Reform and Practice of Water Conservancy Engineering Construction Course Based on Immersive Teaching

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Abstract: The course "Water Conservancy Engineering Construction" is a specialized course in the field of water conservancy engineering. Based on the characteristics of the course and the current cultivation goals of applied talents, this paper briefly analyzes the teaching status and problems in the course, proposes to adopt immersive teaching in the teaching process of the course, and puts forward several suggestions for relevant personnel to refer to.

1. Introduction

Water conservancy construction technology is a highly practical professional technical course in the field of water conservancy. There are various construction technologies and methods that students need to understand and master in a short period of time. In addition to requiring students to have strong self-learning ability and teachers to have high teaching level and practical experience, traditional teaching methods also need to be changed. Traditional classroom teaching often adopts a cramming style to instill knowledge in students, with teachers becoming the main body of teaching and students becoming the target audience. Teachers instill the content of textbooks into students, emphasizing theoretical explanations in the teaching process. During the learning process, taking notes, memorizing concepts, memorizing principles, and dealing with exams can lead to being submerged in dull theories and principles, making it easy to lose interest in learning and motivation in future studies. As time goes on, this situation becomes a vicious cycle[1].Due to its many advantages, this teaching method is still widely adopted so far. However, with the rapid development of science and technology, the widespread exchange of knowledge, and the acceleration of knowledge updating, students are eager to acquire more and more knowledge. Relying solely on this traditional teaching method of infusion is not conducive to teaching students according to their aptitude, is not conducive to tapping and unleashing their full potential, and cannot fully adapt to the needs of modern teaching. Cultivated students often lack independent thinking and creative abilities, and are also unable to meet the social demand for applied talents. Therefore, it is necessary to analyze the current teaching situation and problems in the course of water conservancy engineering construction, propose new teaching methods, greatly stimulate students' interest in learning, and enable them to learn and master knowledge and skills in lively and real scenarios[2,3].

2. The Current Teaching Situation and Existing Problems of Water Conservancy Engineering Construction Courses[4]

2.1. Allocation of Teaching Staff

Due to the practicality and comprehensiveness of the water conservancy engineering construction course, and the lack of practical engineering construction experience among teachers engaged in teaching this course, two problems arise: firstly, ideological and conceptual issues. In the teaching process, emphasis is placed on theory over practice, and the teaching process is based on the textbook. Overemphasizing the systematic, coherent, comprehensive, and rigorous nature of knowledge cannot achieve the goal of cultivating applied talents. Secondly, there is a lack of

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practical ability. Many teachers directly step onto the podium after graduating from school, only experiencing a change in identity and lacking practical engineering experience, making it difficult to meet the requirements of vocational and technical education skills training.

2.2. Teaching Methods

The teaching content and methods are outdated and relatively single, which is disconnected from the actual engineering practice. The traditional teaching method adopts classroom teaching method, and a large amount of construction technology and other practical knowledge in the course are taught through theoretical teaching by teachers, which results in poor acceptance by students; At the same time, due to the lack of practical work experience among teachers, the lack of vividness in lectures, and insufficient emphasis on the application of knowledge and the cultivation of practical abilities in the teaching process, students cannot actively participate in practical operations during the learning process, and professional skill training is relatively weak, making it difficult for students to develop mature and practical application skills and adapt to social changes, and failing to fully reflect the essence of applied talent cultivation.

3. Immersive Teaching Mode

Immersive teaching refers to providing students with a nearly real learning environment through virtual reality technology. With the help of virtual learning environment, students can enhance their practical skills through high participation in interaction and practice. Based on entity based water conservancy engineering projects and computer virtual simulation technology, 3D virtualization of water conservancy engineering projects is achieved, enabling students to learn knowledge and master practical application skills in a virtual engineering project environment [5,6].

Immersive teaching mode can enhance students' interest in learning, increase the fun of learning, and make them more willing to participate in learning. By creating a real learning environment, students can experience learning firsthand, gain a deeper understanding of the learning content, and better improve learning outcomes.

Immersive teaching method can also improve students' practical abilities and cultivate their good practical abilities. Students not only learn knowledge in theory, but also experience and master knowledge in practice. Through this approach, students can better apply their learned knowledge to practical work[7].

4. Immersive Teaching of Water Conservancy Engineering Construction Courses

With the help of immersive teaching mode, the water conservancy project under construction is virtualized in 3D through computers, enabling the construction process, construction technology, and construction machinery that were originally on the construction site to be displayed in a virtual and real environment. Based on the theoretical teaching progress of the course, the virtual simulation practice environment provides different construction design schemes according to the construction situation of typical water conservancy projects. Students are required to choose construction methods, processes, etc. at each step of the construction process, and only after the correct selection and confirmation in the first step can they enter the next stage of construction procedures, The design of immersive teaching further deepens students' understanding and mastery of engineering construction procedures and construction processes. Thus, through the use of information technology teaching methods, practical teaching objectives can be achieved, enabling students to understand and master the content and knowledge points of water conservancy engineering construction procedures, and improving practical effectiveness.

4.1. Virtual Environment in Immersive Teaching

Through the immersive teaching method and means of virtual simulation environment, it greatly compensates for the shortcomings in the teaching process of water conservancy engineering construction courses, such as weak practicality,difficulty in developing professional comprehensive

practice, and significant gap between theory and actual project sites. This enables students to fully immerse themselves in the virtual real environment and master the construction process of water conservancy engineering,and simulate the environment through informatization. The immersive teaching method in which students are fully immersed achieves practical teaching objectives, thereby improving students' practical skills[8].

4.2. Transformation of Student Identity in Immersive Teaching

Combining the core textbook of "Water Conservancy Engineering Construction" with virtual simulation technology, it will be synchronized with the theoretical teaching of the course. For example, simulation of earth-rock dam construction: In terms of teaching methods, theoretical knowledge is taught first, followed by a logical explanation that is consistent with the actual construction sequence of the project. Virtual simulation is used to simulate the construction process of the diversion project, the preparation of foundation excavation and construction conditions, the construction of sand and gravel materials for the dam body, the construction of filter materials, the construction of anti-seepage bodies, and the compaction of various parts of the dam body. During this process, students are encouraged to change their identity, Completely immerse oneself in the engineering site, work as a technical personnel on the engineering site, understand the mechanical equipment for earthwork construction, the principles of overall layout during construction, and knowledge points such as earthwork construction methods, requirements, quality control, and precautions. Based on one's own understanding and mastery of professional knowledge, subjectively carry out engineering construction and improve practical application skills.

4.3. Design of Immersive Teaching

(1) Enhancing Systematicity in Immersive Teaching

We should further strengthen students' understanding and recognition of the systematicity of water conservancy engineering construction, by entering project virtualization scenarios, mastering the systematicity in project design, and designing engineering problems driven by systematicity; It can cultivate students' higher-order thinking and ability to research learning scaffolds in learning; We should also strengthen the organization and guidance of students' engineering project systems, so that virtual immersive education can play a role in promoting the cultivation of application skills.[9,10].

(2) Reflection on Strengthening Understanding in Immersive Teaching

In order to effectively improve the comprehensiveness of engineering project learning plans, teachers strengthen their understanding of theoretical knowledge during the process of virtualization of engineering projects, construct a virtual teaching mode for immersive teaching, and continuously reflect during this process, which helps to improve teachers' reflective and analytical abilities, thereby enhancing the design of immersive teaching plans, and improving the cultivation of students' application skills during the teaching process[11].

(3) Implementing design solutions in immersive teaching

In the implementation of immersive teaching methods in engineering projects, it is necessary to distinguish the solutions of engineering projects, identify virtual immersive teaching methods, and visualize the difficulties encountered in real water conservancy projects through virtualization, achieving "real problems, real practice". Students solve problems in the immersive practice process.

5. Several Opinions on Immersive Teaching of Water Conservancy Engineering Construction Courses

When conducting immersive teaching and research, the following points should be achieved.

(1) Emphasize the breadth, depth, and continuity of immersion

The focus of immersive teaching is on evaluating classroom teaching and improving teaching methods based on problem-solving. However, there is insufficient attention to teachers' teaching ideas and subject literacy, and insufficient exploration of the internal influencing factors of teaching problems. Therefore, in courses with strong practicality such as water conservancy engineering to

cultivate practical application abilities, it is necessary to strengthen guidance for new teachers, young teachers, and other groups, comprehensively and reasonably evaluate the teaching concepts, teaching abilities, and practical abilities of teachers at different stages, guide them to generate educational wisdom, deeply understand the connotation of immersive teaching, and improve the application skills of high school students as the main goal.

(2) Pay attention to improving teachers' comprehensive literacy

Conducting immersive teaching and research can encourage teachers to truly immerse themselves in the classroom, work together with students in the curriculum reform, discover, meet, and guide students' learning needs, provide professional problem-solving solutions to students, and create disciplinary, research-oriented, service-oriented, and innovative organizations.

Faced with new situations and challenges, teachers not only need to have rich subject teaching experience and excellent professional qualities, but also need to actively change their work ideas, deeply understand new things and problems in curriculum reform practice, and continuously innovate their work forms while carrying out immersive teaching. In creating a new education form of "Internet plus", teachers should connect modern information technology with teaching engineering construction projects, carry out immersive teaching through virtual environment, and use it appropriately. Helping students solve practical problems in improving their applied skills in professional learning also further enhances teachers' practical abilities and abilities.

6. Conclusion

Considering the current teaching situation of water conservancy engineering construction courses, the society is increasingly emphasizing the skills and qualities of talents, and the requirements for application skills and comprehensive problem-solving abilities are also increasing. In this situation, immersive teaching methods will become a major trend in the field of education.

(1) It can enhance students' interest in learning and practical abilities, providing better guarantees for their comprehensive development.

(2) Immersive teaching method can greatly combine practice and theory, which is beneficial for students to consider problems from a practical perspective.

(3) The immersive teaching method reduces the constraints and influences of external conditions in the process of cultivating practical skills for courses with strong practicality.

With the demand of the new era society for the application ability of water conservancy talents, as a professional teacher, it is necessary to conduct in-depth research and exploration of immersive teaching methods, and actively adopt immersive teaching methods based on practical engineering. This not only deepens students' understanding and consolidation of knowledge, but also helps to cultivate their application skills and analytical ability to solve problems.

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