Research on BIM Technology in the Teaching of Construction Technology Course

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Abstract: *The teaching content of the construction technology course is a teaching process involving the combination of theory and practice. In the teaching process, not only the practical significance of the theoretical content should be reflected, so that the theoretical content can withstand the test of practice, but also the comprehensive content should be described and analyzed from all aspects and angles, showing the important significance of the construction technology course, To lay a solid learning foundation for students' future development in the field of architecture. This paper analyzes the research of BIM technology in the teaching of construction technology course. BIM technology can simulate the construction process, which is conducive to making abstract knowledge more concrete and easier for students to understand.*

Keywords: BIM technology; Construction technology; teaching.

1. INTRODUCTION

In the process of promoting the teaching reform of the course "Building Construction Technology", how to realize the integrated teaching goal of students' learning by doing and learning by doing has become a key factor. Due to the characteristics of the construction site, such as large volume, complex construction environment, and large potential safety hazards, students have encountered difficulties in completing typical tasks by hand. Therefore, the current teaching form can not well stimulate students' interest in autonomous learning, and can not well cultivate students' ability to operate by hand, and the learning effect is not ideal. The emergence of BIM technology will trigger an innovation in the construction industry, and also provide new ideas for the teaching reform of the course "Building Construction Technology".

BIM is the abbreviation of Building Information Modeling. It has the ability of dynamic simulation and information processing, and has high application value in the teaching of architecture courses. BIM technology can turn written information into a three-dimensional construction scene to prevent the disconnection between theory and actual operation. The application of BIM technology can improve the integration degree of construction engineering, promote the change of its production mode, and improve the construction efficiency and quality. BIM technology originated from the United States. It can analyze whether the structural components of the building and their locations are reasonable, so as to find out the problems in the construction design in advance, adjust the design plan in time, and prevent equipment installation difficulties, structural openings and other phenomena. This technology can achieve the purpose of virtual construction through computer software, intuitively control the construction process, and can be operated repeatedly without risk and destructiveness. It can eliminate the hidden dangers of construction safety, prevent safety accidents, and facilitate the construction team to adjust the construction progress and reduce costs. Virtual construction can simulate various types of construction environment, such as living area, office area, road construction, etc., so that construction personnel can complete the whole construction process according to construction specifications and dynamic drawings, and avoid quality problems.

2. THE INFLUENCE OF BIM TECHNOLOGY ON THE COURSE OF CONSTRUCTION TECHNOLOGY

BIM technology uses virtual building model to systematically master the construction information of each link in the construction process, so as to reduce the problems in the construction process. Applying BIM technology to actual construction technology courses can make use of the characteristics of BIM technology's close to reality appearance and observability to transform theoretical knowledge content into intuitive dynamic courses, so that students can intuitively feel the actual construction site. Compared with previous lectures, it is more conducive to students' understanding of the application of BIM technology in construction technology and arouse students' enthusiasm for learning, Let students take the initiative to participate in the learning of architectural technology courses, drive students to actively explore and think, better complete teaching, and achieve better teaching results.

3. APPLICATION STATUS OF BIM TECHNOLOGY IN CONSTRUCTION ENGINEERING

3.1 Design visualization based on BIM

According to the construction design drawings, the BIM model of the building, structure and installation of the construction project is created by using the series of software such as Revit, and the dynamic visual display of the design results is carried out, so that the parties involved in the construction project can intuitively understand the design scheme, evaluate the feasibility of

construction and find out the possible problems in the future construction in advance, so as to solve them in advance and avoid the loss of human and financial resources in the future. For example, the BIM model of a building construction project at the construction stage can directly reflect the construction characteristics of this stage: site layout, structural components and structural selection, structural space layout, construction machinery layout, pipeline arrangement, material stacking area, etc.

3.2 Collision detection based on BIM

Through professional collision detection software, the BIM models of building, structure, installation and other BIM models created can be used for comprehensive collision detection and analysis of structural components and pipelines, so as to intuitively see the mutual position of building internal components and the direction and position of building components and equipment installation pipelines. In order to find out the problems in the design in advance, reduce the design changes in the construction, and avoid the problems such as opening in the structure and difficulty in equipment installation after the construction.

3.3 Optimize construction scheme based on BIM construction simulation

BIM technology will simulate the whole construction process and construction site in a dynamic three-dimensional mode, which can find potential problems in time and further optimize the construction, including site layout, personnel arrangement, material preparation, mechanical equipment, space conflict, safety problems in construction, etc. At the same time, the 4D construction simulation also includes the mobilization and demobilization time of temporary buildings and large mechanical equipment (such as cranes, scaffolding, construction elevators, etc.), which helps to save costs and optimize the overall schedule.

4. APPLICATION OF 4BIM TECHNOLOGY IN THE TEACHING OF "CONSTRUCTION DRAWING READING"

4.1 Teaching of "construction drawing reading"

The teaching of "construction drawing reading of construction engineering" is the key content for students to learn the courses related to construction technology, which has an important significance for promoting students' future learning. Many secondary vocational schools attach great importance to the systematic teaching of the content of "construction drawing reading of construction engineering" in the teaching of construction technology courses, and strengthen the training of students. However, throughout the previous "construction drawing reading" teaching, the construction drawings used in the teaching process have always been two-dimensional, which is difficult for students to form an intuitive feeling. The students are still in the learning stage and have no actual construction experience, so they can not be verified according to the two-dimensional architectural construction drawings Imagine and learn from international construction. Therefore, teachers need to add BIM technology in the teaching process of "construction drawing reading" to improve students' learning.

4.2 Practical application

Preparation stage. Teachers can divide the specific course content into phased objectives. When assigning specific tasks to students, teachers can effectively divide the course content according to the actual course content, and divide the course content in the degree of difficulty; Use BIM technology in course teaching, create building project models for different course contents, and apply it in the actual teaching process, so as to prepare for class. In the preparation stage, teachers need to have a detailed understanding of the actual course content, effectively combine the actual course content with the building model, and let students feel the learning of building construction drawings more intuitively through language description and actual observation.

Implementation stage. In the course of teaching, teachers can first use BIM technology to show the building model to students, so that students can have a systematic feeling and observation of the building model, let students first contact with three-dimensional and simulated course content, and then use two-dimensional drawings to carry out systematic knowledge teaching to students. The effective combination of BIM technology building model and two-dimensional drawings can enable students to fully understand the role of building construction drawings and effectively improve classroom teaching results.

Evaluation stage. In the evaluation stage, teachers can use various evaluation methods such as group evaluation and student mutual evaluation to evaluate students systematically. During the evaluation stage, teachers can use BIM technology to enable students to complete the evaluation of the ability to read the drawings of building models, systematically compare the evaluation results with BIM technology information, and also use BIM technology to conduct process evaluation to improve students' learning efficiency in an all-round way.

5. PRACTICE OF 5 BIM TECHNOLOGY IN THE TEACHING OF BUILDING CONSTRUCTION TECHNOLOGY

With the continuous promotion of the reform of higher vocational education, how to stimulate students' enthusiasm for independent learning, achieve zero integration between class and post, and form an integrated teaching model of doing and learning will be the goal of teaching reform. For Building Construction Technology, the biggest difficulty in achieving this goal is how to enable students to complete typical work tasks by hand. Due to the characteristics of building construction, such as large body size, complex construction environment, and large potential safety hazards, students have fewer tasks to operate, and cannot achieve the goal of learning by doing, and cannot well stimulate students' interest in learning. Virtual construction based on BIM technology will solve this problem well. First of all, virtual construction will make the work tasks that could not be realized manually can be virtual through computer software.

To be realized, students are required to learn basic knowledge independently and understand new construction materials, new technologies, new processes, new equipment and the latest specifications through virtual completion of work tasks. Solve some basic professional skills such as component positioning, construction process, temporary facility installation and construction requirements, construction process determination, personnel, machinery and material preparation, site layout, etc. Then we can achieve the goal of learning by doing and learning by doing. At the same time, through the completion of groups, we can also exercise students' social ability in team cooperation, communication and other aspects. Secondly, through the virtual construction of actual engineering projects, students will have an intuitive understanding of the engineering construction situation, realize the close combination of the classroom and the post tasks on the construction site, have a clear understanding of the future work positions. At the same time, through repeated virtual construction, students can try to choose different construction processes, different construction machinery, different materials, etc., and analyze and compare their impact on the construction quality, progress, cost Safety and other aspects are conducive to a deeper understanding of construction technology. Finally, it will stimulate students' enthusiasm for autonomous learning and cultivate students' ability to find problems, analyze problems and solve practical problems.

6. CONCLUSION

The extensive application of BIM technology in building construction technology has brought new development approaches to the development of building construction technology. Many technicians will use BIM technology to conduct systematic virtual analysis of the whole project before the overall construction of the building, and understand the construction content of the building construction project. In view of the future application of BIM technology in building construction technology, it is necessary to systematically impart theoretical knowledge to students in the specific teaching process of BIM technology at the current stage, so that students can realize the importance of combining BIM technology with practical operation in building construction technology. This paper takes the relevant course of "construction drawing reading" in construction technology as an example to systematically explain the development of the actual course, in order to provide reference for relevant industry personnel.

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