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Research on Water Conservancy Projects Teaching Reform under the Integration of Virtual Simulation and Course Ideology and Politics

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Abstract: ***Under the background of new engineering construction and "Internet + education" ecological reconstruction, it is an important way to promote the reform and innovation of experimental teaching of Water conservancy projects to integrate virtual simulation experiments into the teaching process by taking the integration of science and reality as the guide, and taking the synergy between education and industry and the enhancement of competence as the goal. Practice shows that relying on high-quality virtual simulation experimental teaching resources, the integration of science and reality and industry-teaching synergy can effectively connect book knowledge and actual engineering, improve the knowledge system, and promote the enhancement of students' independent scientific research ability, innovation and practice ability, and the comprehensive ability to solve complex engineering problems.***

Keywords: Smart classroom, Simulation lab, New engineering course, Water conservancy projects construction.

1. Introduction

"Water conservancy projects" as an important core course of water conservancy and hydropower engineering majors, the course itself contains a wealth of Chinese traditional culture of ideological education resources, silent will be excellent traditional culture into the water conservancy projects in the teaching process to realize the fundamental task of moral education [1]. This paper combines the characteristics of the hydraulics course, analyzes the demand and connotation of the virtual simulation experimental teaching construction of the water flow connection, adheres to the student-centered education concept, and constructs the experimental teaching system of "six modules, four levels, the whole process, and multiple pathways"; And the water flow articulation virtual simulation experimental teaching design and practice, the use of virtual simulation technology to realize the national major Water conservancy projects and different water flow articulation form of three-dimensional reproduction and simulation operation, from the authenticity of the authenticity, comprehensiveness, flexibility, as well as interactivity in four aspects of the experimental teaching methods and processes of reform and innovation. For example, in the teaching process of flood control, there was a great Yu who ruled the water, at that time, the Central Plains were flooded and the people were displaced, and the flooding brought infinite disasters to the human beings. Jiu Ji is not jealous of his father who is punished by Shun, he learns a lesson from his father's failure to control the water and changes "blocking" to "dredging". As a tribal leader, Dayu labored and toiled with his own hands, holding tools in his hands, crossing the threshold of his house three times, plying with the people in the wind and rain, and fighting against the floods. The spirit of Dayu is the source and symbol of the spirit of the Chinese nation, which is formed with the connotation of publicity and forgetfulness of self-interest, supremacy of the nation, the people for the state, and scientific innovation. It is of great significance in guiding college students to establish a correct view of history, nation, country and science, as well as to build a big-picture view of the water conservancy and hydropower engineering profession and the value orientation of aspiring to serve water conservancy [2].

2. Reform of Teaching Objectives of Water Conservancy Projects Program Civics Teaching Reform

The teaching of Water conservancy projects construction courses is oriented to multi-dimensional educational objectives, and a comprehensive cultivation system has been constructed, aiming to promote the overall development of students in many aspects, such as knowledge, ability, humanistic qualities and ideological education. The course emphasizes the systematic mastery of the core theories and design methods of Water conservancy projects construction, covering the typical arrangement of hydroelectric power stations and the working principles of their main buildings, applicable conditions, as well as hydraulic calculations and structural design methods of water conveyance system buildings, and at the same time, in-depth lectures on the arrangement design of hydroelectric buildings, load analysis and structural design principles, in order to provide students with a solid foundation for their specialties.

Humanistic literacy is another core objective of the course. By teaching the laws of river evolution and the interaction between the natural environment and engineering, the course helps students to experience the beauty of nature and the magnificence of engineering, and to deepen their understanding of the relationship between Water conservancy projects and society, the environment and ethics. Students will be able to realize that Water conservancy projects, as an important pillar of national livelihood, not only need to strive for technical excellence, but also need to uphold the concept of harmonious coexistence of the environment, reflecting humanistic care and social responsibility. At the same time, the curriculum is actively integrated into the Civic and

Political Education and plays its leading role. Through the introduction of the history, current situation and trend of China's hydropower development, the course motivates students to inherit the spirit of great national craftsmanship, enhance the sense of family and country and road confidence, and set up the career aspiration of serving the hydropower industry. The course also focuses on combining personal development with national needs, enabling students to recognize the close connection between their dreams of success and the Chinese dream of the great rejuvenation of the Chinese nation, enhance their sense of professional mission and industry pride, consciously practice environmental ethics in engineering practice, and promote the sustainable development of hydropower. This education goal system realizes the organic integration of knowledge transfer, ability enhancement, quality cultivation and value leadership, which not only guarantees the comprehensive development of students' professional ability, but also focuses on the cultivation of their sense of social responsibility, and provides a solid support for the comprehensive growth of the hydropower engineering talents in the new era.

2.1 Creating a Mechanism for "Sharpening Lessons" and Building a "1+N" Diversified Teaching Team.

To create a "grinding" mechanism, forming a "1+N" curriculum teaching think tank composed of professional teachers and enterprise teachers. The teaching process is shown in Figure 1. Promote "two-way mobility of personnel and two-way supply of content" among professional teachers, realize a regular exchange mechanism among professional teachers, fit the teaching content of the courses, excavate and condense the characteristic content of the courses, and carry out special course design, so as to produce integration, embeddedness and infiltration synergy effects. Two professional teachers in the teaching team won the first prize in the national teaching competition, and the professional teachers catalyzed the results of the national competition into the teachers' teaching design ability, curriculum standard development ability, teaching evaluation ability, teamwork ability and information technology application ability, to create a high-level, structured professional teaching team, and to effectively solve the problem of the mismatch between the comprehensive ability of the teaching team and the requirements of education informatization. At the same time, professional teachers promote knowledge updating through the exercise program in enterprises, introduce practical aspects, transform production projects into teaching cases, hire high-level technical backbones as part-time teachers in enterprises, participate in teaching design and practice guidance, cooperate with full-time teachers, develop curriculum standards, implement teaching design, and make joint efforts to teach a good course. We introduce advanced knowledge concepts and craft skills of excellence into the curriculum, practise what we preach, emphasize on the cultivation of professional ethics and the inheritance of vocational ability, parallel theoretical learning and practical skills training, and build a teaching team of "1+N" with multiple education and training subjects through "dual-teacher" cooperative teaching mode, which is in line with the actual production. Through the "dual-teacher" cooperative teaching mode, we have built a teaching team of "1+N" diversified training subjects.

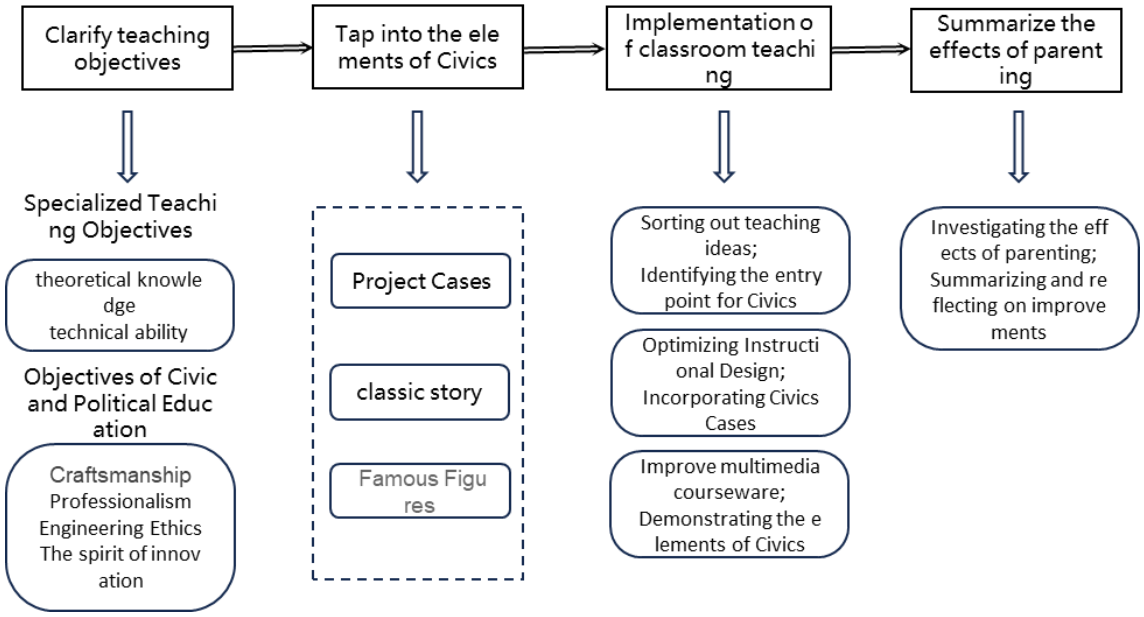

Figure 1: Civics Teaching Process

3. Design and Practice of Virtual Simulation of Open Channel Experiments

Virtual simulation experiment is an important experimental teaching module in the hydraulics course, aiming at reproducing the flow characteristics and hydraulic phenomena of water flow articulation comprehensively through virtual simulation technology, helping students to deeply understand the relevant theoretical knowledge and master the skills of solving practical engineering problems.

3.1 Experimental Background and Needs Analysis

Open-channel flow articulation is a classical and complex problem in hydraulics, involving the analysis and computation of phenomena such as constant uniform flow, inhomogeneous flow, and open-channel hydraulic jumps. However, traditional experiments are difficult to adequately

demonstrate complex water flow phenomena due to the limitations of space, equipment and safety. Virtual simulation experiments can make up for this deficiency, through three-dimensional visualization and a high degree of interactivity, so that students in a safe, intuitive virtual environment to observe the whole process of water flow articulation, to enhance their understanding and memory of theoretical knowledge [3].

3.2 Experimental Design and Content Composition

The virtual simulation open channel experiment is designed to help students gain a deeper understanding of the hydraulic phenomena of open channel flow through several modules. Experiments through the virtual simulation platform to build a number of typical flow scenarios, these scenarios are based on real engineering cases and experimental needs, covering the uniform flow, uneven flow, sudden expansion and contraction of water flow, as well as rapids and slow flow convergence and other water flow phenomena, fully taking into account the characteristics of the hydraulics and the needs of the engineering applications. Students can freely adjust some important water flow parameters during the experiment, such as channel slope, cross-section shape and flow rate, etc., and observe the effects of the changes of these parameters on the water flow state, energy loss and water level changes, so as to intuitively perceive the hydraulic phenomena under different conditions. In addition, the experimental system provides dynamic simulation and interactive operation functions, real-time display of flow velocity distribution, water surface line changes, energy line and momentum line and other key parameters, students can dynamically manipulate the experimental process to better understand and experience the combination of hydraulics theory and actual phenomena [4].The system also has a data acquisition and analysis functions to support the real-time acquisition and export of experimental data, including flow velocity, water depth, pressure distribution and other data, students can analyze these data to discuss the results of the experiment in depth to further deepen the understanding of theoretical knowledge. Finally, the experiment also reproduces a number of typical national Water conservancy projects cases through virtual simulation technology, such as the South-to-North Water Diversion Project and the Three Gorges Water Conservancy Hub, etc., so that the students can combine the knowledge of hydraulics with the actual engineering applications and enhance their understanding of engineering practice.

4. Advantages of Teaching “1+X” Certificate System of Water Conservancy Projects based on Structural Reform of Employment Supply Side

Colleges and universities as a key base for the training of applied talents, the results of the structural reform of the supply side of jobs provide the most fundamental guarantee for the cultivation of talents in colleges and universities and the promotion of college students to improve the quality of employment. Deepen the exploration of new talent cultivation mode and continuing education teaching, the higher the quality of talents cultivated by the new teaching mode of school-enterprise cooperation and in-depth integration of industry, research and teaching, the stronger the employability and the faster the career development and ability enhancement of the students in the future. College graduates are a large-scale group in China's human resources market, and enterprises are often the main demand for college students' talents. The market for supply and demand of talents should follow the market equilibrium mechanism of supply and demand, price mechanism, competition and elimination mechanism, risk mechanism, etc., which is in line with the most basic laws of the market, and through the regulation of the market, college students' human resources can be scientifically, efficiently and reasonably configured. The independent and rational choice of employment by university students, and the two-way and diversified rational choice of employment have greatly improved the allocation of human resources. The implementation of the “1+X” certificate system will enable college graduates who have already obtained vocational skills level certificates to participate in practical projects more quickly, and for Water conservancy projects construction enterprises, it saves the time and cost of pre-employment employee training.

5. The Significance of Implementing “1+X” Certificate System for Water Conservancy Projects Training based on the Structural Reform of Employment Supply Side

The implementation of the “1+X” certificate system and the structural reform of the supply side of employment in colleges and universities is an important feature of the modern model of vocational education in the new era, and an important initiative of the State to promote the implementation of the fundamental task of establishing a moral character in colleges and universities, to improve the vocational education curriculum and the certification system of practical training for college students, and to promote and deepen the integration of industry and education and cooperation between schools and enterprises. The design and innovation of the “1+X” certificate system, the improvement of college students' employment retraining and the policy of supply-side structural reform are conducive to the teaching reform of Water conservancy projects. Accelerate the implementation of the supply-side reform of the technical service capacity of professional talents, effectively and efficiently improve the current level of professional personnel training and supply in the field of Water conservancy projects, promote the upgrading of the structure of the modern water conservancy industry, cultivate composite high-quality technical and skilled personnel adapted to the construction of water conservancy, expand employment channels, and reduce the pressure on the employment of college graduates. Continuing to deepen the reform of the management model of teacher training and the management model of teaching quality evaluation, which are also two important avenues for innovation. By accelerating the implementation of the comprehensive pilot construction of the “1+X” certificate system for vocational training and the reform of the supply side of higher education employment, it will be possible to better mobilize all the forces of society to participate actively in vocational education at the national level, and to promote the continual innovation of vocational training and training modes, mechanisms and talent assessment modes in the major

colleges and universities and the deepening of reforms of the system of vocational teachers, teaching materials and teaching methods. At the same time, it will continue to guide institutions to combine teaching and learning, school-enterprise integration, and the deep integration of industry and education, and further effectively promote adult academic higher education and the training of general vocational and technical personnel, so as to carry out high-quality and orderly training of social talents. In the context of socialist construction with Chinese characteristics has entered a new era, the state is deepening the implementation of vocational education "1 + X" certificate system and promote the employment supply side structural reform, to explore the establishment of a modern talent training mode and evaluation and monitoring system that can effectively connect with the international advanced standards of Water conservancy projects. This is of great significance to effectively improve the level and quality of technical skills and applied talents training in Water conservancy projects in China, and to promote the internationalization of talents training.

6. Conclusion

In the continuous progress of science and technology today, the traditional teaching methods and teaching concepts of Water conservancy projects have been detached from the current situation and needs of the development of water conservancy projects, resulting in a number of shortcomings. Virtual simulation experiments can help students experience the whole process of Water conservancy projects from design to implementation by reproducing the fine process of engineering practice. The virtual simulation technology simulates the water conservation projects of Dayu's time and the modern Water conservancy projects respectively, so that students can compare the technological development of history and modern times, and discuss the similarities and innovations between the two concepts. Through the experiment, students can experience the inheritance and development of the concept of "scientific water management" and deepen their understanding of the national spirit.

The combination of virtual simulation technology and course ideology can innovate the education mode through technical means, integrate science and technology with humanities education, and realize the educational goal of cultivating moral integrity while enhancing the teaching effect.

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