Research on Cultivation Model of Professional Talents of Engineering Cost Based on BIM

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Abstract: As a hotspot in the field of construction engineering, BIM technology has been highly valued by the government and industry. The working model of engineering cost post will also change dramatically, which requires universities to renew their thinking and change the Cultivation model of professional talents of engineering cost to meet the requirements of the development of the times. This paper analyses the necessities, principles and methods of talents cultivation of engineering cost based on BIM to give some references for the relevant researchers.

1. Introduction

Nowadays, China's construction industry began to pay more attention to the application of BIM technology, mainly to design companies, and gradually extended to construction units [1]. As a consulting think tank of Engineering management, engineering cost talents with both engineering cost expertise and BIM operation skills in engineering cost consulting industry are regarded as the backbone of promoting the development of BIM. However, contrary to expectations, the shortage of BIM talents in the field of engineering cost consultation has become a shackle hindering the rapid development of BIM. The reason is that BIM operation requires executives to have dual technical abilities of computer programming and project management. However, the training mode of separation of engineering cost and computer information system in universities cannot provide a complete knowledge system for BIM personnel training. The resulting discrete knowledge Island hinders the large-scale output of BIM operational personnel. Therefore, colleges and universities urgently need to develop and improve BIM education programs and courses in engineering cost specialty, and train professional talents to support the sustainable development of BIM technology in engineering cost consulting industry. Engineering cost specialty is a new specialty, which emerges under the background of the development of construction industry, decoration industry, real estate industry and so on. At present, the development of teaching reform in Colleges and universities is not compatible with the training objectives. A large number of cost majors lack practical ability, and their employment concept and skills are vague. With the rapid development of BIM technology and concept, the training of BIM technicians of engineering cost specialty in colleges is facing great challenges. This requires us to learn from the existing research results of foreign countries and combine with the actual situation of colleges and universities, explore the training mode of engineering cost professionals in universities Based on BIM technology, cultivate advanced applied talents in engineering cost that adapt to the whole life cycle of the construction industry, vigorously promote the construction of BIM talent team in China, and realize the informatization of the construction industry [2].

2. Necessities of Talents Cultivation of Engineering Cost Based on BIM

BIM technology occupies a pivotal position in the field of construction in our country, which brings about the transformation of the mode of construction cost work, and also leads the adjustment of the training mode of engineering cost talents in and universities nowadays. In order to standardize the application of BIM technology, BIM Standard Compilation Group Based on engineering

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construction industry standards has been established in the Institute of Architectural Standard Design. The edition of this standard also indicates that BIM technology will be more popular. Big and medium-sized enterprises have strong awareness of applying BIM technology. As far as Jiangsu, Zhejiang and Shanghai are concerned, they have been successfully applied in several large-scale projects. Using BIM model to realize database association can not only be used to realize collision inspection and virtual construction, but also help to realize the whole process cost control, save labor and time costs, and ensure the quality of the project to ensure that all software enterprises are in line with industry trends, develop BIM software, and promote it in enterprises and campuses through various training and competitions. With the gradual maturity of BIM technology and the support of national policies, the construction industry is undergoing historic changes. It is a general trend to apply BIM in the whole industry. As a major role in the whole life cycle of construction, the cost of construction is directly affected by BIM technology. Universities with huge changes in working methods as training cost-skilled personnel also need to adapt to this situation. The trend is to constantly reform teaching methods in Colleges and universities throughout the country. Many colleges and universities have listed technology as the focus of the reform and development of architecture specialty, and actively organize teachers and students to participate in relevant training for this purpose. Colleges and universities offer relevant courses and establish training bases to prepare for the training of engineering cost skilled personnel who master technology [3].

3. Principles of Talents Cultivation of Engineering Cost Based on BIM

The development of BIM technology in China is basically the same as that of all new IT technologies [4]. It conforms to Gartner's HPCE Cycle model, which describes the process from birth to maturity of a technology. Judging from the law of the model, the development of BIM technology in China has gone through a period from early application development to mass media publicity and then to the surge of providers nowadays, and it is ready to enter the peak period of expansion. Therefore, the BIM curriculum design should also correspond to the development trend of BIM technology, that is, to take the engineering cost specialty as the outline, to take the BIM operation education as the basis, to gradually upgrade the BIM nested education which is generally suiTable for engineering cost specialty to the personalized BIM professional education.

The training goal of BIM talents of engineering cost is to master the professional skills of engineering cost first, and then the professional talents of BIM operation technology. BIM is an assistant tool for engineering cost personnel practicing. Therefore, in the course design, the education of engineering cost expertise should be based, while the education of BIM operation skills should be the outline. Finally, the engineering cost professionals with solid engineering cost expertise and BIM operation skills should be realized. In response to the characteristics of BIM information integration, coherence should be emphasized in the design of Engineering Cost Specialty to avoid the disjunction of BIM in different cost specialty skills. In the course design of engineering cost specialty, the basic courses of architecture, construction and engineering cost are run through, which makes the undergraduates keep in touch with BIM ideas and technology in the four-year Engineering Cost Specialty education, and understand the BIM application ideas and methods between different disciplines and interfaces. In engineering cost consulting service, BIM plays a dual role of guidance model and execution software for cost consulting work. Therefore, BIM personnel of engineering cost are required to understand BIM theory knowledge and have BIM practice ability. Accordingly, the BIM curriculum design of Engineering Cost Specialty in Colleges and universities should also take into account the cultivation of undergraduate BIM theory and BIM practice, so as to realize the purpose of exporting BIM talents who can work independently to engineering cost consulting industry.

4. Methods of Talents Cultivation of Engineering Cost Based on BIM

4.1 Update Education Concept.

In view of the demand for BIM skills of engineering cost professionals in the construction industry, some universities have reformed the undergraduate course system of engineering cost specialty, which is mainly embodied in embedding BIM technology into existing courses and strengthening the teaching of BIM software. At the same time, drawing lessons from the practical teaching design concepts of developed countries, building a capacity-oriented Workshop Teaching Mode for engineering cost specialty. Combining the corresponding relationship between the competency standard system of cost engineers in China and the curriculum system of higher education, the BIM curriculum system guided by professional competence has been formed, and the practical teaching mode of workshops guided by competency standard has been established and implemented, including the workshops of figure recognition and calculation, bidding and contract management, feasibility study and project financing, and the workshops based on construction information model. Workshop on Investment Measurement. The practice teaching mode has changed the situation of decentralized practice outside the school, and the centralized practice inside the school has achieved remarkable results, which further ensures that the talents trained in this major can meet the requirements of industry competence standards. BIM technology belongs to the traditional information processing model, which contains various mathematical information rules and models. Therefore, we need to use the relevant software to complete the optimization of the technical project in the actual cost evaluation of the project. Simply put, it is to transform complex algorithms into simple and efficient ones. For the teachers of engineering cost course, after teaching the students how to calculate, they will teach the students the knowledge of Engineering quota, list and so on, and explain the composition of the price at the same time. For the quota unit price, its composition mainly includes labor, materials, machinery and other parts. For students, after they are familiar with the unit price composition, quota valuation, list valuation and so on are introduced. Meanwhile, the differences and links between quotas and lists are carefully explained.

4.2 Reform Curriculum System.

Using BIM modeling software to build different professional and different use models of Engineering projects, the difficulty is to divide the project models into specialties, set up professional teams for modeling and division of labor, and integrate and share information resources, so the key is the collaborative ability of each specialty. Proficiency in building, structure, electromechanical and other professional modeling techniques is required, and the application software can quickly complete the model drawing. At present, there are many kinds of modeling software and their application fields are different. Each software developer has his own magic power. They positioned the market in the construction of university laboratories and cooperated with curriculum development. The competition is very fierce. The BIM model is used to analyze, simulate and optimize the cost management stage. It can cooperate with the project manager to control the cost. The focus of the work is to simulate the construction progress on site according to the BIM model, to carry out the cost comparison management of human resource machines, and to put forward the cost revision suggestions. The courses of engineering cost specialty include a series of courses such as construction engineering, decoration engineering, road engineering, municipal engineering, installation engineering and so on. Therefore, the application content of BIM in various specialties can be added on the basis of the content of the original courses. Increase the application of BIM modeling technology, so that students have a certain understanding of BIM model construction, increase the ability of map recognition and modeling. In the past, the course design of engineering cost specialty was mainly based on manual calculation, and used valuation software to bid and list. To change the operation form of curriculum design, BIM bill of quantities valuation software should be used to model and valuate, while solving design problems such as structure and pipeline collision, so as to increase student’s practical operation and problem-solving ability. The course requires students to

realize the application management of the whole software from the beginning of modeling to the whole process of construction site management, so as to achieve the realization of the comprehensive application ability of the specialty.

4.3 Strengthen College-Enterprise Cooperation.

A large number of colleges and universities have established off-campus training bases to make up for the lack of on-campus training conditions. In the real working environment, student's professional expertise is brought into full play, and students' BIM professional skills are trained. This kind of practical experience enables students to participate in real construction projects, at the same time, combine BIM technology and the application of BIM technology in the construction cost control organically, cultivate student’s practical ability, truly meet students' graduation needs, and realize the seamless connection between BIM talents and jobs. At the same time, some teachers in Colleges and universities go to the front line of enterprises to hold posts, and they are more exposed to engineering practice activities. They play their respective strengths in theory and practice. In this process, teachers take part in the project cost control of BIM technology related projects, deeply understand the application status of BIM technology in the field of construction engineering, truly feel the development direction and goal orientation of professional construction, and can grasp the correct direction of BIM technical personnel training. Students cannot become professionals who can meet the needs of enterprises if they only study theory in class, but do not enter the enterprises for practical operation. Higher Vocational Colleges in China need to change the traditional teaching methods and build training bases inside and outside schools so that students can go deep into the specific working environment from time to time to carry out technical operations. This will be the main way to improve the development of talent cultivation in the future, aiming at promoting student’s practical ability.

4.4 Enhance Teacher’s Level.

The new demand for project construction puts forward higher requirements for engineering cost professionals. Therefore, university engineering cost professionals need to change the traditional concept of development and use BIM development system to improve themselves. Colleges should play a guiding role in the process of education and teaching. To employ a team of teachers with advanced technical operation ideas and new educational reform ideas to provide fresh elements for the training of technical personnel. The construction of high-quality teachers is the premise to promote the training of technical talents. Therefore, school administrators must recognize the role of teachers. By introducing all kinds of excellent teachers in the talent market, we can promote the virtuous circular development of the whole school's teaching staff. Mobilize the enthusiasm of teachers to learn, so that teachers into the front line of enterprises for post practice, through real practical operation to understand the innovative application of technology. It is not only necessary to improve the teaching level of teachers in the classroom, but also to enable teachers to apply BIM technology in enterprises to practice, and to improve the educational and teaching ability of the whole school by cultivating a team of double-qualified teachers. The traditional curriculum system of colleges and universities in our country mainly uses teachers to teach knowledge according to the texts in the classroom. The training goal of this system is mainly to train students with examination-oriented talents. This has greatly hindered the training ability of engineering cost specialty in universities. Therefore, colleges should make reasonable curriculum system arrangements to ensure that the whole course content, curriculum standards and textbooks are taken into account in the learning arrangements throughout the semester. By expanding student’s guided knowledge in class, students can understand the operational norms of today's technology.

5. Conclusion

With the acceleration process of engineering management, BIM technology is continuously recognized and promoted in the construction industry. In order to cope with the impact of BIM technology promotion on engineering cost professionals in time and train BIM technology

professionals needed by construction industry, it is necessary for colleges and universities to reform the training program of engineering cost undergraduates. Colleges should combine their own characteristics, rationally set up courses, and select appropriate BIM software for teaching. Engineering cost specialty should be closely linked with the construction industry to cultivate new professionals to meet the needs of the industry.

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