

Research on the Course System of Architectural Design Based on Bim Technology

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Abstract: the Major of Engineering Management is Engineering Management and Engineering Cost. under the Impact of the Concept and Technology of the Information Age, the Reform of Information Management Education for Engineering Managers is Imminent. as the Basis of Bim Technology Application Ability Training, Universities Need to Actively Explore the Mode of Integrating Bim Technology in Professional Education. Based on the Four Main Platform Courses of Engineering Management Technology, Economics, Management and Law, This Paper Explores the Reform Scheme of Personnel Training for the Master's Course of Engineering Management. Planting Provides Reference.

1. Introduction

Building Information Modeling (Bim) Technology Uses Digital Means to Build Virtual Buildings on Computers. Virtual Architecture Provides a Single and Logical Building Information Database. Bim is an Integration Process from Design, Construction to Operation Coordination and Based on Project Information[1]. There Are Five Characteristics of Visualization, Adjustment, Simulation, Optimization and Mapability. in the Field of Architecture, This is the Second Technological "Revolution" after Cad, and It is the Product of the Development of Information Technology in the Construction Industry. after the Proposal of China's Ministry of Housing, Urban and Rural Development, the Ministry of Housing, Urban and Rural Development, Which Accelerated the Application of Bim Technology of the Project during the 12th Five Year Plan, and the Outline of Informatization Development of Construction Industry from 2016 to 2020, Clearly Put Forward the Construction Industry Information during the 13th Five Year Plan. Transformation is an Important Part of the Development Strategy of Construction Industry. in February 2017, the Comprehensive Affairs Bureau of the State Council Issued the Opinions on Promoting the Sustainable and Healthy Development of the Construction Industry (Guobanfa [2017] No. 19 Document), Accelerating the Application and Maintenance of Planning, Investigation, Design, Construction and Building Information Modeling (Bim) Technology. the Comprehensive Application of the Whole Project Will Realize the Data Sharing and Information Management of the Whole Life Cycle of the Construction Project. under the Guidance of Relevant Policies of the Ministry of Housing and Urban Rural Development, More Than One National Administrative Region and City is Promoting the Development and Application of Regional Bim Technology, and Has Issued Relevant Bim Technology Application Guidelines. Fully Implement the Relevant Bim Technical Guidance Strategy Issued by the Ministry of Housing and Urban Rural Development. the Application of Bim Technology in Construction Industry is Developing Rapidly.

2. The Necessity of Bim Training in Engineering Management

BIM originated in European and American countries and is the product of information society. In order to meet the needs of information technology development, governments around the world are committed to the development of BIM related policies and specifications, as well as the application

and promotion of BIM Technology[2]. At present, in China's construction sites, from the government to the owners, are actively promoting and applying. The successful implementation of BIM Technology will inevitably change the current project management mode from point to area. As the cradle of training engineering professionals, higher education must bear the training burden of the talents needed for BIM development in the construction industry, and must keep up with the pace of BIM development in the industry. Engineering management professional education, the traditional two-dimensional ranking, from the training needs of industrial BIM engineering management talents, according to the education reform of engineering management professional BIM, the problems that must be faced through the transformation of education mode. Pure software skills education, engineering technology and management education mode, and a big platform and data for the huge industry of large engineering industry. In combination with the implementation of the national “ties and roads” initiative, BIM Technology has been deeply integrated into the infrastructure industry, meeting international standards. China's higher education needs to be adjusted in time. We should pay attention to the training of master's technical talents from class to practice.

Table 1 Advantages and Functions of Bim Technology in Different Stages

Stage	Advantage	Effect
Design phase	Detect and analyze problems, and the system will automatically identify and modify them	Guarantee the smooth development of the project
Construction stage	BIM Technology provides detailed materials and information to meet the needs of all participants	Achieve collaborative work
Operation stage	Maintaining consistency of information at all stages	Improve the efficiency of project management and construction

3. Analysis on the Training Status of Bim Technicians in Engineering Management

As a revolutionary force in the construction industry, BIM is widely recognized by the construction industry worldwide[3]. However, the existing curriculum system of engineering management and engineering cost is mostly based on the original professional catalog. With the popularization of civil engineering management information technology, the current situation of international talent training in the field of technology management in China is not satisfactory, which is not suitable for social development and enterprise needs. Based on the BIM application in the whole life cycle of engineering, this study has practical ability, training talents, engineering application ability training, using the concept of system engineering, the reform of theoretical courses and practical education of engineering management specialty. Through curriculum reform, guidance methods and training mode, universities at home and abroad carry out BIM talent training in engineering management major. Based on the needs of industrial development, the research of Bim in China is in a rapid development stage, which is basically divided into two levels: the first level focuses on professional construction. Second, in the construction of engineering management courses in higher education institutions, BIM is involved in the research. There are two main approaches: one is to provide BIM courses separately, and the other is to integrate BIM into one or two courses. The course arrangement of these two methods focuses on introducing students into BIM basic concepts and BIM software. In the whole project life cycle, the role of BIM is ignored, while the use of operations. At present, the following problems exist in the training of BIM talents. In terms of short-term universities, BIM education can not be widely carried out in a short period of time, which requires in-depth enterprise cooperation. Secondly, BIM teachers are insufficient. The knowledge system of BIM is interdisciplinary and needs the help of many teachers. Due to the limitation of each teacher's BIM application level, it is difficult to cooperate with professional knowledge system. The third specialized university and the comprehensive university have different training objectives and characteristics, and the BIM knowledge system has different coverage and learning requirements in terms of professional knowledge. There are few resources to support BIM textbooks and educational cases. BIM education material system based on professional characteristics and training objectives. Fourth, the integration of BIM Technology in the existing

curriculum system increases the difficulty of students' learning[4]. The training courses of the fifth major are being modified, and the teaching modes of various courses have been basically modified. It is difficult to provide BIM with part of the course content by reducing the class time. The sixth BIM is not specific software, but a series of software technology. According to the existing basic laws, it is difficult to form an organic knowledge system by decomposing the complex BIM knowledge system and integrating it into the curriculum system of all levels of engineering manager.

4. Building Bim Technical Ability Training Model of Engineering Management

4.1 Cooperation of Bim Technology and Engineering Management Related Courses

As a technical operator, refer to engineering management, engineering cost and other related disciplines. BIM Technology is not specific software. It includes BIM based architectural design, structural design, green building (energy saving, sunlight) analysis, equipment design, 3D calculation and billing, project management and bidding tools, and project virtual construction. At present, AR / VR simulation and other technologies are divided into four knowledge systems: engineering technology, economics, operation and law[5]. At present, there is no law related to Bim in China, so the courses related to BIM include engineering technology, economics and management. Engineering technology courses include engineering drawings and CAD, building structure and identification, engineering mechanics and structure, building mechanical engineering, civil engineering construction technology, etc.; economic courses include engineering economics, engineering measurement and catalog evaluation. Construction project evaluation courses, management courses include engineering project management, engineering cost management, and other courses. Generally speaking, there is a specific correspondence between BIM Technology and project management route: the 3D modeling technology of BIM, the education of engineering drawings and CAD, in order to support the structure and identification that can be used, building equipment engineering is established. Some teaching based on two-dimensional plan can improve the teaching effect more intuitively and concretely; civil engineering construction technology integrates the four-dimensional virtual construction and conflict detection technology for BIM of construction organization and other routes, and students' fully recognized engineering project assistance can build process, construction sequence, construction method, understand construction plan and other problems of different majors[6]; engineering project Management, engineering cost management and other courses, for progress and cost dynamic analysis, BIS 4D progress plan; engineering measurement and pricing courses can directly teach you 3D calculation based on Revit.

4.2 Analysis on the Comprehensive Mode of Engineering Management Courses and Bim Technology

4.2.1 Some Theoretical Courses of Bim 3d Technology to Help Students Develop Cognitive Ability

The training of BIM technical talents needs to be implemented in stages. To build a systematic and comprehensive education method is the core of university education curriculum reform. First of all, students should be aware of BIM Technology. BIM Technology must be transplanted to the theoretical foundation courses of the first and second grades. With the help of three-dimensional model platform, the basic core line of engineering management field (engineering drawings or CAD, residential buildings, construction machinery, etc.) has the penetration of some teaching BIM Technology, the problems that can be solved by weak intuition, the spatial structure brought by the existing two-dimensional plane basic education, can not understand and recognize the experience of students' BIM Technology and BIM Technology benefits[7]. The advantage of 3D visualization guiding students is to learn BIM Technology and improve their interest in learning. After that, based on the original course design, some new BIM 3D model design tasks are added to train students to apply BIM software and basic modeling functions.

4.2.2 Construction of Bim Education Platform and Systematization of Engineering Management Professional Knowledge

The thorough application of BIM Technology in the whole life cycle of architectural design, bidding, construction, operation, etc., makes the value of Bim in construction engineering management more and more obvious[8]. Future BIM engineers must be able to complete the full life cycle of the project. Although BIM Technology is used to manage the communication and exchange between upstream and downstream enterprises, the capability training of BIM is really not the research of one or two software. The existing courses of engineering management, technology, economy and management are independent of each other. They are “their own business.”. The courses are not closely and systematically linked. It is impossible to realize the mutual connection and progressive knowledge of each course. Students only need to pay attention to learning BIM knowledge or software systematically. It is difficult to adapt to the requirements of engineering management industry after graduation. The effective way to solve this problem is to use BIM data integration platform to build a course system based on the instance of BIM application. Through case engineering, the relevant knowledge units and knowledge points are integrated to highlight the application value of Bim in the whole life cycle. In order to improve the ability of simple modeling, we can develop adult BIM management talents through the practice of enterprises.

4.2.3 Construction of Practical Education Model Based on Bim Technology

The specialty of engineering management has obvious characteristics of generality, logicity, technicality and practicability. The four main knowledge systems of engineering management major are less related, which are related to the poor students' overall grasp of knowledge, understanding of knowledge and comprehensive ability. Many universities also realize this through practical teaching links (experiments, study period, design, etc.) to ensure the quality of talent training and improve the integration of knowledge points. However, the on-site technical practice outside the school has greater safety, and generally does not accept large-scale engineering company practice. The scale, schedule and management mode of each project are different, so the practical education conditions in the school are limited. The complete engineering practice has no effect on the actual education. The arrival of BIM Technology has opened up new ideas for the production practice of University and university construction specialty. Under the practical education mode of “reality and reality, reality and reality”, many universities combine basic schools with existing training based buildings on campus. The knowledge of the main body, roof, decoration, construction management and many other nodes constitute the physical model of the building. Secondly, with the help of BIM virtual construction, roaming inspection and other information technology, the “comprehensive training foundation of virtual and practical integration” is established. Node knowledge can be dominated by solid-state model, and the construction site can be restored by BIM virtual construction technology to solve the problem of lack of practicability in project management.

5. Conclusion

The virtual scene created by BIM Technology plays a role in the context creation of architectural design theme[9]. It can make students think subjectively in the form of buildings. Using BIM Technology in architectural design education, students can freely feel the advantages and disadvantages of their own design works from the posture of the universe in an intuitive way. Therefore, from the perspective of three-dimensional space, students can learn more effective design methods from design.

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