

Based on BIM Project Cost Professional Graduate Studies

Dongyang Geng^{1,*}

1. School of Management Science and Engineering Hebei GEO University, Shijiazhuang, China

Weiwei Wang², Xiangmei Yu¹

1. School of Management Science and Engineering Hebei GEO University, Shijiazhuang, China

2. School of Economics and Management, College of Si Fang of Shijiazhuang Tiedao University, Hebei, China

Abstract—The graduation project of engineering cost is one of the most important practical teaching links in undergraduate teaching of engineering cost. It plays a very important role in cultivating students' comprehensive quality and innovation ability. This paper puts forward some problems in the reform of the graduation project of engineering cost, summarizes the strategy of solving the problem of traditional graduation project of engineering cost specialty, and further discusses the reform direction and development of the graduation project of construction cost specialty.

Index Terms—BIM, graduation project, project management, reform suggestion

I. INTRODUCTION

BIM in the construction industry at home and abroad more and more attention, the industry also needs more and more able to master BIM talent, but the scale of personnel training is far from adapting to the trend of industry development. The lack of adequate training of personnel is the biggest challenge for the construction industry to adopt BIM. The lack of BIM talent has become the construction industry application of the technology the biggest limiting factor.

The solution to the BIM lack of talent lies in the university BIM teaching reform [1]. Based on the development trend of foreign and domestic BIM, it is necessary to carry out the reform of personnel training methods to improve the overall quality of engineering cost professionals and enhance the competitiveness of engineering graduates. Therefore, it is necessary to introduce BIM into the teaching system of BIM and realize the breakthrough of BIM education and BIM talents. In addition to meeting industry needs, BIM is also conducive to the absorption of professional knowledge of students [2]. Compared with other

professional, project cost professional in addition to the basic knowledge required to master the professional, more emphasis on communication, coordination, control and practice with the ability to combine [3].

At present, the cultivation mode of civil engineering specialty of various universities in China is still in the traditional professional segmentation. In the mode of individual training, the graduates of civil engineering are lack of effective communication in the graduation project, and the graduation project is limited to the specialty inside [4]. Graduates who are trained by this traditional graduation design mode will still need a longer period of time to adapt to the needs of practical work, and a phenomenon of poor coordination with other professors in the actual project design process. The simulation of BIM and the mutual cooperation among the various disciplines have overcome the drawbacks of the plane drawing and the traditional calculation in a certain extent. In the simulation project, students can improve the ability of three-dimensional cooperation, but also achieve efficient cross-professional learning, Cost of professional teaching requirements and objectives of a high degree of match. In summary, the engineering cost of graduation design reform introduced the BIM is significant [5].

II. BIM DESIGN PATTERNS AT HOME AND ABROAD

Most foreign universities require students to team up to complete the "integrated design project." BIM model of such projects by way of formation can be divided into the direct use of BIM design architectural model, after the completion of the revised model based on drawings, refer to the as-built drawing model, and the combination of four categories, as shown in Table 1

TABLE I
BIM COMPREHENSIVE DESIGN PROJECT OPENING SITUATION OF FOREIGN UNIVERSITIES

	Foreign Universities	Modeling
Based on the completed	Auburn University	Business center

drawing		
Direct Design Based on	The Pennsylvania State University	Multi - project topics
	Port Said University	Office building
Based on as - built drawing	Ferris State University	In the performance hall
	The University of New South Wales	Apartments for the elderly
	The University of Nebraska	Nebraska Performance Center
	Montana State University	
University of Wyoming		
Modeling in multiple ways	National University of Singapore	School teaching building

Regardless of the form, the choice of modeling objects in foreign university projects tends to be small in size, but has a certain complexity and special functional needs of the building, reflecting the BIM in complex engineering design, construction advantages. The whole process of the project, 3D modeling as a basic work for the analysis to provide the basis. Analysis is divided into all buildings are necessary to extract the amount of work, progress simulation, collision checking, energy analysis and other basic items; determined by the modeling object function requirements of the optical and optical analysis, simulation and other special disaster escape. National University of Singapore BIM integrated design combines these three models, covering the rich content, the mode of operation is more mature, and improve the information, with a certain representation and general.

BIM is a high degree of collaboration, which is reflected in: 1) inter-professional collaboration, BIM courses open to multi-faculty, architecture, structure, project management and other students of different disciplines to participate. 2) Inter-school cooperation, some colleges and universities play their respective teaching advantages, organize students to complete a BIM design task. 3) Team internal collaboration, the team developed BIM implementation plan for each participant detailed division of labor, such as BIM managers, modelers, model analysts, model managers and so on. The progress of the project need to record the model based on each coordination process and the resulting model changes, as an important assessment indicators. In contrast, only a few colleges and universities in China to carry out BIM graduation design pilot, and more than a building, structural professional. Such as the BIM graduation design of civil engineering of Yan'an University, requires the use of BIM software such as PKPM and SATWE8 structural analysis; Southeast University and Harbin Institute of Technology BIM graduation design involving construction, civil and engineering management, requiring completion of architectural design, structural analysis, And intelligent drawing and other tasks; Tianjin University and Chongqing University in the construction cost of professional introduction of BIM curriculum design, based on BIM to complete the progress of the plan, the construction plane layout. But overall, the domestic BIM in the construction cost of the professional design of colleges

and universities less. Hebei GEO University is the first to carry out such pilot universities; their experience has a higher reference value. Therefore, this article takes the BIM graduation project of Hebei GEO University as the case analysis, and puts forward the improvement suggestion.

III. THE PROJECT COST OF TRADITIONAL GRADUATE DESIGN OF THE EXISTING PROBLEMS

In the past, the graduation practical teaching link of the engineering cost specialty in the college was divided into two stages: graduation practice and graduation design. Graduation design is for a practical project for students to carry out measurement and valuation of the project to submit a final engineering measurement and valuation of the document, the design time is 8 weeks. Design documents is to require students to build the entire project to calculate and calculate the value of the process through the valuation of the knowledge acquired by the master, and finally need to attach a control of project cost. Although the students through the practice of graduation design process, the ability to use professional knowledge has improved, but the use of this form of design is still there are many shortcomings, the specific performance is as follows:

A. Graduation design arrangements time rush

Engineering cost of traditional professional practice Graduation practice is usually arranged in the last semester of a senior, the first few weeks is the process of student internship in the construction unit, the school's graduation design generally from the beginning of the year in mid-April. Debate practice in early June this time near graduation, so students in this period in addition to design also need to deal with graduation matters. Therefore, the students really put into graduate design a very short time, often cannot complete the whole day to do the graduation design, which is difficult to sum up the system to learn the knowledge, but in the line to finish the graduation design, cannot really up to Less than the cost of graduation project design requirements of the high degree.

B. Graduation Design Content Is Not Comprehensive

Traditional graduation design requires students to do the calculation of the amount of engineering and the list of several, followed by a project cost control measures, two aspects of the content cannot converge, the project cost control is often stereotyped, and cannot be combined with the actual project selected To summarize the control measures, all of the engineering control measures arising from all the consultations. But also because of the short time of graduation design, the scope of the topic is narrow, civil installation cannot be unified design, the lack of new ideas, the design just stay in the theoretical level of calculation, the ability of students after employment and social needs of the students ability to seriously out of line.

C. The Process Management System of Graduation Design Is Imperfect

The traditional graduation design is a single tutor system, process management is weak. In the process of graduation design, the instructor should not only finish the teaching task of lower grade, but also undertake some scientific research projects, and guide the students number, because of their energy is limited, cannot guide the students in time, design progress cannot effectively monitor, Graduation design documents cannot be completed on time, the final stage of the students often engage in assault, or buy online design documents, poor quality of design. The evaluation of the design results of the lack of scientific evaluation mechanism, the reply is up to two students are allowed to reply, making the reply is also a mere formality.

IV. THE ENGINEERING COST OF GRADUATION DESIGN OF THE REFORM STRATEGY

In view of the various defects in the traditional graduation design, the college from the 2002 project management graduation class began graduation design from the topics, content and design cycle, and so have a greater reform, after nearly five years of practice shows that the reform After the students' comprehensive quality training and professional ability training effect is remarkable.

A. Graduation Design Topics With The Actual Project

The graduation project topics "Practical engineering training", two-way selection of design topics in the project management to meet the training objectives on the basis of concerned about the latest developments in the field of engineering construction, pay attention to market-oriented and closely integrated with the actual project, And according to the graduates in the future of the main areas of employment and the needs of employers, the main choice of the two directions of the design issues: construction project bidding documents and the preparation of tender documents. Cancel the past graduates not only for graduation design, but also to write the practice of graduation thesis, to a construction or proposed construction of large and medium-sized construction projects as the background,

the " Practical engineering training ". That is, a real construction project from the project, according to their engineering characteristics, the requirements of the owners, international and domestic legal environment and on-site engineering geology, hydrological and meteorological conditions, the completion of a construction project tender documents or tender documents. Its content involves the construction engineering technology, the project economy, the related laws and regulations and the management knowledge, has strengthened the graduation design the difficulty, the depth, the breadth and the design achievement quantity.

B. The Establishment of A Mentoring Group to Achieve the Phased Joint Guidance of the Vertical Integration

In view of the past graduation design single tutor system ineffective guidance, the college not only focus on the Department of international and domestic engineering cost experience teachers, also hired a design unit, supervision unit has rich practical experience of engineering and technical personnel composition design guidance group , The implementation of staged pipeline, the joint guidance. That is, in the first phase of the design of the design of the construction site, mainly by the teaching of construction management teachers to guide students in the field of cloth specifications; the second phase of the application of measurement and valuation software by teaching measurement and valuation of teachers and engineers involved in the guidance; Phase BIM5D data extraction is guided by the teachers of the building information model. This "flow-shop", the joint guidance of the way not only can give full play to the professional advantages of instructors to achieve optimal allocation of resources, but also to change the past "single tutor system" overwhelmed situation, to achieve the guidance of the vertical integration stage.

V. CONCLUSION

In recent years, our hospital closely around the engineering management professional training objectives, the professional graduation design of this practical teaching links to a greater degree of reform and exploration, and fruitful, has accumulated a lot of experience for similar colleges and universities played a Good demonstration effect. However, graduation design is complex teaching system engineering, is still in constant exploration, will inevitably encounter new situations, and generate new problems. Therefore, our hospital will further deepen the practice of teaching and research, continue to deepen the engineering cost of graduation design reform, and constantly sum up experience to ensure that the organic integration of theory and practice, the students truly meet the needs of the community training project cost talent.

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