime and anywhere, and sharing teaching information and resources. Virtual teaching and research section can facilitate interdisciplinary, inter school, and even international discussions, providing an effective and reliable communication mode to address common and forward-looking issues in teaching. [1]

In the process of curriculum construction, the teaching staff of the course group often hold seminars to discuss the development of talent cultivation plans and the teaching methods of a certain knowledge point in the classroom. However, for complex and difficult problems that cannot be solved by local teaching and research section, or for high-level educators to learn, physical teaching and research section face difficulties. However, in virtual teaching and research section, these problems can be answered. The virtual teaching and research section integrates diverse modern information technology and offline exchange and visit mechanisms, and collaborates to carry out teaching seminars, demonstration classes by renowned teachers, special report meetings, teaching case competitions, and student subject competitions.

The key to effectively carrying out the construction of virtual teaching and research section lies in the innovation of mechanisms. Breaking the physical teaching and research section requires gathering together and face-to-face discussion mode. The mechanism innovation of virtual teaching and research section can continuously stimulate the endogenous motivation of virtual teaching and research, improve the work efficiency of virtual teaching and research, and enhance the professional ability of teachers in education and teaching. [2-3]

2. The Purpose of Constructing a Virtual Teaching and Research Section

"Intelligence Plus" virtual teaching and research activities are effectively organized, without disrupting the original layout of the teaching and research section. On the basis of not affecting the original teaching team and members of the teaching and research section, teachers who have a common willingness to solve a certain problem form a virtual teaching and research section. They discuss and

engage in activities together for their pursuit of scientific research topics and academic frontiers, forming a form similar to a teaching and research section. It is also possible to conduct high-level course discussions for teaching a certain topic.

In the context of the continuous development of artificial intelligence technology, virtual teaching and research section have emerged. Intelligent technology is utilized based on physical teaching and research section, integrating open and interconnected, virtual and real integration, and resource sharing characteristics. They conduct research activities on teaching phenomena, problems, and processes. With the core goal of improving the quality of teaching and research on "Intelligence Plus Power System Virtual Simulation", the virtual teaching and research section takes digital empowerment and data-driven innovation as the driving force, and conducts classified exploration on specialty construction, course teaching, teaching reform, etc., in order to build a multi-level, multidisciplinary, and multi-type new grassroots teaching organization system.

Teaching research aims to build high-quality classrooms, using classrooms and lesson examples as carriers to carry out teaching research, effectively utilizing teaching and learning data and digital teaching tools, and conducting systematic, normalized, and innovative research on new teaching concepts, models, and methods. Curriculum based teaching and research, exploring new forms of textbooks and new system curriculum construction paths. Curriculum is the core element of talent cultivation, and the quality of curriculum directly determines the quality of talent cultivation. [4-6] At present, curriculum based teaching and research revolves around the construction of golden courses, ideological and political education in courses, the construction of course knowledge graphs, the construction of new forms of teaching materials, and inter-school collaborative teaching.

On the basis of conducting offline courses and online virtual laboratories, the Power System Simulation Virtual teaching and research section relies on disciplinary support and strong teaching staff to seize development opportunities, continuously explore the operating system of the virtual teaching and research section in the new era background, explore the mode of school enterprise co-construction and management, and build a virtual platform for power system simulation teaching with scalability, compatibility, and foresight.

3. Improving Technological Support and Enhancing the Effectiveness of Virtual Teaching and Research

With the support of intelligent technology, virtual teaching and research section have broken through time and space limitations, broken down campus walls, and provided strong support for high-quality teaching and research exchanges, efficient resource collaboration, and high-level teaching and research development.

3.1. Accurately Locate Real and Difficult Problems in Teaching and Research

Based on the advantages of the Internet, big data, and artificial intelligence, digital tools and data-driven approaches are utilized. Determine the teaching and research themes and issues of the virtual teaching and research section through course teaching practice; search for teaching and research issues from the construction of first-class courses and teaching activities; Search for teaching and research issues from the analysis of course teaching data and academic diagnosis; search for teaching and research problems from the difficulties of constructing first-class majors and cultivating talents; search for teaching and research issues in the process of integrating teaching and technology application, and so on.

3.2. Innovate the Operation Mode of "Intelligence Plus" Virtual Teaching and Research Section

With the support of digital technology, various scenarios such as live streaming teaching and research, mobile teaching and research, intelligent teaching and research, and hybrid teaching and research are carried out in the implementation process of "Intelligence Plus Power System Virtual Simulation" virtual teaching and research. The benchmark role of teachers from different universities and regions and first-class course resources is fully utilized to construct virtual teaching and research scenarios and operation methods suitable for teaching applications in electrical engineering and automation majors.

3.3. Improve the Teaching Methods of Virtual Teaching and Research

Teachers of power system virtual simulation courses should not only master teaching and research technologies that are "low threshold, lightweight, and practical and easy to use", including live streaming tools, resource processing tools, interactive tools, etc., but also master high-end teaching and research techniques such as big data, intelligent listening and evaluation, teacher portraits, and virtual simulation systems according to conditions. In the teaching process, it is important to have a systematic approach to teaching and research. When carrying out virtual teaching and research activities, teachers should effectively master the skills of online lesson preparation, online lesson grinding, and online lesson evaluation. They should also master effective methods for organizing virtual discussions and strategies for regulating the pace of virtual teaching and research activities. [7]

4. Mechanism Innovation Stimulates the Vitality of Virtual Teaching and Research

The core of the "Intelligence Plus Power System Virtual Simulation" virtual teaching and research section still lies in course teaching, subject competitions, and scientific research.

4.1. Strengthen the Operational Mode of Virtual Teaching and Research

The implementation of virtual teaching and research fundamentally depends on the internal drive of teachers in the course group of the virtual teaching and research section. It is necessary to enhance the urgency of teachers to improve their educational ability and teaching quality by participating in specific work. Therefore, virtual teaching and research section need to leverage their digital advantages to achieve the integration of virtual and real teaching and research space, feasible operation of teaching and research processes, and visualization of teaching and research results.

How does a young teacher give a lecture when they first stand on the podium? How can experienced professors use new media technology for teaching? How to achieve the transfer of teaching resources between different universities? How to build a professional knowledge graph? The platform for communication, interaction, and resource sharing in virtual teaching and research section provides solutions to these problems.

4.2. Expand Teaching Resources of Virtual Teaching and Research Section

By using industry university research practice projects and subject competition projects as the starting point, the common development of virtual teaching and research teams should be driven and cultivated in the two-way integration process of scientific research and teaching research; taking the construction of first-class courses as the starting point, promoting the co construction of high-quality resources for various courses and the joint compilation of textbooks from multiple schools; taking inter school collaborative teaching services as the starting point, driving the construction of cross school teaching teams and online collective preparation for teaching, and so on.

Through construction, on the basis of sufficient research and communication, talent training programs, teaching outlines, knowledge graphs, teaching videos, electronic courseware, exercise questions, teaching cases, experimental projects, practical training projects, datasets and other resources will be built collaboratively, forming a high-quality and shared teaching resource library. teachers should be motivated to strengthen research and exploration in specialty construction, curriculum construction, teaching content, teaching methods, teaching methods, teaching evaluation, and other aspects.

4.3. Establish a Data-Driven Virtual Teaching and Research Evaluation Mechanism

In the digital age, teaching and research are developing with scientificity and precision, and there is a greater need to promote the application of new generation information technologies such as 5G and big data to achieve virtual teaching and research without perception, full process data collection, mining, and intelligent analysis. Collect and comprehensively evaluate multi-source data such as teacher characteristic data, teaching and research psychological data, teaching process data, teaching and research behavior data, and teaching and research achievement data to achieve precise teaching and research. By incorporating matching learning situation data and management data into teaching and research data, it is possible to promote research and improvement through evaluation. [8]

4.4. Cooperation in the Teaching Process between Schools and Enterprises Achieved in Different Locations by Conducting Speciality Teaching

Guided by the collaborative innovation of the school enterprise cooperation practice base, a scientific organizational management system, scientific performance evaluation mechanism, reasonable resource allocation mechanism, application of excellent engineering talent training mode, good communication and cooperation mode, and harmonious cooperation atmosphere environment can be constructed to achieve mutual support between schools and enterprises mutual penetration, two-way intervention, complementary advantages, resource utilization, and benefit sharing. Application reverse force mechanism should be explored by testing through practice. We need to transform and apply the theories, plans, and resources formed in the process of virtual teaching and research into the practice of talent cultivation, specialty construction, and course teaching, to achieve win-win cooperation between universities and enterprises, and to realize the innovative mechanism of virtual teaching platforms for capacity cultivation.

4.5. Develop a Practical Model for Implementing Cross Temporal and Spatial Virtual Teaching and Research Section

Based on the curriculum and enterprise practice, combined with the technological advantages of Foshan City Xiling Robot Technology Co., Ltd., "cross temporal and spatial virtual teaching and research section practice model with deep collaboration between schools and enterprises" will be built. The CDIO engineering education model, engineering education certification, and curriculum ideological and political education will be integrated for talent cultivation research, and a virtual teaching and research section operation mode should be construct based on engineering capability enhancement. With engineering ability cultivation as the main line, the talent cultivation plan runs through the engineering education concept of the new engineering discipline through hierarchical cultivation, with students as the main body, focusing on a new model of talent cultivation and teaching education process.

5. Conclusion

In the construction process of virtual teaching and research section, improving the construction effect through mechanism innovation can better promote communication between teachers across schools and regions, promote equality and fairness in education, facilitate teachers from different regions and universities to share teaching and research experience, and strengthen teaching communication. However, due to the sharing characteristics of information platforms, it is necessary to ignore innovation and more effectively promote the construction of virtual teaching and research section.

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