

Research on Innovative Practice Teaching of Civil Engineering Specialty in Vocational Colleges Based on Bim

Junli Wang

Guangdong Engineering Polytechnic, Guangzhou, Guangdong, China

Email: 26439219@qq.com

Keywords: Bim Technology, Vocational Colleges, Civil Engineering, Innovation and Entrepreneurship, Practical Teaching

Abstract: Since the Reform and Opening Up, China's Modern Construction Industry Has Developed Steadily and Rapidly for More Than 30 Years. with the Large-Scale and in-Depth Promotion of the Construction of New-Type Modern Urbanization in China in Recent Years, the Problems of High Consumption, High Cost Input and Low Income of the Construction Industry Have Become Increasingly Prominent. the Traditional Construction Management Mode is No Longer in Line with the Needs of the Market Economy of the Sustainable Economic Development, Nor Can It Meet the New Development Requirements. under the Active Advocacy of the Relevant Policies of the Party and the State, It Has Become the General Trend to Actively Explore and Promote the Accelerated Development of New Manufacturing Materials, New Manufacturing Processes, New Engineering Technologies and the Realization of New Models in the Modern Engineering Construction Industry. Therefore, the Core is to Use Bim Technology to Carry out the Construction of Innovation and Entrepreneurship Practice Teaching System of Civil Engineering Specialty in Vocational Colleges and to Provide New Ideas for the Innovation of Construction Industry.

1. Introduction

With the Development of Contemporary National Economy, the State Has Accelerated the Construction of New Urbanization Projects, Increased the Efforts to Promote the Coordinated Development of Urban and Rural Areas, and Put Forward the Basic Theory of Synchronous Development in the Fields of Urbanization, Industrialization, Agricultural Comprehensive Modernization and Agricultural Informatization. the Development of New Urbanization Requires the Construction of an Intensive, Green, Low-Carbon and Intelligent Smart City[1]. Develop Industrial Green Energy-Saving Buildings, Strengthen Green Engineering Construction, Realize Green Energy-Saving and Low-Carbon Emission Reduction in the Whole Process, Realize Green Production with Low Consumption, Environmental Protection and High Efficiency, Vigorously Support and Promote Production Technology Innovation and Management Mode Innovation of Green Building Industry, Promote Industrial Green Building Construction, Develop Advanced Modern Industrial Production Mode, and Make Green Energy-Saving and Low-Carbon Emission Reduction Industry Become China's Construction Industry Continues to Develop a New Economic Growth Point.

2. Construction Background of Innovation and Entrepreneurship Practice Base

2.1 Bim Technology Overview

BIM architecture is a complete digital language expression of the physical and functional structure characteristics of engineering construction facilities, a complete text description of the physical and functional structure characteristics of engineering construction facilities, a shared building knowledge information resource, which realizes the whole life cycle and long cycle engineering information resource sharing of the whole building, and is widely used in architectural

design, construction It is a new type of information application technology. Its extensive application and development need a kind of information technology support. Its key technology must be application software[2].

2.2 Innovation Value Brought by Bim Technology

The important role and technical value of BIM engineering technology in the field of construction technology has been widely recognized by the industry in a wide range of the world. For the whole construction industry in China, the extensive application of BIM engineering technology in the construction stage is likely to save construction costs, speed up progress, ensure quality and other aspects of the enterprise It plays an important role in promoting.at the same time, the in-depth promotion and application of BIM Technology will bring great application value to promote various innovative technology development modes of modern construction equipment industry in China[3]. It can be used to promote the continuous improvement of engineering technology innovation ability of China's construction industry, effectively help to improve the early sustainable implementation and process controllability of the construction project, reduce the repeated rework of the construction process, and improve the process collaborative work management efficiency in the construction and construction stages.



Fig.1 4d Construction Simulation Demonstration

2.3 Innovation and Development Trend of Bim Technology

At present, from the application of BIM information technology application practice results, it can be seen that the application of BIM Technology alone has become less and less, and more application is to integrate BIM information technology with other general professional information technology, general enterprise information system technology, management information system and other technologies, so as to play a greater application value. Therefore, the application of “BIM +” can show the application characteristics of “BIM +”[4]. It is embodied in five different aspects: Service Application in diversification stage, integrated service application, multi angle service application, collaborative service application and popularization service application.

3. The Necessity of Bim Technology Application in Civil Engineering Teaching

The arrival of the digital and information age has brought many new challenges to the construction industry. BIM Technology provides an optimized path to solve the problems of complex construction, high cost, long construction period, etc[6]. and also puts forward new requirements for civil engineering specialty in formulating talent training objectives. BIM Technology has the characteristics of visualization, simulation, plotting and optimization. Applying BIM Technology to the teaching process of civil engineering courses can not only stimulate students' interest in learning, but also enable students to simulate the real situation through BIM Technology in the absence of practical conditions, take building information model as the carrier, highly restore the building, simulate the whole process and management of building construction The mode achieves the effect of “what you see is what you get” (see Figure 1), greatly improves the teaching efficiency, enables students to understand professional knowledge more thoroughly through BIM Technology, and firmly grasp relevant working skills. Based on BIM Technology,

civil engineering courses can further enhance students' ability in design, construction and management, and then improve students' comprehensive quality to meet the needs of enterprises for talents.

4. The Current Situation of Innovation and Entrepreneurship in Colleges and Universities At Home and Abroad

4.1 Entrepreneurship Education Abroad

Training a batch of innovative enterprise talents has gradually risen to the important height of the contemporary national talent strategy, and is also one of the important development means to continuously improve the comprehensive national strength of contemporary Chinese enterprises. As early as 1972, in the special report of “learning to survive”[7], UNESCO clearly proposed that the quality education of entrepreneurs should gradually become a basic quality of citizens. In the past 20 years, entrepreneurship education in the world has been gradually valued by governments of all countries. The education of excellent entrepreneurship talents in more than ten countries, such as the United States, Britain, France and Japan, has been widely extended to junior high school or even primary school.



Fig.2 Installation Demonstration of Curtain Wall

4.2 Entrepreneurship Education in China

At present, the innovation driven entrepreneurship education in Vocational Colleges and universities in China is in full swing. The development of innovation driven entrepreneurship education and teaching has begun to take shape, but there are still many problems: the form of innovation and entrepreneurship education is relatively simple, has not yet formed a certain scale, and the training mechanism is not perfect. the teaching system of innovation technology entrepreneurship education in domestic enterprises is not perfect, and it is still in the primary stage of education, so it is urgent to gradually rise to the level of education theorization and subject education.

5. Bim Based Practical Teaching System Construction Strategy of Civil Engineering Major in Vocational Colleges

5.1 Ccultivate Campus Innovation and Entrepreneurship Culture and Concept, and Push Forward Innovation and Entrepreneurship Basic Education

Colleges and universities of construction technology should pay more attention to the establishment and cultivation of good educational services and concepts for innovative and entrepreneurial talents on campus. To a great extent, the reasons for the low entrepreneurship rate of young entrepreneurial college students in China are their low recognition of entrepreneurs and high risk of innovation and entrepreneurship[8]. Therefore, it is very important to build a sound culture of innovation and entrepreneurship activities in schools, so that students can really immerse themselves in a good environment of innovation and entrepreneurship, and stimulate the enthusiasm of innovation and entrepreneurship.

5.2 Improve Innovation and Entrepreneurship Teaching

The overall design of innovation and entrepreneurship practice curriculum system and professional teaching practice link must first correctly bear the development concept of colleges and universities, combine the professional and technical education of Construction Science in Vocational Colleges with the innovation and entrepreneurship practice education in vocational colleges, and train the architectural integration of students while constantly training broad students to use the basic theoretical knowledge of construction Practical application of thinking ability and comprehensive ability to integrate different disciplines.

5.3 Take the Road of Combination of Production, Learning and Research with the Development Orientation of Meeting Market Demand

In fact, the cooperation between schools and enterprises is an effective way to combine the production, learning and research of colleges and universities. After a long-term practice inspection, the cooperation between schools and enterprises is not only one of the important means for enterprises to maintain the good development of innovation and entrepreneurship base in vocational colleges, but also the main activity place for enterprises to cultivate the ability of students in vocational colleges to carry out innovation and entrepreneurship practice activities[9]. The school organically combines the teaching of entrepreneurship theory base, practice base and modern science and technology research, encourages independent innovation, encourages students to carry out independent entrepreneurship learning in the practice and entrepreneurship base of the school or actively contact relevant enterprise organizations to carry out targeted research and independent learning, enhances the effect of practical teaching such as innovation and entrepreneurship, and cultivates Cultivate students' innovative consciousness and practical ability.

5.4 Actively Participate in Various Competitions of Bim Technology Application

Actively participating in various BIM Technology Application competitions can also improve students' enthusiasm for learning. Through the competition, students can not only improve their BIM application ability, but also strengthen the communication with students from other schools and enterprise personnel, increase their knowledge and understand the development trend of BIM Technology [5]. Teachers can summarize the loopholes in teaching and adjust the teaching content reasonably by guiding students to compete. Students of Shenyang City College have participated in the “bim5d competition for building software skills certification of national colleges and universities”, “2018 BIM bidding competition of national middle and higher education institutions” and “BIM application skills competition of Liaoning construction colleges” for many times, and achieved excellent and different results in the competition.

5.5 Establish Bim School Enterprise Alliance

The establishment of deep cooperation between universities and enterprises can play an important role in personnel training, curriculum construction, increasing employment and realizing the coordinated education of production and learning. Shenyang City College has established school enterprise cooperation with a number of domestic architectural design institutes, research institutes, real estate development enterprises and other units. The purpose is to work with enterprises to study the specific way of introducing architectural information technology into traditional professional courses teaching, formulate talent training programs with architectural information technology capabilities, guide students to start their own businesses and arrange their employment based on scientific and technological innovation projects, so as to help Liaoning Province The development of provincial construction industry provides strong support. Based on the principle of “opening, cooperation, innovation and sharing”, the university enterprise cooperation establishes a platform for cooperation in administration, production, learning, research and use, promotes closer cooperation between universities and enterprises at a deeper level, guides University researchers to carry out research and development activities and scientific and technological services in accordance with the needs of enterprises, and realizes personnel training and industry by combining

engineering with learning, building secondary colleges and project-based teaching The seamless connection between the needs and the establishment of a new mechanism of school enterprise cooperation for sustainable development.

6. Conclusion

Considering the current development trend of the construction industry, combined with the actual situation of civil engineering talents training in vocational colleges, a practical teaching system suitable for the construction specialty is formed, especially the innovation and entrepreneurship practical education system. With the development of BIM Technology, it is necessary to reconstruct the innovation and entrepreneurship practice teaching system of Civil Engineering Specialty in vocational colleges to meet the market demand.

References

- [1] Alcínia Z. Sampaio. (2019). Proposal of Curricular Program to Introduce BIM in a Civil Engineering School. *Innovation, Engineering and Entrepreneurship*.
- [2] MU Biao. (2018). Research on Students' Entrepreneurial Ability. *The Theory and Practice of Innovation and Entrepreneurship*.
- [3] Adriano Stadler, Anne M. J. Smith. (2017). Entrepreneurship in vocational education: A case study of the Brazilian context. *Industry & Higher Education*, vol. 31, no. 2, pp. 81-89.
- [4] Loveder P. (2017). Australian apprenticeships: trends, challenges and future opportunities for dealing with Industry 4.0.
- [5] Hendra Hidayat, Syaiful Islami. (2017). Developing an Entrepreneurship Module by Using Product-Based Learning Approach in Vocational Education. *International Journal of Environmental & Science Education*, vol. 12, no. 3, pp. 1097-1109.
- [6] Xu Yanbing, Li Jie. (2018). On the Construction of Practice Bases for Innovation and Entrepreneurship Education. *The Science Education Article Collects*.
- [7] Yang H, Xiao F. (2017). Research on Innovation and Entrepreneurship Education for College Students of Electronic and Information Majors.
- [8] MA Xiaolong. (2018). Exploration of "Three All" Idea in Education of Innovation and Entrepreneurship in Local Universities of Science and Technology. *Journal of Higher Education*.
- [9] Sui G, Liang B, Jia H. (2017). Study of the undergraduate student's innovation and entrepreneurship training strategy.