Application of information technology in the course teaching of “Foundation Engineering”

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Abstract. With the continuous development of information teaching, the traditional and single teaching mode can no longer meet the teaching needs. In order to improve the teaching level and cultivate high-tech and high-skilled talents that meet the needs of the society, continuous teaching innovation and reform are required. As the best means and method for colleges and universities to improve the quality of teaching, the construction of modernization is combined with the curriculum standards and the use of information technology to upgrade traditional teaching to improve teaching efficiency. This article takes information technology as the research object and takes the course of "Foundation Engineering" as an example to illustrate the application of information technology in the teaching reform of municipal engineering technology in higher vocational colleges.

Keywords: information technology, foundation engineering, teaching reform.

1. Introduction

The application of information technology in education and teaching, that is, the use of some information technology and methods in the education and teaching process, so that the entire link of the subject teaching becomes more digital, which can correspondingly improve the quality of education and teaching. Modern education should be guided by advanced teaching concepts, supported by computers as technical means, and applied modern and advanced teaching methods to carry out educational and teaching activities. With the development of society, education has undergone profound changes. The previous concept of education was to cultivate talents from all walks of life for the society through education, and cultivate a large number of workers with similar behavioral capabilities. Nowadays, the concept of education has undergone tremendous changes with the times. The education and teaching of vocational colleges has entered an era of comprehensive information coverage. Informatization teaching requires students as the theme and humanism as the basic guiding ideology, so as to satisfy every different child The demand for personalized development and development of education. Wang Xiaowu, deputy curator of the Central Audio-visual Education Center, said: “Technology will always develop faster than people think. The emergence of innovative IT technologies and products injects vitality into informatization teaching, while also greatly enriching teaching resources for students. Individualized learning provides opportunities; and with the deepening of educational reforms, information technology and classroom teaching content will be more deeply integrated”.

The “Foundation Engineering” course is a professional basic course for higher vocational municipal engineering technology and construction engineering technology. It is usually offered in the second
semester of the first year of university. It mainly cultivates students' Foundation Engineering design and construction abilities. Through the study of the course, students can carry out basic design and construction based on various contract documents, engineering drawings, and project site conditions. This course is a comprehensive and practical course, including soil mechanics, Foundation Engineering construction technology and other aspects of knowledge. There are many kinds of specifications involved in the course, and the requirements for students' comprehensive ability are very high. Foundation Engineering is the core professional course in the municipal engineering technology major. It occupies an important position as a foundation for the follow-up professional basic courses. According to the requirements of the civil engineering professional post ability in higher vocational colleges and the characteristics of higher vocational students, it is imperative to reform the "Foundation Engineering". By clarifying the ability goals, knowledge goals and quality goals of course training, the teaching content is optimized in order to effectively improve the quality of professional teaching. This article takes the course of "Foundation Engineering" as an example to explore the application of informatization teaching in the course.

2. Characteristics of application of informatization teaching in professional courses
Informatization teaching is a process of implementing teaching by applying modern teaching methods under the guidance of modern teaching concepts and the support of information technology. Informatization teaching requires the use of system thinking, student-centered, teacher-led, fully and rationally using modern information technology and information resources, and specific design of teaching content, teaching methods, teaching process, teaching evaluation and other teaching links.

2.1. The transformation of teachers' teaching methods
In the era of big data, teachers not only need to upload limited textbook knowledge in the classroom, but also need to cultivate students' ability to think about problems, the ability to collect and organize information, and the ability to distinguish and use information. Teachers should transform from knowledge transmitters and appraisers of students' learning effects to inspirers and guides of students' autonomous learning. Classroom teaching reform requires teachers not only to be proficient in information technology, but also to have the ability to control education and teaching activities under the background of network technology. Teachers can only effectively improve their teaching effects if they improve their own informatization teaching literacy, improve their ability to use modern information technology, and deeply integrate information technology with education and teaching. Teachers can use mainstream digital teaching platforms such as cloud classes and teaching spaces to strengthen classroom interaction and off-class communication with students, so as to maximize students' interest in learning.

2.2. Changes in the way students learn
Various new types of classrooms under the background of information technology have broken through the boundaries of regions and time and space. Learners can make full use of network information resources to carry out learning activities anytime and anywhere, choose learning content independently, and freely grasp the difficulty of knowledge and the progress of learning. If you encounter problems in the process, you can consult the teacher online, or you can interact with your classmates at any time. This way of learning allows students to get rid of the predicaments and problems faced by the traditional classroom teaching mode. Students can actively acquire knowledge and process information during the learning process, and promote learning more effectively.

3. The application of informatization teaching in the course of "Foundation Engineering"

3.1. Construct a knowledge system of teaching resources
In recent years, with the implementation of teaching reform projects such as the teaching resource library and high-quality resource sharing courses, a large number of teaching resources have been shared on
the Internet. As an important professional basic course, Foundation Engineering is an important part of the construction of the teaching resource database of municipal engineering technology. In the digital teaching platform of the teaching space, the course has set up courses such as course introduction, course standards, study guides, course content, electronic textbooks, course training, micro-class videos, animations, coursework, course exams, test question banks, online communication, etc. By building a school-level digital education resource sharing system, high-efficiency, low-cost, reusable teaching resources can be developed, and at the same time, it can provide effective space for students' personalized learning.

3.2. Create an information education environment

Our school has built a campus network security system that integrates firewall, intrusion detection, and identity authentication. The wireless network covers the campus office area, teaching area, training area, library, student activity center and other areas, which are used for informatization teaching. The smooth development provides the necessary network environment. Production training room, building material testing training room, BIM training room, etc. are open to students free of charge, enabling students to use network courseware and video recording to learn independently, and perform practical operations and simulation simulations, which greatly expands the learning content of students, inspiring students' enthusiasm for independent learning.

3.3. Adopt the information-based teaching tool "Rain Class"

At present, there are many kinds of informatization teaching tools, including blue ink cloud class, rain class and so on. After the author's many practices. Choosing Rain Classroom software is convenient for students to operate, and you can directly scan the code on WeChat to enter. The information-based teaching software Rain Classroom is mainly developed and researched jointly by Xuetang Online and Tsinghua University Online Education Office, and establishes an intelligent connection terminal that connects students and teachers through software applications. Intelligent and informatized technology applications are used in every link of pre-class preview, in-class learning, and after-class review. In order to give the classroom a brand new, creative, and information-based teaching experience, use mobile phones to maximize students' interest in the "Foundation Engineering" course, release the passion of teachers and students, and vigorously promote the "Foundation Engineering" course Informatization teaching reform. Rain Classroom software embeds the software itself into PowerPoint and WeChat applets in the office. Establish a bridge for communication and exchange between teachers and students in the links of extracurricular preparation, in-class learning, and after-class review, so as to avoid the traditional classroom teaching mode that only pays attention to the classroom itself, so that the interactive communication between teachers and students in the classroom is online 24 hours. Using Rain Classroom, teachers can push pre-class preparation materials such as micro-classes, exercises, PPT, teaching voices, etc. to the mobile phone terminal of students in Rain Classroom. After students complete, the teacher can check in time through the background, and teachers and students can communicate; in class Answering questions in real time through Rain Classroom, and interacting with the barrage during the answering process, breaks the traditional teacher-student interaction model in the classroom. The software scientifically and effectively covers every teaching link before class-during class-after class. Through the informationized teaching platform, it provides teachers and students with complete and all-round data analysis, and can formulate personalized reports to make teaching Learning with you is clearer, simpler and clearer.

3.4. Diversified network platform

"Several Opinions of the Ministry of Education on Further Deepening the Reform of Undergraduate Teaching and Improving the Quality of Teaching in an All-round Way" (Jiaoga [2007] No. 2), "Outline of National Medium and Long-term Education Reform and Development Plan (2010-2020)" and other documents, clearly require construction Network learning resources to realize the sharing of learning resources. According to the spirit of the national "National Medium and Long-term Education Reform
and Development Plan Outline (2010-2020)" and "Several Opinions of the Ministry of Education on Comprehensively Improving the Quality of Higher Education" and other documents, adapt to the "Quality Project" of the Ministry of Education for the informatization of college education and teaching. According to the requirements, Hunan Urban Construction Vocational and Technical College began to start the curriculum resource library construction plan through the teaching, research and teaching reform project. In 2015, we started to establish the "Foundation Engineering" course resource database. And introduce a network teaching platform. In 2018, full coverage of the college’s WiFi was achieved, and smart classrooms were set up in the newly-built civil engineering building of the college. Use the existing hardware facilities to develop network teaching resources construction and auxiliary teaching. Organically integrate the newly-built modern network teaching platform equipment with informatized teaching modes and methods. This is not only conducive to the classroom to explore new teaching models and new teaching methods, but also can greatly enhance students' interest in learning. Make full use of advanced network technology and information-based teaching methods to improve the teaching effect of the "Foundation Engineering" course. At the same time, in the network platform of smart vocational education, there are a lot of teaching resources uploaded by each school, which has become a powerful network teaching platform for students to learn independently. Relying on network platforms such as the World University City and Wisdom Vocational Education, various information-based teaching methods such as micro-classes, teaching videos, mechanics simulation software, contacting enterprise experts to answer questions, and so on are used to assist teaching.

3.5. Mechanical simulation software
Foundation Engineering courses have the characteristics of "the concept is abstract, the theory is easy to understand and the problems are difficult to solve", especially for students in vocational colleges with relatively weak knowledge. Mechanics involves a lot of mathematical operations and complex formula derivation, which is objectively caused to students. A great deal of psychological pressure can easily lead to incomprehensible phenomena, which will make students not have a deep understanding of some theoretical concepts of mechanics, such as stress and strain. The mechanical simulation software is used to simulate the force state of some components under the action of force to vividly show the concept of mechanics.

(1) Through some specific mechanics teaching simulation software, using dynamic mathematical models, it can simulate real experimental phenomena and experimental processes in real time, and can produce experimental phenomena, experimental processes and experimental results consistent with reality.

(2) Through the reasonable application of the software, it can reflect the basic process of engineering mechanics device data processing, can meet the basic requirements in teaching, and is safe enough, and can run for a long time.

(3) The software is different from the previous mechanics experiments. Only the teacher can operate it alone. In the software simulation, each student can operate independently by himself. By observing phenomena, recording and processing experimental data, verifying formulas, principles and theorems, and finally printing reports, Understand the principles of mechanics during the experiment.

3.6. Application of information technology in assessment and evaluation
Change the traditional assessment model that uses test scores as a single assessment indicator and adopt a diversified assessment mechanism. The assessment of students' abilities is divided into two parts: theoretical knowledge assessment and practical operation assessment. At the same time, factors such as students' learning attitude, participation in group discussions, teamwork ability and other factors are comprehensively considered. For example, the following aspects should be fully considered in the assessment of the theoretical knowledge of the cement testing part and the learning situation of the practical training link: ①The teacher asks the students in the classroom, and checks the pre-learning situation of the use of informatization methods before the class. ②After the teacher demonstrates the operation, observe the accuracy of the student's test steps, the operating specifications, the accuracy of
the data read, and the rationality of the data processing. ③In the group discussion session, observe student participation and teamwork. ④Using the digital learning platform to count the students' online learning situation and the completion of homework after class. According to various factors and related data in the whole teaching process, students are assessed for theoretical knowledge and practical operation.

Evaluation can use digital platforms such as teaching spaces and cloud classes to initiate questionnaire surveys to students at the end of each class or at the end of the semester, so as to grasp the students' opinions and suggestions on the teacher's teaching in real time, so as to more rationally carry out the follow-up course design. To achieve the purpose of improving the quality of teaching. For example, use the teaching quality management platform to issue immediate teaching evaluations to students. The following questions can be set:

①What do you think of the teaching arrangement of this section of the course ( )
   A. There is too much content and time is too tight; B. The content is appropriate, and the schedule is tight and reasonable; C. More teaching content should be provided to improve teaching efficiency.
②In the learning process of this lesson, do you think (  )
   A. The teacher only pays attention to the problems of a few classmates and fails to solve their own learning questions in a targeted manner; B. Through communication with classmates and teachers, I understand and master the learning content; C. The teacher ignored my learning achievements and did not give me a fair evaluation.
③In the course of studying this lesson, what questions do you still have?
④In order to better promote your own learning, what advice do you have to the teacher?

4. Conclusion
With the rapid development of information technology today, the use of informatization can comprehensively improve teaching effects, and the reform of informatization teaching in higher vocational colleges has become an inevitable trend. The application of informational means such as network learning platform, virtual simulation training room, micro-classes, and metering and pricing software conforms to the learning characteristics of students who love to watch and love to operate, which improves students' learning participation and ensures the mastery of knowledge goals. According to students' different learning foundations and learning abilities, different job roles are assigned, different job tasks are completed, and hierarchical teaching is realized. The game points mode is close to students' lives and improves students' interest in learning. In each link, the students summarize the errors, analyze the reasons, and report, which cultivates the students' management and expression skills, and improves their professionalism. The use of teaching software to achieve the entire assessment, timely inspection of knowledge mastery, real-time summary based on the assessment results, layer by layer, to achieve the overall teaching goal. Invite corporate teachers to participate in teaching, and use corporate teachers’ live broadcast of the project to make project teaching more realistic and students' practical learning more fully. Through real-time broadcast and point-of-view, students are guided into real work scenes, complete real work tasks, and help students' career development.

Acknowledgments
This work was supported by the Research on the Application of BIM Technology in the Process of Engineering Construction (ZJTK2020014).

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